freedom WON
PLUG INTO THE CURRENT FUTURE

Li^{TE} Commercial HV

The following specifications pertain to the Freedom Won Li^{TE} Commercial range of High Voltage lithium iron phosphate batteries manufactured by Freedom Won with capacities fitting in above the Freedom Won Li^{TE} Business and below the Freedom Won Li^{TE} Industrial ranges for use with the ATESS range of

	100/80 HV	**200/160 HV**	**300/240 HV**	**400/320 HV**	**500/400 HV**	**600/480 HV**	**700/560 HV**
Total Energy Capacity [kWh]	100	200	300	400	500	600	700
Energy, 80% DoD [kWh][1]	80	160	240	320	400	480	560
Energy, 90% DoD [kWh]	90	180	270	360	450	540	630
Current Capacity [Ah]	200	400	600	800	1 000	1 200	1 400
Max & Cont. Charge and Discharge Current [A][1]	200	400	600	800	800	800	800
Max & Cont. Charge and Discharge Power [kW][1]	112	200	300	400	400	400	400
Nominal Voltage [V]	512	512	512	512	512	512	448
Max/Min Operating Voltage [V]	568/456	568/456	568/456	568/456	568/456	568/456	568/456
Max. Inverter Cap. [kVA]	120	200	300	400	400	400	400
Total Weight [kg]	883	1 760	2 353	3 520	4 400	5 290	6 180
Height [mm]	1 520	1 575	1 460	1 460	1450	1 400	1 460
Depth [mm]	360	370	725	725	725	730	710
Length [mm][5]	1 265	2 460	2 390	2 940	3 490	4 460	4 490
DC Connection - Fly Leads, [no. per electrode] [mm^2][2]	1x70	1x95	1x120	1x185	1x185	1x185	1x185
Round Trip Efficiency	96-97%						
Enclosure	3mm thick Aluminium, powder coated, tamper proof, indoor use						
External Interface	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, USB Plug 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 heavy-duty prismatic cells of 200Ah each and 3,2V nominal voltage, fully sealed in aluminium casing with laser welded electrode connection						
Battery Cooling	Natural Convection (heat generation is negligible inside the battery)						
Suitable Ambient Temp [°C]	0°C to +35°C						
Extreme Operating Temp [°C][3]	-20°C to +60°C						
Warranty[4]	10 years or 4 000 cycles for average 80% DoD, and max 90% DoD						
Service Life - Cycles & Years	> e.g. 16 years (>5 500 cycles) expected life at 70% DoD per cycle, >20 years (>7 500 cycles) at 50% DoD						

Notes to Specification Sheet

The Li^{TE} Commercial high voltage range is available in two variants, namely the HV and HV+. The HV models are suitable for the ATESS **HPS** range of hybrid battery inverters and the HV+ is suitable for the **PCS** range of battery inverters and associated PBD DC charge controllers. The 230/184HV+ model is suitable for both the **HPS** and **PCS** ranges. Note that integration with other inverter brands is feasible – please contact Freedom Won for assistance.

1 The maximum (peak) and continuous current and power ratings are the same for the Li^{TE} Commercial HV and HV+ battery range. The maximum values given apply to both charge and discharge. For systems requiring more than 400kW from the Commercial HV range, two or more batteries must be installed in parallel.
2 Fly Leads 4.0m 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 8m 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 Li^{TE} Commercial HV and 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 (a cable tray is an alternative).
3 Charging below 0°C not permitted. Extended time above 35°C not recommended for optimal battery life.
4 See Freedom Won Warranty document for further detail.
5 Excluding protrusions