

## Li<sup>TE</sup> Commercial HV Scale

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

	100/80 HV	120/96 HV+	140/112 HV+	160/128 HV+	200/160 HV	230/184 HV+	300/240 HV (HV+)	400/320 HV (HV+)	500/400 HV (HV+)	600/480 HV (HV+)	700/560 HV (HV+)
Total Energy Capacity [kWh]	100	120	140	160	200	230	300	400	500	600	700
Energy, 80% DoD [kWh] <sup>1</sup>	80	96	112	128	160	184	240	320	400	480	560
Energy, 90% DoD [kWh]	90	108	126	144	180	207	270	360	450	540	630
Current Capacity [Ah] (140/112 HV+)	200	200	200	400	400	400	600(400)	800(600)	1000(800)	1200(1000)	1400(1000)
Max & Cont. Charge and Discharge Current <sup>1</sup> [A]	200	200	200	400	400	400	600(400)	800(600)	800	800	800
Max & Cont. Charge and Discharge Power <sup>1</sup> [kW]	112	120	143	164	200	230	300	400	400(500)	400(500)	400(630)
Nominal Voltage <sup>2</sup> [V]	512	602	717	410	512	576	512(768)	512(682)	512(640)	512(614)	512(717)
Max/Min Operating Voltage [V]	568/456	682/547	780/638	454/365	568/456	639/513	568/456 [780/627]	568/456 [756/607]	568/456 [710/570]	568/456 [681/547]	568/456 [780/638]
Max. Inverter Cap. [kVA]	120	120	140	160	200	230	300	400	400(500)	400(500)	400(630)
Total Weight [kg]	883	1060	1236	1413	1760	2030	2209	2835	4400	5290	6180
Height [mm]	1550	1755	1550	1550	1550	1550	1450	1450	1450	1450	1450
Depth (from wall) [mm]	370	363	370	370	370	370	725	725	725	725	725
Length (width along wall) [mm]	1261	1264	1867	2456	2456	2456	2576	3126	3676	4226	4776
DC Connection - Fly Leads, [no. per electrode] <sup>3</sup> [mm <sup>2</sup> ]	1x70	1x70	1x70	1x95	1x95	1x95	1x120	1x185	1x185	1x185	1x185
Round Trip Efficiency	96-97%	96-97%	96-97%	96-97%	96-97%	96-97%	96-97%	96-97%	96-97%	96-97%	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 <sub>4</sub> )										
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] <sup>4</sup>	-20°C to +60°C										
Remote Monitoring	Real time data logging and transmission via WiFi to online portal of key battery information										
Warranty <sup>5</sup>	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 80% DoD per cycle, >20 years (>7 500 cycles) at 50% DoD										

### Notes to Specification Sheet

The Li<sup>TE</sup> 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 120/96HV+ and 230/184HV+ models are suitable for both the **HPS** and **PCS** ranges. Note that integration with other inverter brands is feasible - please contact Freedom Won for assistance.

If either HV or HV+ is not shown in the table under the model name it means it is not available for the respective size battery. You will need to select the closest size option that is available.

- The maximum (peak) and continuous current and power ratings are the same for the Li<sup>TE</sup> 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 and 630kW for the HV+ range, two or more batteries must be installed in parallel.
- Higher voltage custom batteries are available on request ranging up to 800V DC (nominal) should this be required for other types of inverters. Note that custom voltages may result in different battery capacities from what is included in this specification sheet - please contact Freedom Won for further details.
- 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 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 Li<sup>TE</sup> 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).
- Charging below 0°C not permitted. Extended time above 45°C not recommended for optimal battery life.
- See Freedom Won Warranty document for further detail.