480kW Power Cabinet - Official Commercial BESS Technical Overview & Datasheet

480kW POWER CABINET - OFFICIAL COMMERCIAL BESS TECHNICAL OVERVIEW & DATASHEET

PRODUCT IDENTIFICATION

The 480kW Power Cabinet represents a Tier-1, utility-grade bi-directional energy storage inverter and power conditioning system (PCS) enclosure. Designed for commercial & industrial (C&I), micro-grid, and EV charging infrastructure applications, this cabinet integrates advanced LFP battery compatibility, liquid thermal regulation, and grid-forming capabilities into a compact, outdoor-rated chassis.

INTERNAL BESS TOPOLOGY

The cabinet houses a modular, three-level NPC (Neutral Point Clamped) power conversion stage with independent DC-DC and DC-AC sections. Key internal assemblies include:

- Redundant IGBT power modules with silicon carbide (SiC) options
- Integrated DC busbar combiner for parallel energy storage racks (up to 8 strings)
- Isolated auxiliary power supply (24Vdc / 230Vac control outputs)
- Dual-channel battery management system (BMS) bridge interface (CAN 2.0 / Modbus TCP)

THERMAL PROTECTION MECHANISMS

Active closed-loop liquid cooling maintains cell and IGBT junction temperatures within ±1.5°C of setpoint across -30°C to +55°C ambient. Features include:

- Redundant circulation pumps (N+1 configuration)
- Loss-of-flow emergency derate protocol (5-second response)
- Frost protection down to -40°C storage (ethylene-glycol circuit)
- Self-cleaning air intake for control electronics

OPERATIONAL ADVANTAGES

- 99.1% peak efficiency (CEC weighted)

- 110% continuous overload capability (1 hour) / 200% for 10 seconds

- Grid-forming (virtual synchronous generator) and grid-following modes

- <20 ms islanding detection and seamless transition to backup power

- Certified UL 1741 SA (Rule 21), IEEE 1547, IEC 61727

TECHNICAL SPECIFICATIONS

Parameter	**Specification**
Rated AC Power (continuous)	480 kW @ 40°C, 440 kW @ 55°C
Max DC Input Voltage	1500 Vdc
DC Operating Range	800 – 1500 Vdc
Max DC Input Current	720 A per cabinet
Rated AC Voltage (line-to-line)	480 Vac (3P + N + PE) or 400 Vac configurable
A	C
5	0
Max Efficiency	99.1% (peak)
Cooling Method	Active liquid cooling (water-glycol)
Protection Class	NEMA 3R / IP55
Standby Auxiliary Consumption	< 80 W

Operating Ambient Temp.	-30°C to +55°C (full power to 40°C, derate above)
Dimensions (W x D x H)	1200 mm x 800 mm x 2200 mm
Weight	Approx. 1250 kg (excluding batteries)
Communication Interfaces	Ethernet (Modbus TCP), CAN 2.0B, 2x DI/DO, 4x AI
Grid Standard Compliance	UL 1741 SA, IEEE 1547, IEC 61727

SAFETY & COMPLIANCE HIGHLIGHTS

- Arc-fault detection per UL 1699B (DC side) and UL 1699 (AC side)
- Type 3R / IP55 enclosure (cable entry via IP68-rated glands)
- Integrated DC contactor (1500Vdc, 500A) with welded contact detection
- Manual service disconnect with visible break
- Third-party witnessed fire suppression readiness (ANSUL or aerosol pre-plumbed)

REGULATORY COMPLIANCE

- UL 1741 (including SA and SB CA Rule 21)
- IEEE 1547-2018

- IEC 62109-1 / -2

- IEC 61000-6-2 / -6-4 (EMC)

- CE, UKCA, RCM (as configured)

RECOMMENDED DEPLOYMENT LAYOUTS

Single cabinet can parallel up to 6 units on a shared 1500Vdc bus, supporting 2.88MW DC-coupled storage blocks. Minimum 1.2m side clearance for service access; top ventilation requires 600mm unobstructed space. Pad mounting with 100mm reinforced concrete base recommended for seismic zone 3.