sonnen Megawatt series C – Small 1 System

1MW / 1MWh Base Performance – Configurable

Minimum Size .5MW / .5MWh

BESS Specification

1. Abbreviation

BESS: Battery Energy Storage System

EMS: Energy Management System

FSS: Fire Suppression System

PCS: Power Conversion System

POI: Point of Interconnection

THD: Total Harmonic Distortion

UPS: Uninterruptable Power Supply

2. Product Overview

The 1MW / 1MWh Battery Energy Storage System consists of 3 Battery cabinets, 1 control & DC combiner cabinet and 1 PCS.

Each battery cabinet consists of FSS including Smoke detector, Heat detector and Aerosol, Liquid cooling system and 8 battery modules in series, each battery module is managed by a set of cell supervision center and composed of 52 285Ah LFP cells. The battery rack is configured to 1P52S*8s and managed by 1 battery monitoring unit. The rated energy of each battery cabinet is 379.4kWH

The control and DC combiner cabinet is a system control center, which is equipped with IPC, monitoring system, Emergency switch, UPS, battery control and FSS control. It provides high-voltage DC bus parallel connection for the battery rack in the system. It also provides the communication interface between system and EMS.

sonnen will provide the following system components as part of the complete BESS scope of supply.

No.	Item description	Qty
1	Battery cabinets	3
2	PCS	1
4	DC combiner and control cabinet	1
5	EMS	1
6	25kVA, 480V/400V AUX supply transformer	1

Note:

- The required 1200kVA, 480V Isolation transformer for the PCS grid connection is to be supplied by Developer. The transformer is to be per IT system (with PCS side AC connection of 3P3W, delta connection).
- All external cabling for DC and AC connection between the sonnen system cabinets and to the transformers to be supplied by Developer. Sonnen will provide the required connectors for Battery cabinets interface. Sonnen will support providing specifications of recommended cables.

3. Product Specification

a. Battery Cabinet Specification

Type Designation	Specification
Cell type	LFP 285Ah
Battery System configuration	1P416S
Multiplying Power	≤1C
Battery capacity (BOL)	379.4kWh
Rated voltage	1331.2 Vdc
Voltage range	1164.8~1500Vdc
Rated charging current	285A
Max. charging current	364.8A
Rated charging power	379.4kW
Rated discharging current	285A
Max. discharging current	364.8A
Rated discharging power	379.4kW
Aux. power 1 for BMS (Voltage range, Power, Rated current)	L+N+PE /220V/110V±10%, 50/60HZ Max. 135W 2.3A
Aux. power 2 for cooling system (Voltage range, Power, Rated current, Inrush current)	L+N+PE /220V ±20%, 50/60HZ Max. 4800W 20A ≤32A, ＜1ms
Aux. power 3 for FSS	24Vdc 0.003W (standby) / 27.3W (alarm status) 0.125mA (standby) / 1.1375A (alarm status)
Dimensions of battery unit (W * H * D)	1390*2348*1344.1mm 54.72*92.44*52.92 inch
Weight	3650±100 kg 8046.8±220.5 lbs
Degree of protection	Type 3R (Battery Cabinet) IP56 (Battery room) IP23 (Electrical room) IP66 (Control Box) IP67 (Battery modules)

	IP26 (Chiller unit)
Cooling method for battery	Liquid cooling
Storage temperature	-30 to 60°C / -22 to 140 °F
Operating temperature range	-25 to 55°C / -13 to 131 °F (discharge) 0 to 55°C / 32 to 131 ° F (charge) built in TMS activated between -25 C and 0 C to allow the battery cells to reach a charging temperature 0 C
Anti-corrosion grade	C5
Relative humidity	0 ~ 95 % (non-condensing)
Max. working altitude	≤4000m ≤13123.4 ft
Seismic level	IEEE 693-2018 Moderate design level
FSS equipment	Smoke detector, Heat and Gas detector, Aerosol, Deflagration panel, Dry pipe (optional)
Communication protocols	CAN, Modbus/TCP
Compliance	UL1973, UL9540, UL9540A, UN38.3, NFPA 855

b. Control and DC Combiner Cabinet Specification

Type Designation	Specification
AC Input Voltage/Frequency	400Vac, 60Hz
AC Output Voltage/Frequency	230V, 60Hz
DC Input/Output Voltage	1500 Vdc
Max. AC Input cont. current	63A
Max. AC Output cont. current	30A
Max. DC Input/Output current	1600A
Max. DC Input/Output Power	1725 kW
Operating temperature	-20 to 50°C / -4 to 122°F
Operating humidity	5%-95% (non-condensing)
Ingress protection rating	IP54*
Dimensions (W * H * D)	800*2000*1200mm 31.5*78.74*47.24inch
Weight	700 kg 1543.24 lb
Compliance	UL508A, UL1741

* Complies to Type 3R enclosure requirements, as evaluated in UL1741 and UL508A certification

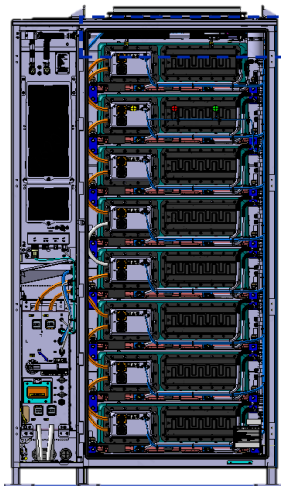
c. PCS Specification

PCS cabinet data	Specification
Nominal AC output power	1200kW @50°C (de-rating above 50°C)
Max. AC current	1604A
Nominal grid voltage	480V (must use upstream grid isolation transformer)
Nominal grid voltage range	422.4V ~ 528V
Nominal grid frequency	60Hz
Max. THD of current	<3% (at nominal power)
DC voltage range	679~1500Vdc
Max DC charge current	1741Adc
Max. DC discharge current	1794Adc
DC side protection	DC load switch + DC fuse
AC side protection	AC circuit breaker
DC overvoltage	Surge arrester, Type 1
AC overvoltage	Surge arrester, Type 1
Dimensions (W * H * D)	2200*2260*1100mm 86.61*88.97*43.30inch
Weight	2600 kg 5732 lb
Degree of protection	Type 3R / IP55 / IP34 / IP34 electronics / air duct / connection area
Operating temperature range	-30 to 55°C (de-rating > 50°C) -22 to 131 °F (de-rating > 122°F)
Storage temperature range	-30 to 70°C -22 to 158°F
Relative humidity range	0 ~ 95 % (non-condensing)
Max. working altitude	<4000m (de-rating above 2000m) <13123 ft (de-rating above 6561.7 ft)
Communication protocols	Modbus TCP
Compliance	UL1741, UL1741SA Rule 21, UL1741 SB, IEEE1547:2018

4. Product Appearance

a. Battery cabinet

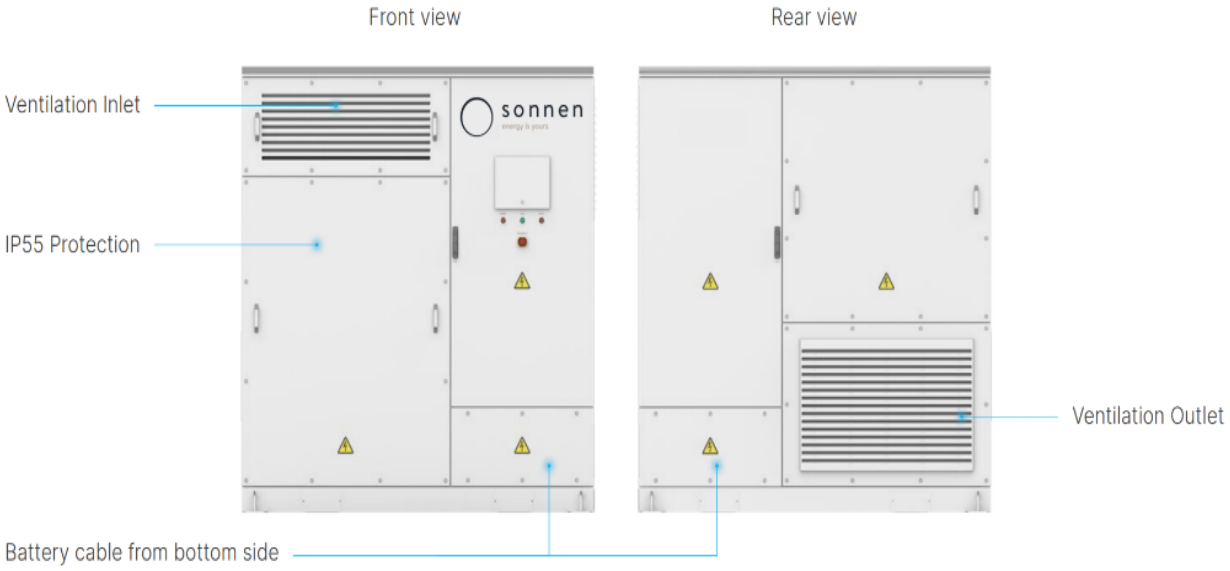
(External view)



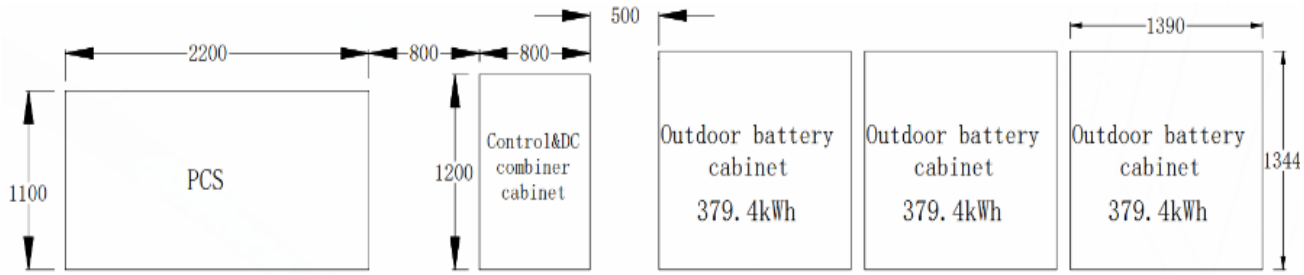
(Internal view)

b. Control and DC combiner cabinet

c. PCS



5. Installation Layout with required clearance space



6. SLD of the BESS