accutron ag
Batterien & LED Beleuchtung

LEAD

LITHIUM BATTERIES

ADVANCED PORTABLE & OFF-GRID POWER

LILEAD

LILEAD DESIGNED & MANUFACTURED

FOR PERFORMANC

E & ENDURANCE

Ray-Tech International is a highly respected innovator and manufacturer in the rapidly-expanding Lithium battery market. This relatively new battery technology is at the core of the global race to reduce CO_2 emissions on two significant touch points. Firstly Lithium batteries are a highly efficient method to capture and store renewable energy. Secondly the fast recharging and lighter-weight is an advantage as a portable stored energy source and for electric traction power. Low self-discharge reduces charging expense in stand-by mode and a longer battery life makes Lithium a better investment in TCO (Total Cost of Ownership).

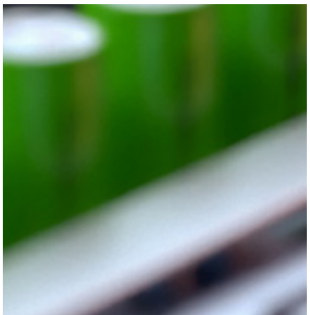
LILEAD branded lithium batteries are the result of Ray-Tech's considerable knowledge and experience gained from design and production of intelligent power solutions. LILEAD products have proven track record for meeting the critical needs of governments, medical equipment makers, military and winning motor racing teams. The company's batteries achieve and often exceeded high bench marks when tested and evaluated by global quality and safety standards organisations. LILEAD is one of the world's most certified lithium batteries.

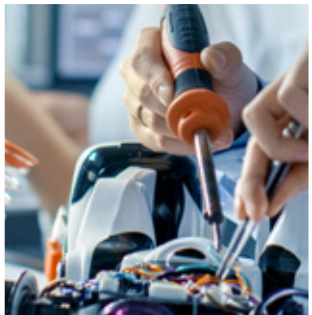
As portable consumer units LILEAD lithium batteries are becoming the preferred choice for many end user applications. As a deep cycle supply power source, the battery offers excellent performance in marine-leisure and off-grid installations. Marine power sometimes calls for both engine cranking and supply energy. LILEAD answer this need with an impressive choice of 12V & 24V Dual batteries. The light-weight power of LILEAD also helps fast-track Powersport users.

LILEAD's offer is always driven by the demands of our customers – we like to think that we listen and respond better than most.







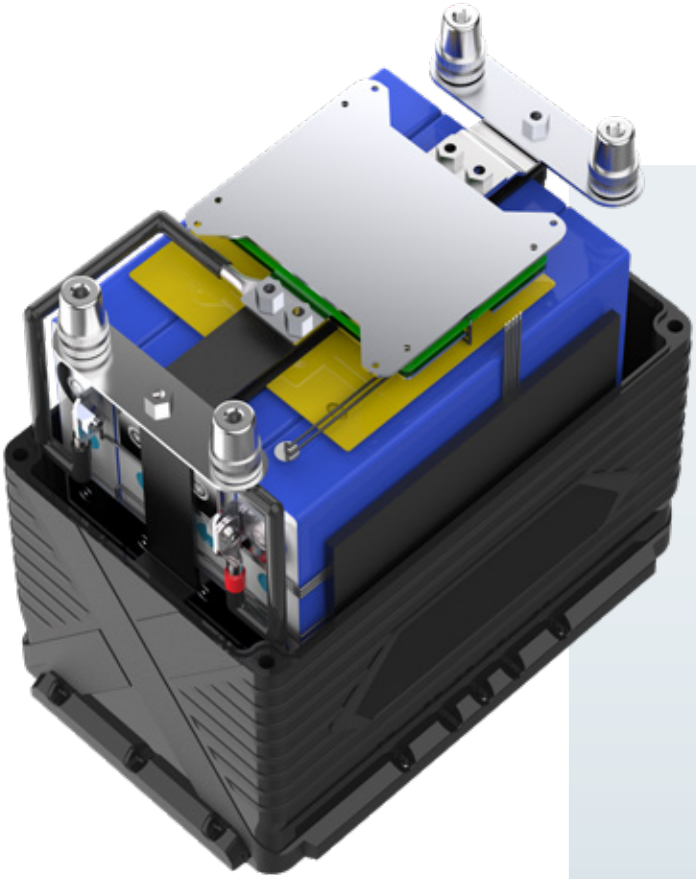



LESSONS IN LITHIU

INSIDE THE BOX

Superior design, manufacted with precision using only the highest quality components.

Results in a lithium battery that is safer, more durable with greater performance and longer life.

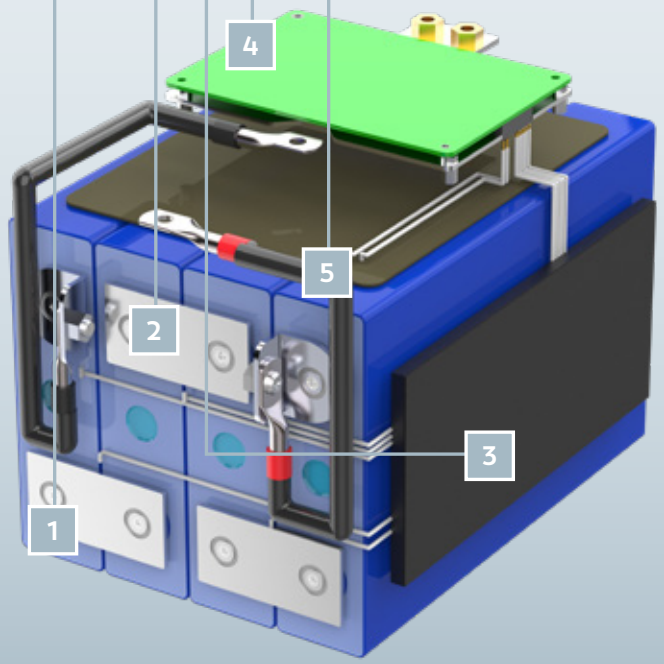


Safety Features

Built to withstand extreme weather conditions and temperature. Battery remains cool at high temperatures with no risk of thermal runaway and danger of overheating or overcharging.

Premium Features

1. Laser welded
2. Intercell plinth connectors
3. Vibration plates between cell and battery box
4. Servicable Battery Management System
5. Robust/temperature tollerent cables



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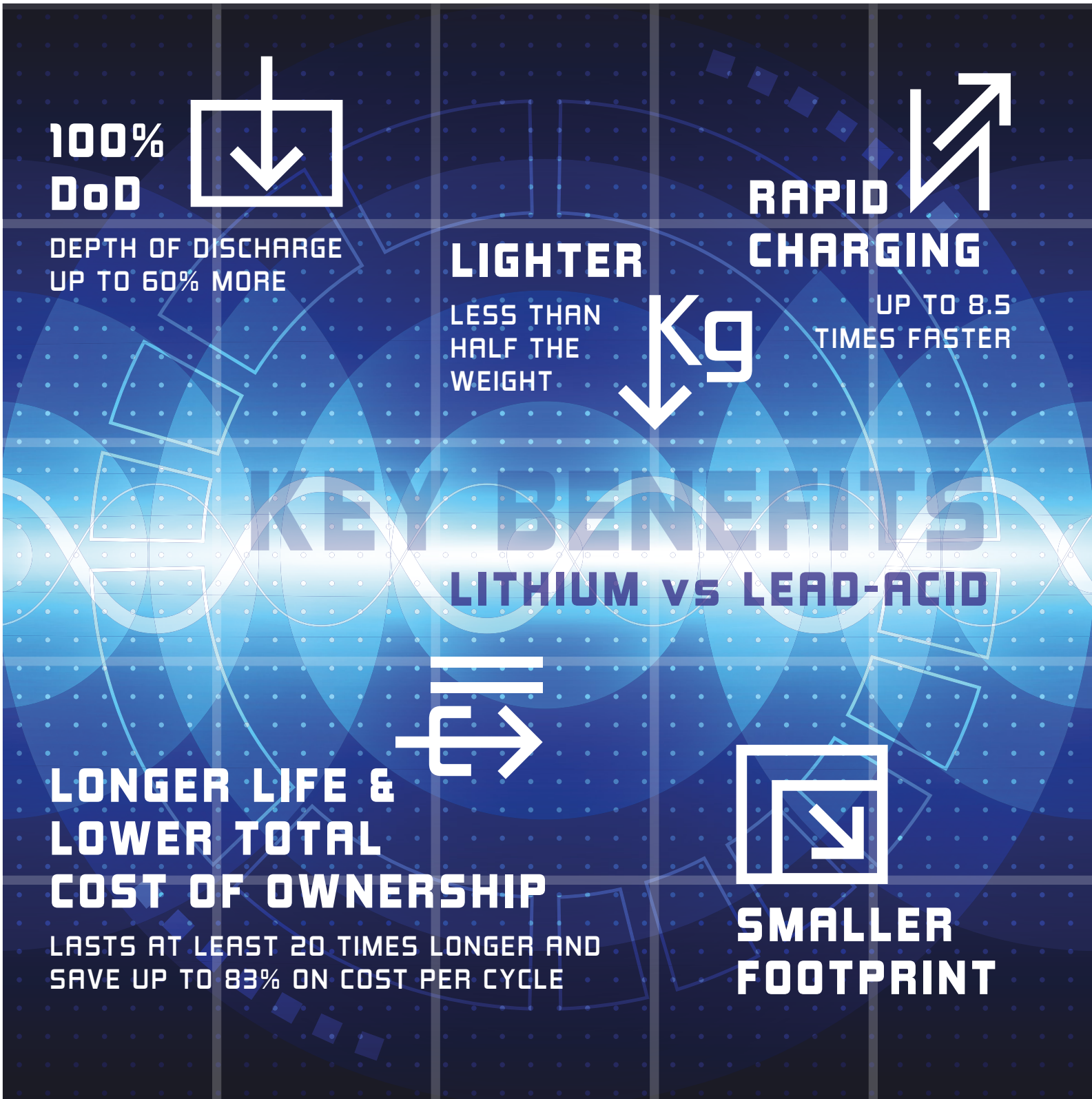

100%
DoD
DEPTH OF DISCHARGE
UP TO 60% MORE
LIGHTER
LESS THAN
HALF THE
WEIGHT
kg
RAPID
CHARGING
UP TO 8.5
TIMES FASTER
KEY BENEFITS
LITHIUM vs LEAD-ACID
LONGER LIFE &
LOWER TOTAL
COST OF OWNERSHIP
LASTS AT LEAST 20 TIMES LONGER AND
SAVE UP TO 83% ON COST PER CYCLE
SMALLER
FOOTPRINT

LESSONS IN LITHI

VOLUME & WEIGHT
LEAD-ACID VS. LITHIUM

	DUAL		DEEP CYCLE	
	LEAD-ACID 100Ah	LITHIUM 110Ah	LEAD-ACID 110Ah	LITHIUM 110Ah
Weight Kg	30.6	12.0	32.0	13.5
Percentage Difference		39%		42%
Volume m3	0.14	0.09	0.12	0.12
Percentage Difference		68%		100%
Benefit/s		Lighter & Smaller		Lighter
		3 batteries fit the same space as 2 x L-A and weigh 24Kg less		Less than half the weight of L-A
Usable energy DoD* (Depth of Discharge)	40%	100%	40%	100%

DoD calculations based on recommended levels for average battery life. Beyond these recommended levels: Deeper discharge = shorter average battery life. Shallower discharge = longer average battery life. *Estimates based on Depth of Discharge at 20°C

UM

PRICE PER CYCLE
LEAD-ACID VS. LITHIUM

	DUAL		DEEP CYCLE	
	LEAD-ACID 100Ah	LITHIUM 110Ah	LEAD-ACID 110Ah	LITHIUM 110Ah
[A] Initial Investment	€180	€765	€276	€525
[B] Cycles	120	3000	700	4000
[C] Cost per cycle [A] ÷ [B]	**€1.50**	**€0.26**	**€0.39**	**€0.13**
Percentage Difference		17%		33%
	Long-term Lead-Acid cost excluding inflation How many Lead-Acid batteries equal the same lifetime of a Lithium Battery			
Number of Batteries	25		6	
x Unit Cost	€180		€276	
Total Cost	€4,500		€1,577	

Approximate prices at the time of publication. Subject to local market, time, season or availability.
Use this formula to compare current costs.

LILEAD LITHIUM BA

	DUAL	DEEP CYCLE
Power In		
Mains charger	✓ With suitable charger	✓ With suitable charger
Alternator	✓	✓
Solar/Wind	✓	✓
Power Out	Starting & Supply	Supply
Engine Cranking	✓	
Supply Power	✓	✓
Applications		
Camping	Motorhome Starter Battery – not recommended as a replacement of vehicle manufacturers specified battery	
Leisure Boats		
Off-grid		
Powersport		

Battery Options	S110	S2450	S200	S24110	D105	D125
Volt	12.8	25.6	12.8	25.6	12.8	12.8
Ah	110	50	200	110	105	125
Wh	1350	1250	2560	2816	1344	1600

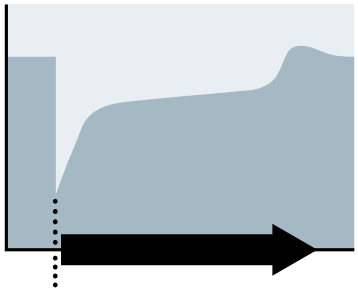
ATTERY OVERVIEW

POWERSPORT		
✓	With suitable charger	
✓		
Starting		
✓		

MC7	MC14	MC30
12.8	12.8	12.8
3.2	5	10
41	64	128

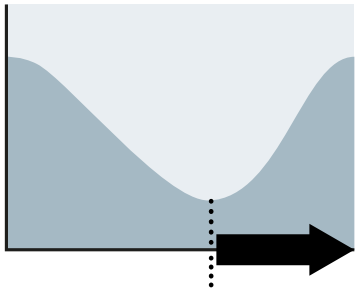
DISCHARGE & RECHARGE PROFILES

Engine Cranking (Starting)



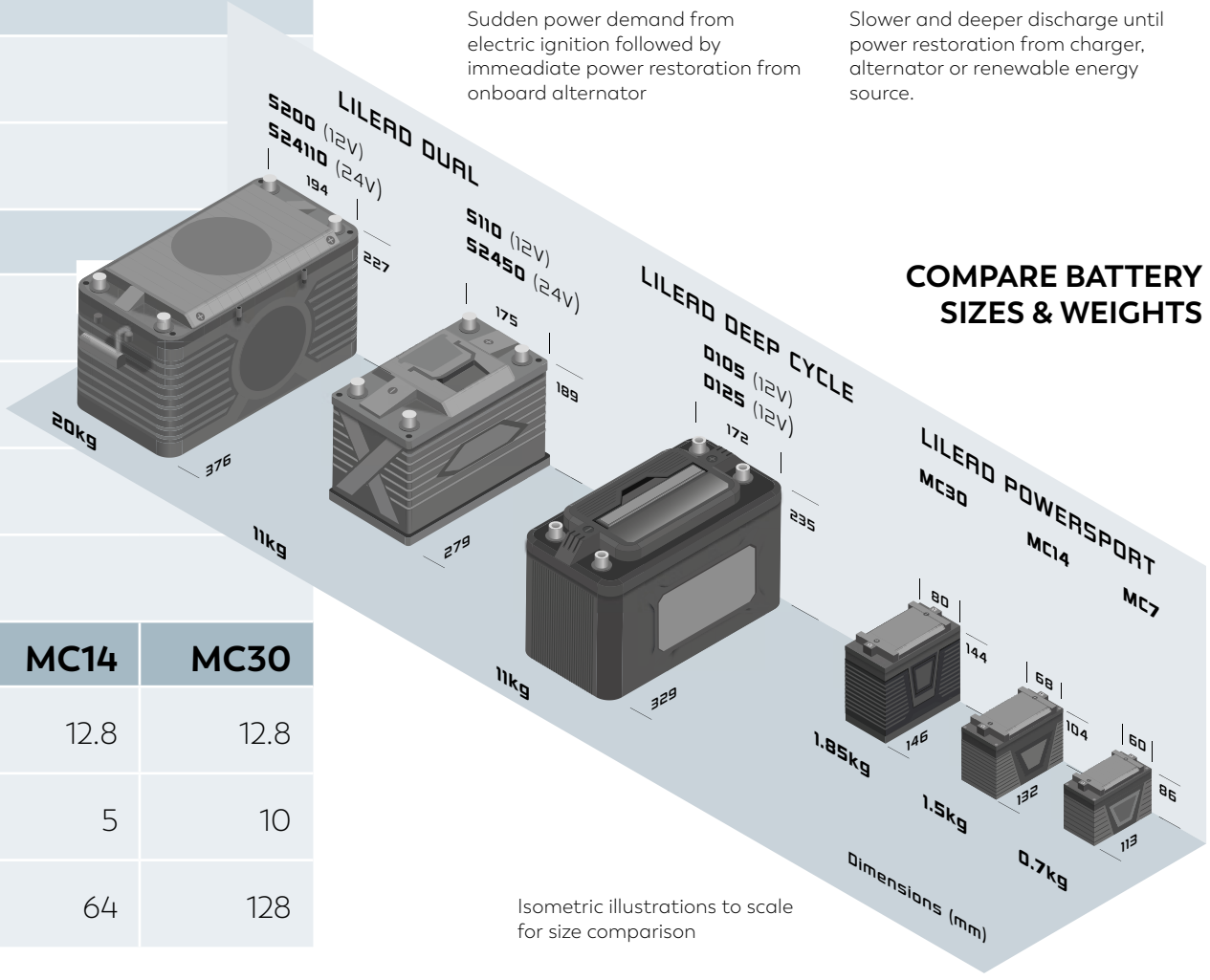
Sudden power demand from electric ignition followed by immeadiate power restoration from onboard alternator

Supply Power



Slower and deeper discharge until power restoration from charger, alternator or renewable energy source.

COMPARE BATTERY SIZES & WEIGHTS



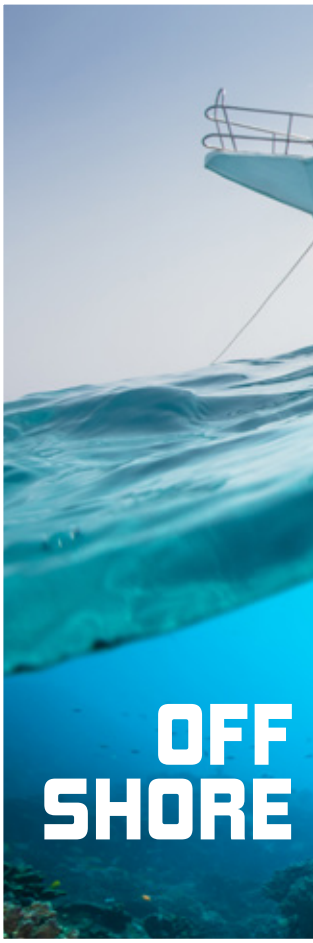
Isometric illustrations to scale for size comparison

DEEP CYCLE SUPP

D105

D125

IP67

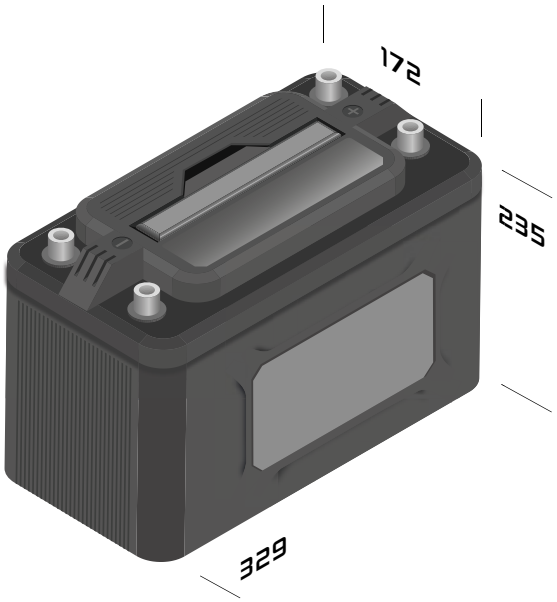


Camping

LY BATTERY

Battery Options	D105	D125
Volt	12.8	12.8
Ah	105	125
Wh	1344	1600

Cycle Life	Average Temp.	Average Discharge	No. of Cycles
	0.5C / 23°C (73°F)	10% shallow	6,000
		100% deep	2,000



mm

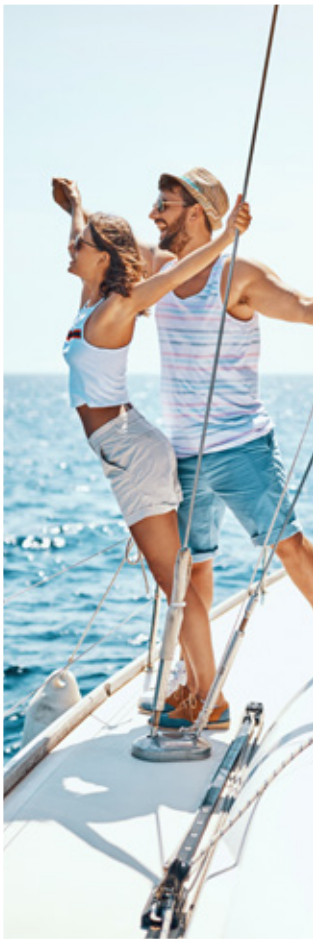
Leisure Boats

Off-grid

D105 11 kg

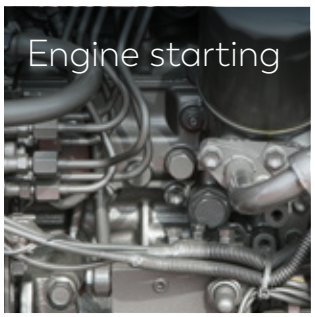
D125 11 kg

12v DUAL BATTER



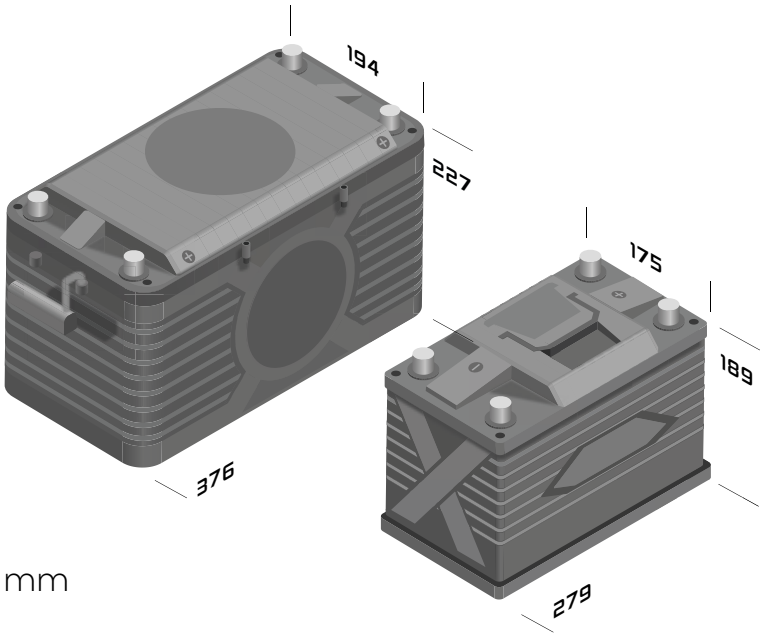
Leisure Boats

Y SUPPLY AND ENGINE CRANKING



Battery Options	S110	S200
Volt (V)	12.8	12.8
Amp Hour (Ah)	110	200
Watt Hour (Wh)	1350	2560
Cranking Amps (CA)	800	1500

Cycle Life	Average Temp.	Average Discharge	No. of Cycles
	0.5C / 23°C (73°F)	10% shallow	4,000
		100% deep	2,000



mm

S200 20 kg

S110 11 kg

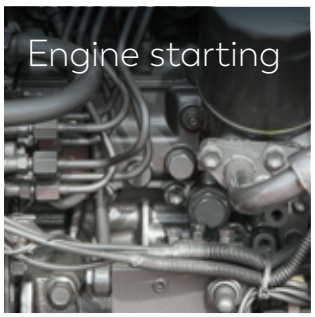
24v DUAL BATTERY

S24110

S2450

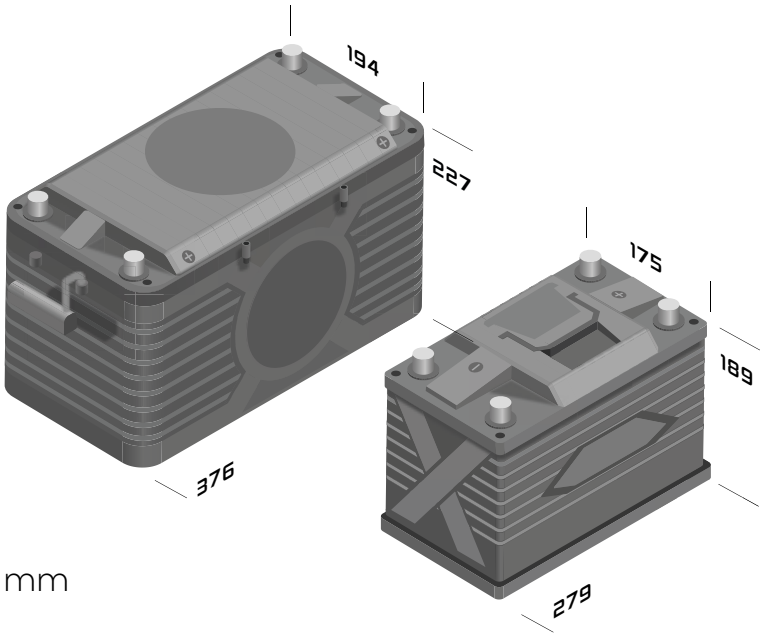
Leisure Boats

Y SUPPLY AND ENGINE CRANKING



Battery Options	S2450	S24110
Volt (V)	25.6	25.6
Amp Hour (Ah)	110	200
Watt Hour (Wh)	1350	2560
Cranking Amps (CA)	800	800

Cycle Life	Average Temp.	Average Discharge	No. of Cycles
	0.5C / 23°C (73°F)	10% shallow	4,000
		100% deep	2,000

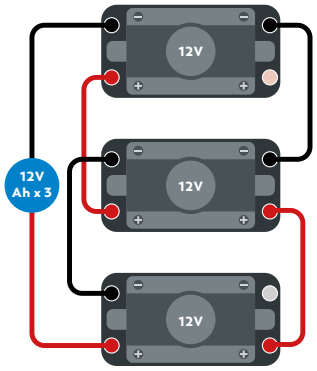
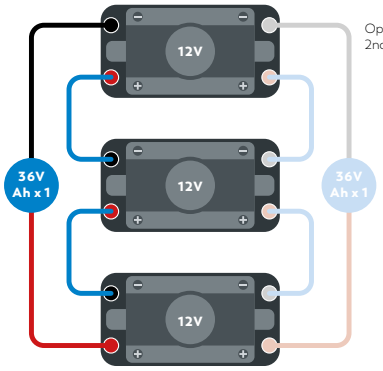
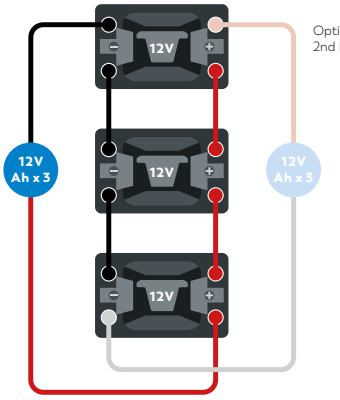
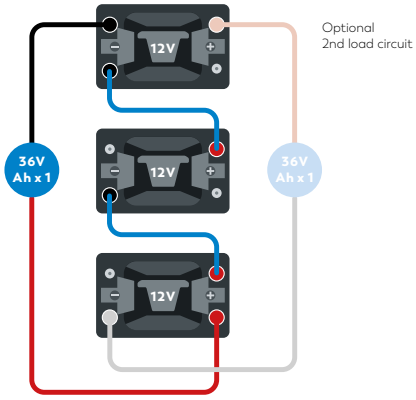
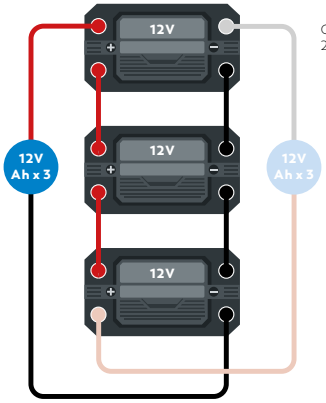
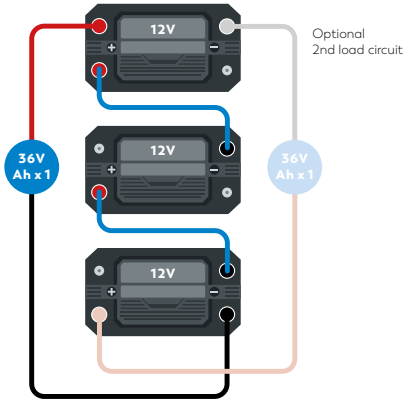


mm

S24110 20 kg

S2450 11 kg

CONNECTIONS PARALL

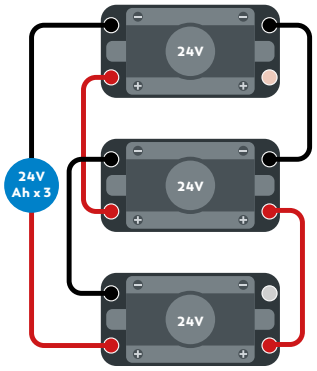
	Diagonal Parallel Connection of 2-4 (max) batteries	HIGHER AMP HOUR	Series Connection of 2-4 (max) batteries	INCREASED VOLTAGE
12V DUAL S200				
12V DUAL S80/110				
12V DEEP CYCLE D105/125				

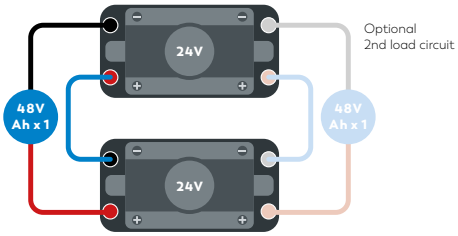
LEL AND SERIES

These connection diagrams are for guidance only. Refer to electrical instructions in your your craft's handbook or consult a certified marine electrian.

	Diagonal Parallel Connection of 2-4 (max) batteries	HIGHER AMP HOUR	Series Connection of 2-4 (max) batteries	INCREASED VOLTAGE

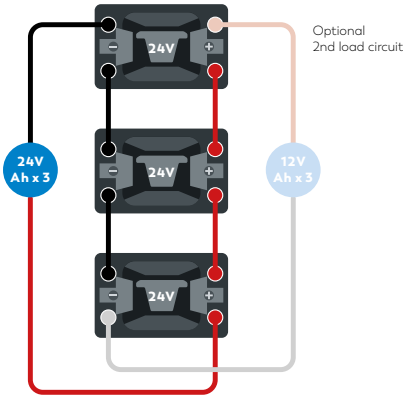
24V DUAL S24110

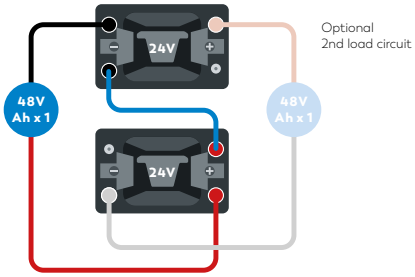




For marine use 48V is the usual maximum meet by series connection of two batteries

24V DUAL S2450





For marine use 48V is the usual maximum meet by series connection of two batteries

Watt-Hour (Wh) Appliance Ratings

A unit of energy measuring capacity of power (in watts) in use over time (in hours).

Appliance Rating Example

	Watts (W)	×	hours (h)	=	Watt hours (Wh)
Lamp	25	×	4	=	100 Wh

Amp-Hour (Ah) Battery Rating

A unit of charge measuring current (in amps) in use over time (in hours).

Battery Rating Example

	Amps (A)	×	hours (h)	=	Amp hours (Ah)
Battery	100	×	1	=	100 Ah

To calculate your energy needs make a list of all appliances and Watt ratings. Multiply by the amount of usage of each item in time over the period between battery charges. A coffee maker will be a higher watt rating than a TV but will be in use for shorter periods.
Calculate the total required Wh and add a 20% safety margin.

Conversions

Battery Charge Output

Calculate how many Wh a battery will deliver (see example below)

Ah	×	Volt	=	Wh
100Ah	×	12V	=	1200Wh

Energy Requirement

Calculate what size battery you need (see example below)

Wh	÷	Volt	=	Ah
1200Wh	÷	12V	=	100Ah

TECHNICAL DATA

Technical Data

		D125	S110	S200	S24110	S2450
Norminal Voltage	Volts (V)	12.8 V	12.8 V	12.8 V	25.6 V	25.6 V
Rated Capacity	Amp hour (Ah)	125 Ah	110 Ah	200 Ah	110 Ah	50 Ah
Stored Energy	Watt hour (Wh)	1600 Wh	1350 Wh	2560 Wh	2816 Wh	1250 Wh
Starting Power	Cranking Amps (CA) (±0°C)	N/A	800 CA	1500 CA	800 CA	800 CA
Voltage Range	Volts (V)	10-14.6 V	8-14.6 V	8-14.6 V	16-29.2 V	16-29.2 V
Cell Type	Prismatic	LiFePO4	LiFePO4	LiFePO4	LiFePO4	LiFePO4
Charge Time	Standard	5.5 hr	5.5 hr	5.5 hr	5.5 hr	5.5 hr
Charge Time by Charger Amp Rating **Fully charged from toal discharge** **Time in hour : minutes** **Higher Amp Charger = Faster Charge Time**	10A	12:30	11:00	20:00	11:00	5:00
	15A	8:30	7:30	13:30	7:30	3:30
	25A	5:00	4:30	8:00	4:30	2:00
	40A	3:15	2:45	5:00	2:45	1:15
	60A	2:15	2:00	3:30	2:00	1:00
	80A	2:00	1:30	2:30	1:30	0:45
Rapid Charge hour : minutes	**100A**	**1:30**	**1:30**	**2:15**	**1:30**	**0:30**
	150A			**1:30**		
Charge Method CC-CV	Standard	25 A / 14.6 V	22 A / 14.6 V	40 A / 14.6 V	22 A / 29.2 V	10 A / 29.2 V
	Rapid	100 A / 14.6 V	100 A / 14.6 V	150 A / 14.6 V	100 A / 29.2 V	100 A / 29.2 V
Max Discharge Current	Continous	100 A	100 A	100 A	100 A	100 A

EEP CYCLE & DUAL BATTERIES

Battery Management System (BMS) Protection

		Deep Cycle	Dual
Balance	Current	40 mA	40 mA
	Volume	3.55V/cell	3.55V/cell
High Temperature (MOSFET temp.)	Protection	85°C (185°F)	85°C (185°F)
	Release	75°C (167°F)	60°C (140°F)
Over-charge	Protection	15.4 V (3.85 V/cell)	15.6 V (3.9 V/cell)
	Release	14.6 V (3.65 V/cell)	14.4 V (3.6 V/cell)
Over-discharge	Protection	9.2 V (2.3 V/cell)	8.0 V (2.0 V/cell)
	Release	10.0 V (2.5 V/cell)	10.8 V (2.7 V/cell)
Short-circuit	Protection	1500 A	3000 A
	Release	Disconnect Load	Disconnect Load

Parallel connection OK if batteries are charged to same voltage before connecting.

Temperature Range

Temperature Range		Deep Cycle	Dual
	Charge	±0 to +55°C (32°-113°F)	±0 to +45°C (32°-113°F)
	Discharge	-20 to +60°C (-4°-140°F)	-20 to +60°C (-4°-140°F)
	Storage	-10 to +35°C (14°-95°F)	-20 to +35°C (-4°-95°F)

Battery State of Charge (SoC)

	12 V		24 V	
	0.1C discharge	OCV	0.1C discharge	OCV
100%		13.4 V		26.8 V
90%	13.19 V	13.3 V	26.38 V	26.6 V
80%	13.17 V	13.3 V	26.34 V	26.6 V
70%	13.15 V	13.3 V	26.30 V	26.6 V
60%	13.05 V	13.2 V	26.10 V	26.4 V
50%	12.99 V	13.15 V	25.98 V	26.30 V
40%	12.98 V	13.14 V	25.96 V	26.28 V
30%	12.94 V	13.1 V	25.88 V	26.2 V
20%	12.79 V	12.9 V	25.58 V	25.8 V
10%	12.61 V	12.8 V	25.22 V	25.6 V

OCV = ???

Standard

IP67	**IP67 Ingress Protection (enclosure)**
Solid Objects	Totally protected against dust
Liquids	Protected against the effects of temporary immersion between 15cm and 1m. Duration of test 30 minutes
UL94-V0	**UL94-V0 Flammability Code**
	Burning stops within 10 seconds on a vertical part allowing for drops of plastic that are not inflames.
UN38.3 PASSED Transport Safety Certified	**UN38.3 Transportation**
	Certified safe for shipping by air
Li-Ion 30	**Recycling**
	Li-Ion 30

POWERSPORT BAT

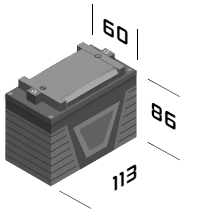
Powersport

TTERY

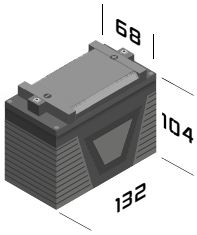
Battery Options		MC7	MC14	MC30
Volt		12.8	12.8	12.8
Voltage Range		10-14.6	10-14.6	10-14.6
Ah		3.2	5	10
Wh		41	64	128
Charge Times hour : minutes	Standard Charger	1A	2A	4A
	Charge Time	5:30	5:30	5:30
	Rapid Charger	**3.2A**	**5A**	**10A**
	Charge Time	**1:30**	**1:30**	**1:30**
Max Discharge Current	Crank	192CA	300CA	600CA
	Max current 60S	96A	150A	300A
	Continous	3.2A	5A	10A

Temperature Range			
	Charge	±0 to +45°C	(32°-113°F)
	Discharge	-20 to +60°C	(-4°-140°F)
	Storage long-rage	-15 to +35°C	(59°-95°F)
	Storage <6 months	-20 to +60°C	(4°-140°F)

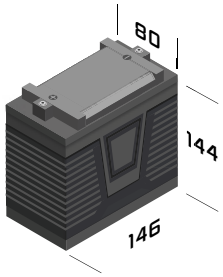
Cycle Life	Average Temp.	Average Discharge	No. of Cycles
	0.5C / 23°C (73°F)	10% shallow	4,000
		100% deep	2,000



MC7 0.7 kg



MC14 1.5 kg



MC30 1.85 kg

ACCESSORIES FOR TH

Battery Drain Protector

Connected between battery and equipment, device detects and automatically shuts off batteries if the voltage drops below 12.6 V for at least one minute. This preserves enough power for engine starting.

USB Mini Charger

Small compact charger ideal for Powersport battries. Connect to portable battery bank or mains power via USB socket/adaptor

E UNEXPECTED

Engine Starter

Start an engine with a dead battery with a simple press for a button inside the cabin. Battery recovers within a minute and starts the engine.