sonnen Megawatt series D – Large 1C

Minimum 4MW-4MWh

BESS Specification

Version 1.3

Date: 4/10/2025

1. Abbreviation

BESS: Battery Energy Storage System

EMS: Energy Management System

FSS: Fire Suppression System

LFP: Lithium Iron Phosphate

LV: Low Voltage

MV: Medium Voltage

MVT: Medium Voltage Transformer

PCS: Power Conversion System

POI : Point of Interconnection

POM: Point of Measurement

THD: Total Harmonic Distortion

2. Product Overview

The complete BESS solution is a 4MW/4MWH system. This system contains 2 BESS containers and 2 PCS skids. The specification for the complete BESS solution is outlined in the following section.

The BESS container is 30ft long with Integrated LFP batteries, liquid cooling system, Fire Suppression System (FSS) and other auxiliary devices. The PCS skid is 20 ft long with integrated Medium Voltage Transformer (MVT) and other auxiliary devices.

sonnen will provide the following system components as part of the complete BESS for this project in its scope of supply.

No.	Item description	Qty
1	30 ft BESS container	2
2	20 ft PCS skid with MVT	2
3	EMS	1

Note:

- This BESS does not include any AUX transformer to support project site auxiliary loads.
- DC cables between the BESS units and PCS skid, PCS skid and POI are excluded
- AC cables between PCS subcomponents and MVT are factory integrated.

3. Product Specification

a. BESS Specification

Battery data	Specification
Cell type	LFP, 280Ah
Total Nameplate Battery capacity at DC side	2 x 2236 kWh*
Voltage range	1123 ~ 1500 V
Auxiliary Power	480Vac/60Hz 3P3L, 230Vac/60Hz, 24Vdc **
Dimensions (W * H * D)	9340*2600*1730mm / 367.71*102.36*68.11inch
Weight	24000kg / 52911 lbs ***
Degree of protection	IP54 / TYPE 3R
Operating Temperature Range	-30 to 50 °C / -22 to 122 °F (> 45 °C / 113 °F derating)
Relative Humidity	0 ~ 95 % (non-condensing)
Max. working altitude	3000m/9842ft
Cooling method	Liquid Cooling
Fire Safety System	Fused sprinkler heads, NFPA 69 explosion prevention and ventilation
BMS communication interfaces	RS485, Ethernet
BMS communication Protocols	Modbus RTU, Modbus TCP
Compliance	UL 9540, UL 9540A/NFPA 855

*Represents the total battery capacity of a complete BESS system

** AUX power supply to be provided externally

***Represents the weight of a single container

b. PCS and MVT Specification

PCS data	Specification
DC Side	
DC Voltage Range	800 ~ 1500V
Max. DC current	1760A*2
No. of DC inputs	2
AC Side (Grid)	
Nameplate AC output power	2750 kVA@45 °C /113°F
Usable AC output power @POI	2000 kW@45 °C /113°F *
AC Max current	1443A * 2
Nominal AC voltage	550V
Nominal AC grid voltage range	484~605V
Nominal grid frequency	60Hz
Grid frequency range	55 ~ 65 Hz
AC connection / Feed-in phases	3-Phase 3-Wire

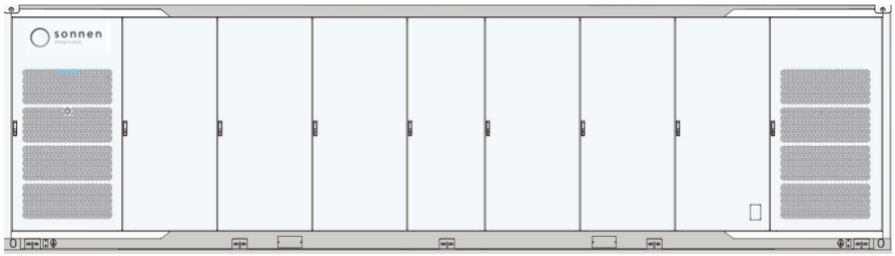
AC Power Factor	> 0.99 (at nominal power)
Adjustable Power Factor	1 leading ~ 1 lagging
Adjustable Reactive Power	-100%-100%
Max. THD of current	<3% (at nominal power)
DC Component	< 0.5 % (at nominal power)
Aux power	480Vac/60Hz 3P3L**
AC side (Off-grid)	
Nominal AC voltage	550V
AC voltage range	484~605V
AC voltage distortion	<3% (Linear load)
DC voltage component	<0.5% (Linear balance load)
Unbalance load Capacity	100%
Nominal Frequency	60Hz
Frequency Range	55 ~ 65 Hz
Transformer	
Transformer rated power	2750kVA
Transformer max. power	2750kVA
LV/MV voltage	0.55kV/ 12.47kV
Transformer Vector	Dy1 or Dy11
Transformer cooling type	KNAN
Oil type	degradable oil
Protection	
DC Input protection	Load break switch + Fuse
Inverter output protection	Circuit breaker
AC output protection	Load break switch + Fuse
Overvoltage protection	DC Type II / AC Type II
Grid monitoring / Ground fault monitoring	Yes / Yes
Insulation Monitoring	Yes
Overheat Protection	Yes
General Data	
Dimension (W*H*D)	6058*2896*2438 mm / 238.5*114.0*96.0inch
Weight	16000 Kg /35274 lbs
Isolation Method	Transformer less
Degree of Protection	TYPE 3R
Operating temperature range	-35 to 60 °C (> 45 °C derating) -31 to 140 °F (> 113 °F derating)
Relative Humidity Range	0 - 100 % (non-condensing)
Cooling method	Temperature controlled forced air cooling
Max working altitude	1000 m / 3280.8 ft (standard)
Communication	RS485, CAN, Ethernet
Compliance	UL1741, UL1741 SA & SB, IEEE1547:2018

* estimated usable power based on assumptions that POI and POM are the same location on MV transformer 12.47kV and DC cable (cable between PCS and BESS units for DC connection) loss of 0.1%

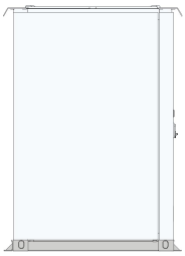
** AUX power supply to be provided externally

4. Product Appearance

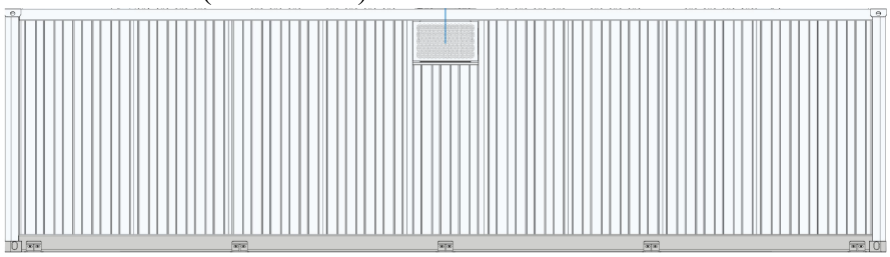
a. BESS container



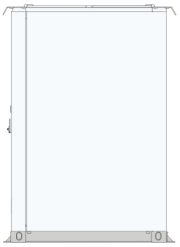
(Front View)



(Left View)

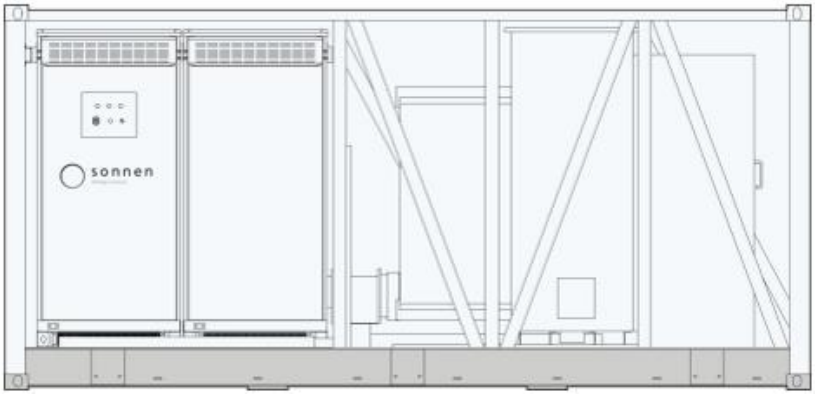


(Rear View)

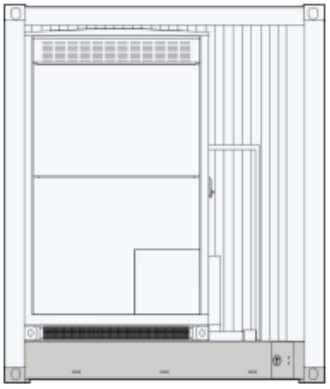


(Right View)

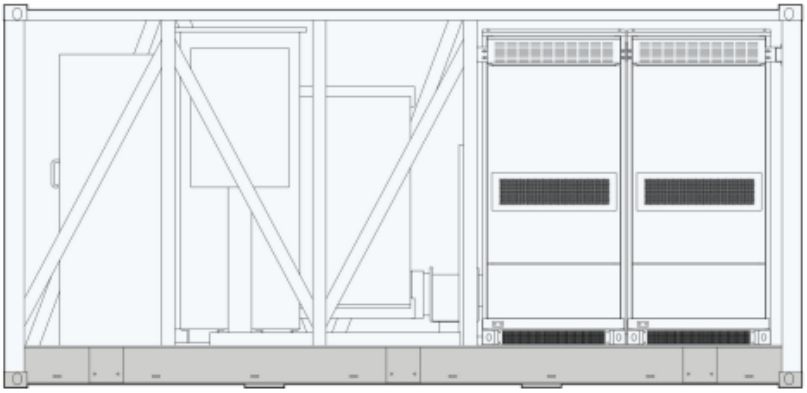
b. PCS skid with MVT

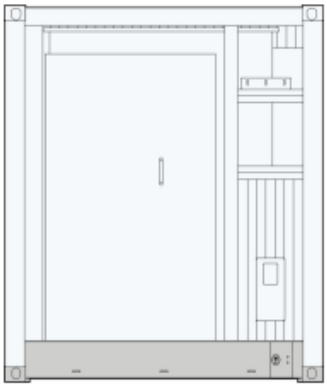


(Front View)



(Left View)





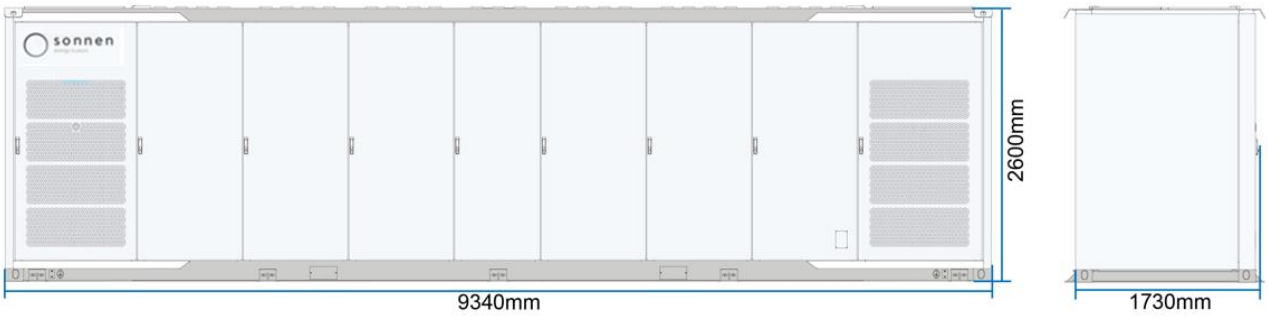
(Rear View) (Right View)

5. Product External dimensions and required clearance space

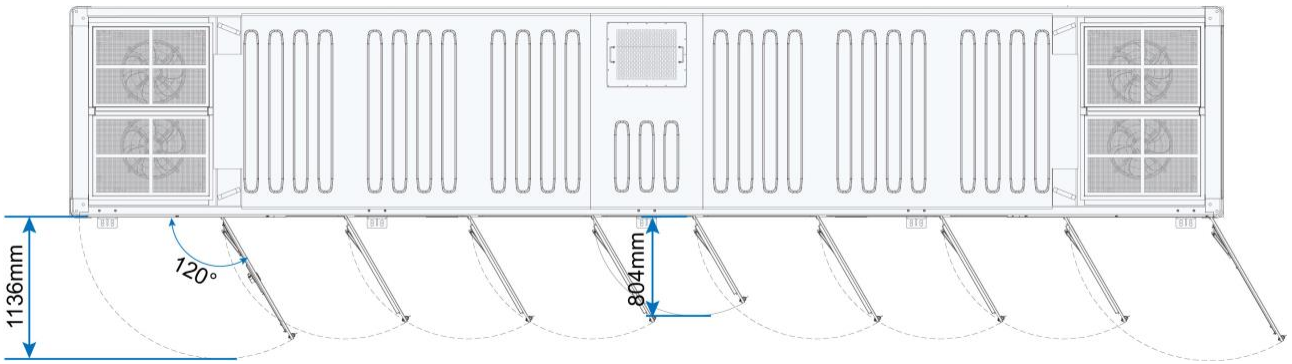
The following sections show the external dimensions and require clearance spaces for a single and multiple BESS and PCS skid installation. A recommended layout with multiple BESS and PCS skid for this project to be provided later in the installation guide or drawings separately.

a. BESS container

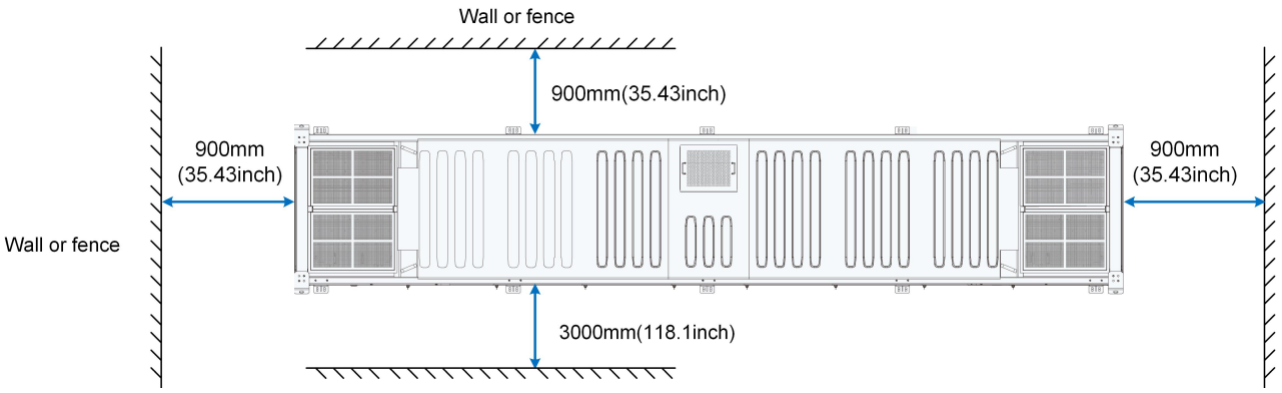
- The figure below shows the external dimensions of the BESS container.



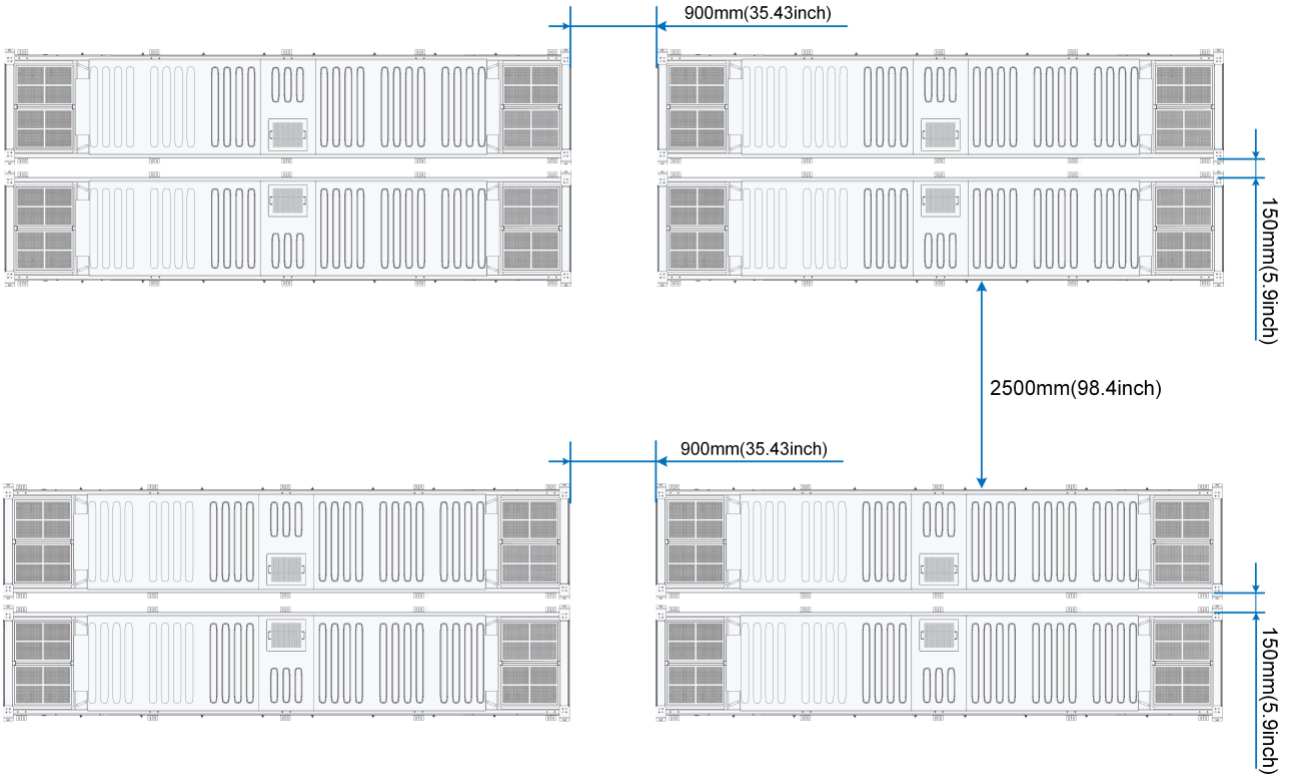
- The figure below shows the require clearance space when the doors of a BESS container are opened.



- The figure below shows the require clearance space for a single BESS container.

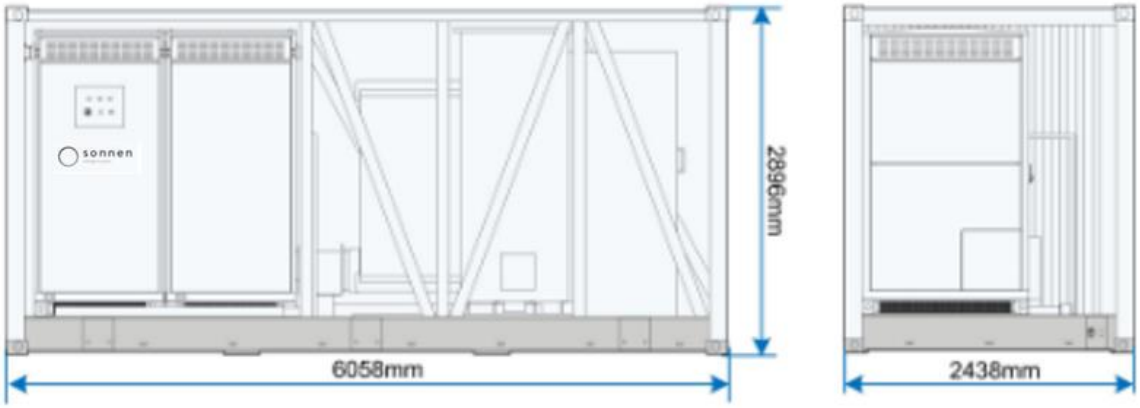


- The figure below shows the require clearanc space for multiple BESS containers

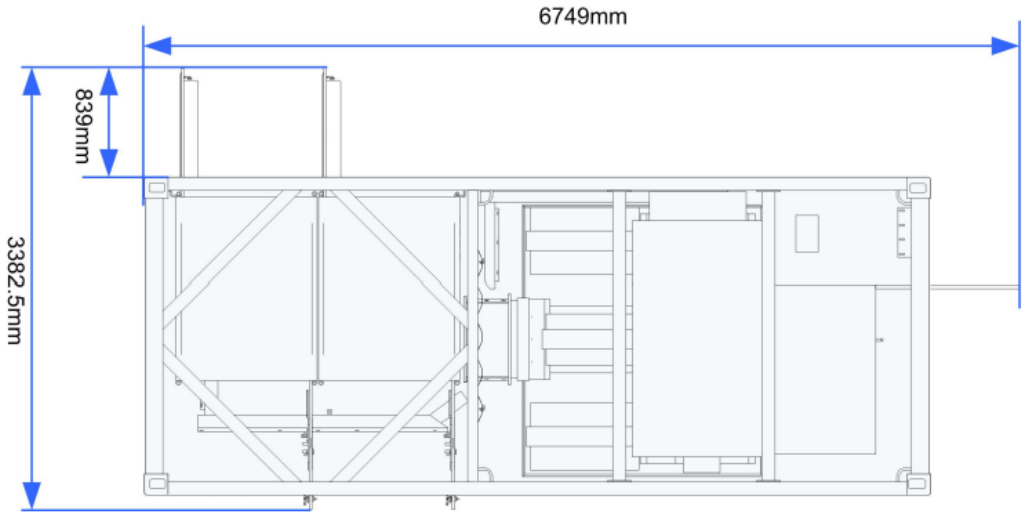


b. PCS skid with MVT

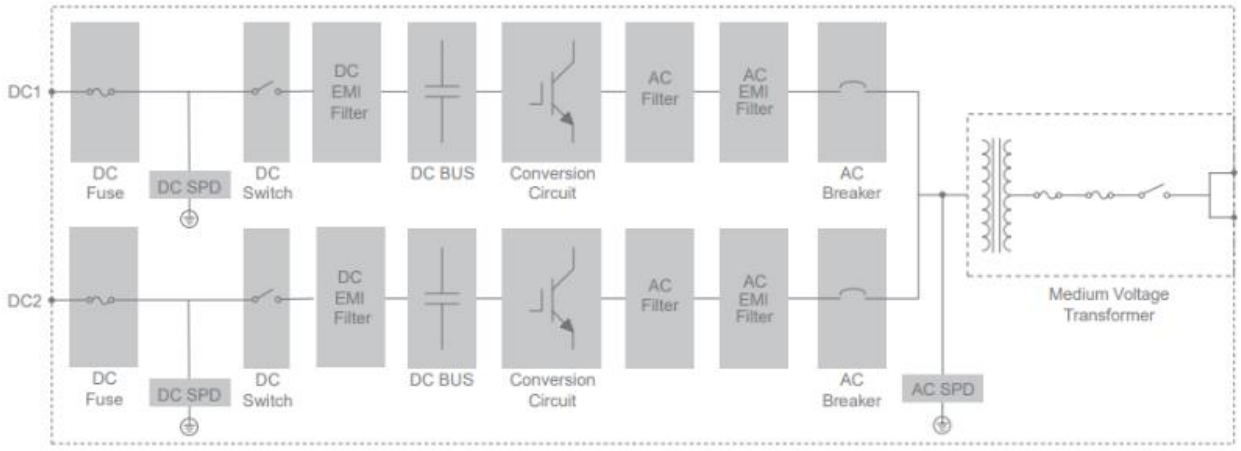
- The figure below shows the external dimensions (without rain cover) of the PCS skid.



- The figure below shows the require clearance space when the door of the PCS skid is opened.



6. Circuit Diagram of the PCS skid



7. SLD of the BESS System