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SPECIFICATION SHEET- Freedom Lite Commercial HV COMMERCIAL SCALE LiFePO4 ENERGY STORAGE

The following specifications pertain to the **Freedom Lite Commercial** range of High Voltage lithium iron phosphate batteries manufactured by Freedom Won with capacities fitting in above the **Freedom Lite Business** and below the **Freedom Lite Industrial** ranges for use with the ATESS range of battery inverter models as well as other brands using similar battery voltages.

Freedom Lite Commercial	100/70	120/84	140/98 *	160/112 †	200/140	300/210	400/280	500/350	600/420	700/490
Total Energy Capacity [kWh]	100	120	140	160	200	300	400	500	600	700
70% DoD Energy [kWh]	70	84	98	112	140	210	280	350	420	490
90% DoD Energy [kWh]	90	108	126	144	180	270	360	450	540	630
Current Capacity [Ah]	200	200	200	400 (200)	400	600	800	1 000	1 200	1 400
Max. Cont. Charge and Discharge Current (1) [A]	220	200	200	280 (200)	400	600	800	800	800	800
Max. Cont. Charge & Discharge Power (1) [kW]	112	120	143	115	200	300	400	400	400	400
Nominal Voltage (2) [V]	512	602	717	410 (820)	512	512	512	512	512	512
Max. Inverter Cap. [kVA]	120	120	140	120 (160)	200	300	400	400	400	400
Total Weight [kg]	1 040	1 250	1 500	1 700	2 200	3 300	4 300	5 300	6 300	7 400
Height [mm]	2 100									
Depth (from wall) [mm]	350					750				
Length (width along wall) [mm]	1 400	1 850	2 300	2 750	3 200	4 600	3 200	4 100	4 600	5 500
DC Connection – Fly Leads, [no. per electrode] (3) [mm ²]	1x70	1x70	1x70	1x95	1x95	1x120	1x185	1x185	1x185	1x185
Round Trip Efficiency	96-97%									
Enclosure	3mm thick Aluminium, powder coated, tamper proof, indoor use									
External Interface (4)	CAN Bus									
On-board Management	Full battery management system and internal trip protection									
Human Interfaces	On and Off Buttons, State of Charge Display (0 to 100%), Error light, Error Reset Button, CANdapter for Programming and data access with PC, main breaker									
Protection	Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault, manual reset. Protection for overcurrent, cell under and over voltage, temperature, weak cell detection and other critical events									
Battery Chemistry	Lithium Iron Phosphate (LiFePO ₄)									
Cell Form Factor	Large Format ultra-heavy-duty prismatic cells of 200Ah each and 3,2V nominal voltage, fully sealed in plastic casing with bolt on electrode connections									
Battery Cooling	Natural Convection (heat generation is negligible inside the battery)									
Suitable Ambient Temp [°C]	0°C to +40°C									
Extreme Operating Temp [°C] (5)	-20°C to +60°C									
Remote Monitoring	Real time data logging and transmission via WiFi to online portal of key battery information									
Warranty (6)	10 years or 4 000 cycles for average 80% DoD, and max 90% DoD									
Design Life – Cycles	>16 years (>6 000 cycles) expected life at 70% DoD per cycle, >20 years (>7 500 cycles) at 50% DoD									

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Notes to Specification Sheet:

- * **The Lite Commercial 140/98 is not suitable for the ATESS HPS range (the voltage is too high) but it is suitable for the full PCS range .**

 - † **The Lite Commercial 160/112 can be supplied in two voltage options – 410V or 820V. The 410V option is required for the ATESS HPS range of inverters. The 820V option is required for the ATESS PCS500 and PCS630 models. This model cannot be used with the PCS models PCS250 and below.**
1. The maximum (peak) and continuous current and power ratings are the same for the Lite Commercial HV battery range. The maximum values given apply to both charge and discharge. For systems requiring more than 400kW, two or more batteries must be installed in parallel. For example, if a ATESS PCS500 battery inverter is required, the battery system can comprise of 2 x Lite Commercial 300/210 models in parallel.
 2. Higher voltage custom batteries are available on request ranging up to 750V DC (nominal) should this be required for other types of inverters. Note that custom voltages will result in different battery capacities from what is included in this specification sheet – please contact Freedom Won for further details.
 3. Fly Leads 3.0m long as standard, power cable Red = Positive, Black = Negative, conductors in table refer to one electrode i.e. per positive and negative connections. Up to 5m long available at extra cost (must be specified in order). Note that the fly leads exit the battery on the right-hand side near the floor on all the Lite Commercial HV models. This is to suit the bottom entry of the floor standing ATESS inverters. A cable trench is recommended for routing this cable along with all the other cables going to and from the inverter.
 4. Potential free contacts and analogue outputs also available on request for several control features (details on request).
 5. Charging below 0°C not permitted. Extended time above 45°C not recommended for optimal battery life.
 6. See Freedom Won Warranty document for further detail.