

## PowerCache® – XL (830 kVA / 833 kWh) Datasheet

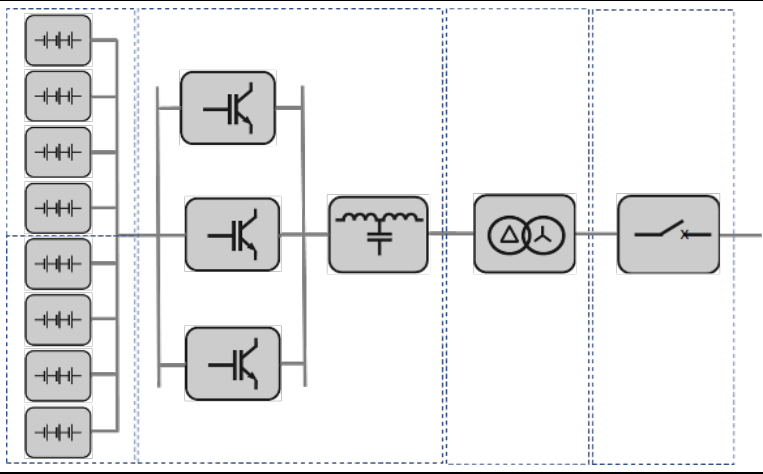
### PowerCache® – XL: Power System Strength Generating Inverter/Battery

PowerCache® is a utility-grade power-system-strength generating inverter/battery system, or a "grid in a box". It enables operators of C&I sites, microgrids and networks to resolve power constraints, and reliably and safely operate an isolated network with up to 100% renewables. The versatile system combines robust, ultra-rapid-response power converters with a high-performance battery and intelligent microgrid control. It provides power system strength incl. inertia, utility-grade fault-current, and low voltage ride-through. It can participate in ancillary services markets if on-grid. PowerCache-XL is expandable to up to 6.6MVA sets and integrates seamlessly with other generation systems on-site.



PowerCache-XL battery cabinet for illustration only – PowerCache-XL is composed of two cabinets

System Performance	
Nominal frequency and voltage	47Hz ... 53Hz, 415V or 400V +10%/-6%
Grid connection	3-phase/3-wire at 510V AC-LV for coupling via a transformer (YNd1) and a controlled breaker (in a separate kiosk) to the LV or HV network
Apparent power rating	$S_{Nom} = 875 \text{ kVA}$ ( $I_{Nom} = 990\text{A}$ ) – the sustained load a single system can serve at $\leq 40^\circ\text{C}$ ambient temperature within the normal range of battery SoC $S_{Nom} = 830\text{kVA}$ ( $I_{Nom} = 940\text{A}$ ) per system for 2-5 LV-bus parallel connected systems
Inverter maximum sustained loading	3-phase: 875 kVA; single phase: $875\text{kVA}/\sqrt{3}$ (other phases not loaded)
Permissible phase load imbalance	Unlimited within the rating per phase +/-
Inverter base power system function	<ul style="list-style-type: none"> <li>Current source (on-grid)</li> <li>Emulated synchronous machine (ESM) (on- &amp; off-grid, various modes)</li> </ul>
Harmonics	Compliant with AS4777.2
Step load capability (islanded or UPS)	Instantaneous load-swing up to 210% $S_{Nom}$ (absorbing to injecting or vice-versa)
Dynamic model & control sampling rate	1 ms (including for inertia, frequency PID and droop model & controls); 140 $\mu\text{s}$ for current limiting and fault current control
Response time to external control signal	< 20 ms (plus any overlaid controller reaction time)
Primary frequency control step response – rise time / settling time	User definable via generator time constant and frequency PID control parameters, typically: 150 ms / 1500 ms
System overload capability	320% instantaneous, 177% for 2s, 104% for 1 minute in 10
Fault current capability	Settable to up to 177% $I_{Nom}$ (3-phase) and 305% (1-phase) for 2s; Fault currents add up for sets made from parallel PowerCache systems
Other power system strength functions	Inertia, voltage disturbance- and fault ride through, direct feeder voltage control (via VT)
Ancillary services functions	FCAS (all services), FFR (2s), Inertia (implemented on the inverter firmware)
Grid AC protection locations	BESS feeder and inter-tie protection of BESS with the site mains or site main generator
Grid AC protection elements	Over/under current/voltage/frequency, RoCoF, VVS, negative sequence voltage, directional power limits, sustained overvoltage, sync-checks, anti-islanding to AS4777, etc.
Application-level protections	Over/under SoC, protection consistency, application alarms, safe states, etc
DC protection	Insulation monitoring, over/under current/voltage, battery OEM protections
System AC-AC round-trip efficiency	> 86% including HVAC-losses, > 89% excluding HVAC-losses (for a typical pattern)
Battery Performance	
Total DC energy / usable energy	833 kWh / 750 kWh at 1C (dis-)charge
Battery chemistry	NMC cathode, $\text{LiNi}_x\text{Mn}_y\text{Co}_z\text{O}_2$ , pouch cell structure
Indicative battery cycle life / full cycle equivalents (FCE)	4,000 FCE at 90% DoD to 70% capacity retention; or 5,000 FCE at 80% DoD to 70% capacity retention
Battery calendar life	>13 years
Battery Protection	Cell-, rack- and system-level supervision, control and protection of current, voltage, power, SoC, SoH, temperature, imbalances, insulation

Interfaces				
System HMI	Web application via VPN, SCADA-style graphics, for local and remote operator access			
Local Data Historian Client	Logging all system actuals, modes, parameters, and features; VPN access			
Cloud-Client GUI and API	Cloud-Client GUI and API via the PaDECS@-Cloud (SaaS), for monitoring and scheduling			
Web-API	Web-API via VPN for 3 <sup>rd</sup> -part system integration			
SCADA	Modbus TCP and/or discrete hardwired alarms and E-Stop			
Mechanical - Inverter System Module (standalone - this cabinet does not include the transformer and switchboard)				
Fire mitigation	Smoke & heat detection			
Cabinet cooling	Forced air cooling, air inlet: 2x large impeller & pleat filter assembly, environmental control			
Cabinet structure	Single-walled, lined with heat & noise protective foam, frame from AS61439 verified modules			
Dimensions and weight	H x W x D = 2,100 mm x 1,460 mm x 1,880 mm (excl. filter cowlings); 2,500 kg			
Mechanical - Battery System Module				
Fire mitigation	Novec® gaseous fire suppression system with a detector tube winding through the cabinet			
Battery Enclosure Cooling	HVAC split cycle system via four door coolers, with central environmental control			
Cabinet structure	Double-walled, four doors			
Dimensions and weight	H x W x D = 2,830 mm x 2,700 mm x 1,880 mm (excl. HVAC cowlings); 10,000 kg			
Environmental				
Humidity	5% to 100% outside; 5% to 95%, non-condensing inside the cabinet			
Altitude	Up to 1,000 m without derating			
Operating ambient temperature	-5° C – 40° C without derating, -20 – 50° C max (inverter); 0 – 45° C (sustained, battery)			
Noise (max. @ 1 m distance)	≤ 65 dBA (excluding compressor and large impellers), ≤ 85 dBA (compressors and impellers on)			
IP Rating	IP54 (inverter system module), IP55 (battery system module)			
Compliances include:				
AS/NZS 4777.2:2020	An equivalent inverter/filter assembly is AS4777.2 certified. Cert No.: SAA192864			
AS 5139	Safety of battery systems for use with power conversion equipment – as applicable			
IEC 61000 (Part 3), EN 61800	EMC emission limits			
AS3000, AS61429	Electrical wiring rules; switchgear assembly standard compliance as far as applicable			
System Configuration – Single PowerCache®-XL				
				
Batteries	Inverter	LCL Filter	Transformer(ext)	Switchgear(ext)
Contact				
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