

no one can afford to be outside of this revolution!

Plug into *The Current Future*

f r e e d o m
W O N

Green Energy Solutions & Electric Mobility



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freedom Lite LiFePO4

**LEADING BATTERY ENERGY STORAGE SOLUTIONS AVAILABLE
FROM FREEDOM WON (DATA SHEETS AVAILABLE UPON REQUEST)**

Freedom Lite Home & Business

Residential and Small to Medium Businesses | Lithium storage from 5kWh to 80kWh
52V | Higher Voltage Options Available | Advanced System Interfacing.

Freedom Lite Mini

Entry Level Lithium storage | 2.5kWh & 4kWh | 26V & 52V available
Simple lower cost design for basic but long lasting solution | 26V & 52V available.

Freedom Lite 6U & 7U

19" rack mounted 5kWh and 10kWh modules | 26V & 52V available
Ideal for server rooms & telecoms.

Freedom Lite Leisure

500Wh to 5kWh | 13V, 26V, 52V available
(eg: Golf Carts, Caravans, Boats, Yachts, 4X4 Aux Batteries, etc.).

Freedom Lite Commercial

100kWh to 300kWh | 52V to 850V available
Custom solutions available.

Freedom Lite Industrial

400kWh – 3MWh (or larger) | 52V – 850V available
Custom solutions available.

Freedom StreetLite

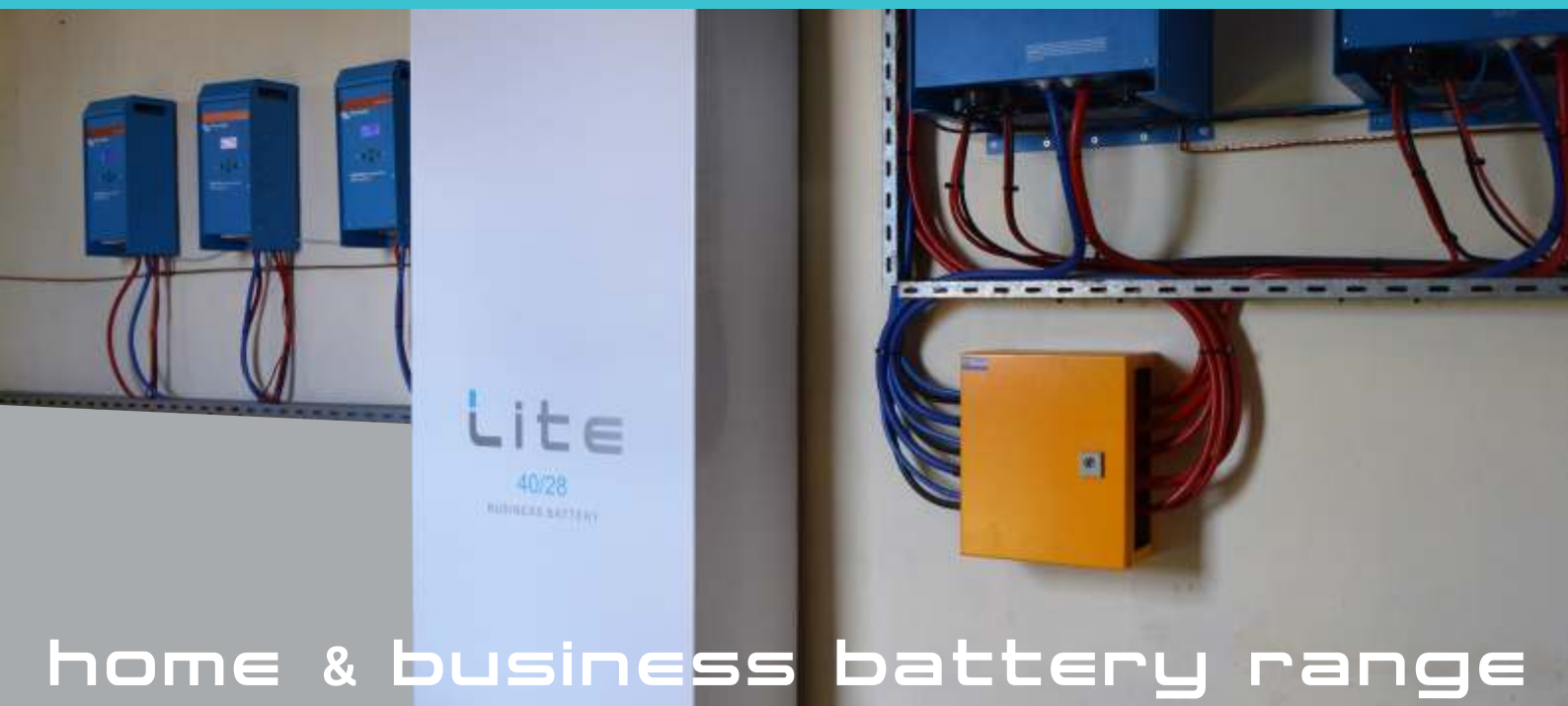
Solar Street Light batteries | Various sizes available
Pole mount with bracket.



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the next generation in energy storage!



home & business battery range

Long Life High Performance Energy

The Freedom Lite Home and Freedom Lite Business range from Freedom Won offers the long overdue next generation energy storage with quantum increase in service life and operational efficiency at a fraction of the life cycle cost compared to other energy storage types.

Expensive?

Lithium Iron Phosphate batteries might seem expensive when compared to lead acid batteries, but this is not true. A proper scenario comparison will reveal that the purchase costs are very similar and any marginal premium for a LiFePO4 battery is more than compensated for by longer life, and very high efficiency. The high efficiency means that far less energy is wasted and that the solar array can be 30% smaller to achieve the same results. In general – because of the high DoD capability and high efficiency the ampere hour rating of a Freedom Lite Battery need only be 35% of a lead acid battery to give the same useful output – this is important when comparing costs between the two technologies.

Compact, Integrated and Attractive

The Freedom Lite (LiFePO4) Home and Business batteries range covers the varying needs of home owners and small to medium business premises with models ranging from the Freedom Lite Home 5/4 to the largest Freedom Lite Business 80/56. The “Home” models are wall mounted offering the ultimate in space saving. All models are integrated with the necessary Battery Management System (BMS) and control circuitry to protect the pack and interface with the separately supplied external inverter/charge unit. The standard enclosure is powder coated with white sides and face.

Control Interface for Compatible Inverter/Charger Units

The BMS provides relay and analogue outputs and CAN Bus for independent control of (and communication with) the inverters and solar charge controllers through a multi core cable and Ethernet cable respectively. Charge and discharge current limits and state of charge values are some of the important parameters transmitted by the BMS.

The Lite is configured prior to delivery for the applicable inverter brand.

Power Interface

Suitably sized positive and negative cables are provided for connecting the 48V DC cables to the inverter and solar charge controller. The DC circuit is protected with a shunt strip circuit breaker.

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freedom lite

home & business battery range

SPEC SHEET	freedom lite							
	Home 5/4	Home 10/7	Home 15/11	Home 20/14	Home 30/21	Business 40/28	Business 60/42	Business 80/56
Total Energy [kWh]	5	10	15	20	30	40	60	80
Energy 90% DoD [kWh] (1)	4.5	9	13.5	18	27	36	54	72
Energy, 70% DoD [kWh] (1)	3.5	7	11	14	21	28	42	56
Current Capacity [Ah]	100	200	300	400	600	800	1200	1600
Max/Cont Current [A] (2)	125/100	125/100	250/200	250/200	375/300	375/300	500/400	500/400
Nominal Voltage [V]	52V, to suit 48V Inverters, min 47V, max 58V							
Weight [kg]	63	116	169	222	328	429	626	823
Dimensions [mm] Height x Width x Depth	736x 508x130	896x 626x146	906x 600x246	1156x 600x246	1656x 600x246	1656x 584x306	1656x 854x306	1656x 1130x306
Enclosure	Aluminium - powder coated white front and sides with aluminium back, rated for indoor use							
DC Connection Cables per +ve & -ve (std length 1.8m)	1x35mm ²	1x35mm ²	2x35mm ²	2x35mm ²	3x35mm ²	3x35mm ²	4x35mm ²	4x35mm ²
External Interfacing	<i>Multicore Cable</i> - Potential Free Contacts Pairs - Remote Enable for Inverter, Charger, Solar Charge Controller, multi purpose programmable output. Analogue Outputs - 0-5V for Charge Current Limit and State of Charge. <i>CAN Bus</i> - RJ45 (Ethernet) Socket.							
Protection	Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault, manual reset. Includes over current, cell under and over voltage, temperature, weak cell detection.							
Human Interface	State of Charge Display (0 to 100%), Error light, Error Reset Button, Serial RS232 Plug for Programming, WiFi Remote Monitoring (optional).							
Warranty	10 years (or 3500 cycles) warranty for average 70% DoD, and max 90% DoD.							
Service Life (3)	15 years (5000 cycles) expected life at 70% DoD (1), 20 years (7000 cycles) at 50% DoD.							

1) DoD = Depth of Discharge max allowable 90% DoD, recommended 70% average daily DoD for extended life, 50% DoD for optimal life.

2) Contact Freedom Won for information on the High Power (HP) upgrade options, should more power be required.

3) End of Life (EoL) defined as cell dropping to 60% of Beginning of Life (BoL) capacity.

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Lithium iron phosphate (LiFePO₄)
the next generation in energy storage

Lithium iron phosphate [freedom lite] batteries have several advantages over conventional lead acid batteries

facts

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High Performance

High energy density: more energy with less weight.

High charge currents (shortens the charge period - essential for a proper solar power system).

High discharge currents (enabling for example electrical cooking on a small battery bank).

Long battery life (up to six times the battery life of a lead acid battery).

High efficiency between charging and discharging (very little energy loss due to heat development).

Higher continuous power available.

Rugged

A lead acid battery can fail prematurely due to sulphation if it is left partially charged, fully discharged, or rarely fully charged for long periods of time. A Lithium Iron Phosphate battery does not need to be kept fully charged, has a wide operating temperature range and excellent cycling performance. They are therefore THE battery for very demanding applications.

Efficient

The typical "round trip" energy efficiency (energy that can be taken out of the battery compared to energy required to re-charge) for lead acid batteries is ~ 70%. For a LiFePO₄ battery it is >96%. The final 20% charge for a lead acid battery is particularly inefficient with inefficiencies of ~ 50% and can take a very long time for the battery to become completely charged. In contrast a LiFePO₄ battery will always achieve >96% efficiency and so can be fully charged more quickly while wasting less energy.

Size & Weight

LiFePO₄ batteries save up to 70% in space and 70% in weight compared to lead acid.

Battery Management System

It is vital that an advanced Battery Management System (BMS) is used to control the battery charging. This is important to actively balance the individual cells that make up the battery and prevent under or over voltage which can otherwise destroy the battery.

It is also important for the battery to be able to communicate with the rest of the system.



typical energy storage solutions

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Residential Off Grid Systems

Total independence - a typical house can run completely from solar power with say a 6kW peak solar array and a 30kWh Freedom Lite battery pack that will last more than 15 years. The system can be sized to any capacity to suit the household demands and can run the house through two to three days of poor weather.

Please refer to Freedom Won's website for more examples.

Residential Backup Systems

Eliminate the power outage frustration without a diesel generator. A 10kWh pack of Freedom Lite cells will operate a household during a power outage for a few hours and then will be charged up again when the power comes back on.

Please refer to Freedom Won's website for more examples.

Telecommunication Tower

The Freedom Lite offers far superior performance to the lead acid batteries that the telecoms companies are presently using.

Please enquire about the Freedom Won range for 19" rack systems.

Power Quality Improvement

Power users on a poor grid infrastructure plagued with dips and spikes can use Freedom Lite batteries efficiently and cost effectively to smooth power supply even on high power systems.

Uninterruptible Power Supplies

UPS systems are notorious for the short life span of the typical lead acid batteries they use, especially if the batteries are kept in a high temperature environment.

LiFePO4 cells are much less sensitive to high temperatures and can happily operate up to 45 degree Celsius with negligible drop in life span or performance. Freedom Lites can stand at full charge without cycling for lengthy periods (20 years +) without deteriorating.

Battery Tripping Units

Electrical sub stations require battery backup to trip the breakers if necessary when there is no grid power. Lead acid cells left at full charge will still deteriorate, which is a common problem with the batteries used to supply these tripping units. Freedom Lites do not deteriorate in such a scenario and only require discharging and recharging once every 6 months.