

sonnen Megawatt series B - 5MW-10MWh BESS with MVT Specification

Version 1.3

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1. Abbreviation

BESS: Battery Energy Storage System

EMS: Energy Management System

FSS: Fire Suppression System

LV: Low Voltage

MV: Medium Voltage

MVT: Medium Voltage Transformer

PCS: Power Conversion System

POI : Point of Interconnection

THD: Total Harmonic Distortion

2. Product Overview

The complete BESS solution is a 5MW/10MWh system. This solution contains 2 of the 2.5MW/5MWh BESS blocks. Each BESS block contains 2 BESS containers and 1 PCS + MVT skid. 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.

Therefore, 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	4
2	20 ft PCS+MVT skid	2
3	EMS	1

Note:

- This BESS does not incorporate any AUX transformer to support project site auxiliary loads.
- DC cables between the BESS containers and PCS skid, AC cables between 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
Total Nameplate Battery Capacity	11008 kwh*
Total Usable Battery Capacity	10000 kwh*
Voltage range	1036.8 ~ 1401.6 V
Container Dimensions (W * H * D)	9340*2600*1730mm / 367.71*102.36*68.11inch
Container Weight	26,400kg / 58202 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 IDLH gases
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 system

**Represents the weight of a single container

b. PCS + MVT Specification

PCS data	Specification
DC Side	
DC Voltage Range	1150 ~ 1500V
Max. DC current	1775A*2
No. of DC inputs	2
AC Side (Grid)	
Nameplate AC output power	8000 kW @45 °C /113°F *
Usable AC output power @POI	5000 kW @45 °C /113°F *
AC Max current	1443A * 2
Nominal AC voltage	800V
Nominal AC grid voltage range	704~880V
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**

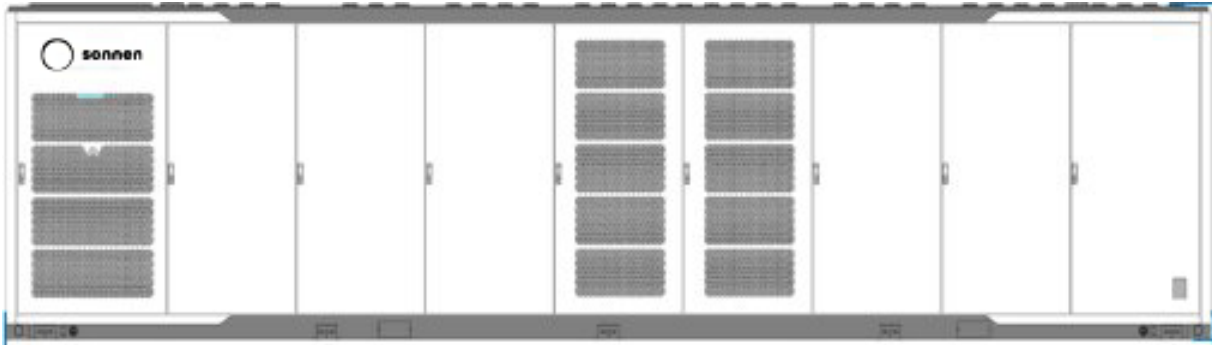
AC side (Off-grid)	
Nominal AC voltage	800V
AC voltage range	704~880V
AC voltage distortion	<3% (Linear load)
DC voltage component	<0.5% (Linear balance load)
Unbalance load Capacity	100%
Nominal Frequency	60Hz
Frequency Range	55 ~ 65 Hz
Transformer	
Transformer rated power	4000kVA
Transformer max. power	4000kVA
LV/MV voltage	0.8kV/ 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	17000 Kg /37479 lbs
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 (standard) / >1000 m (optional) 3280.8 ft (standard)/ >3280.8 ft (optional)
Communication	RS485, CAN, Ethernet
Compliance	UL1741, UL1741 SA & SB, IEEE1547:2018
Grid Support	L/HVRT, FRT, active & reactive power control and power ramp rate control, Volt-var, Volt-watt, Frequency-watt

*Represents total Power of the complete system

**AUX power supply to be provided from external source

4. Product Appearance

a. BESS container



b. PCS + MVT Skid

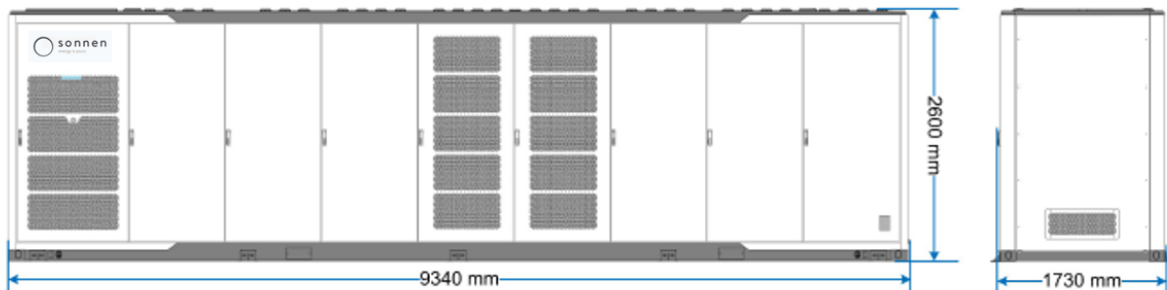


5. Product External dimensions and required clearance space

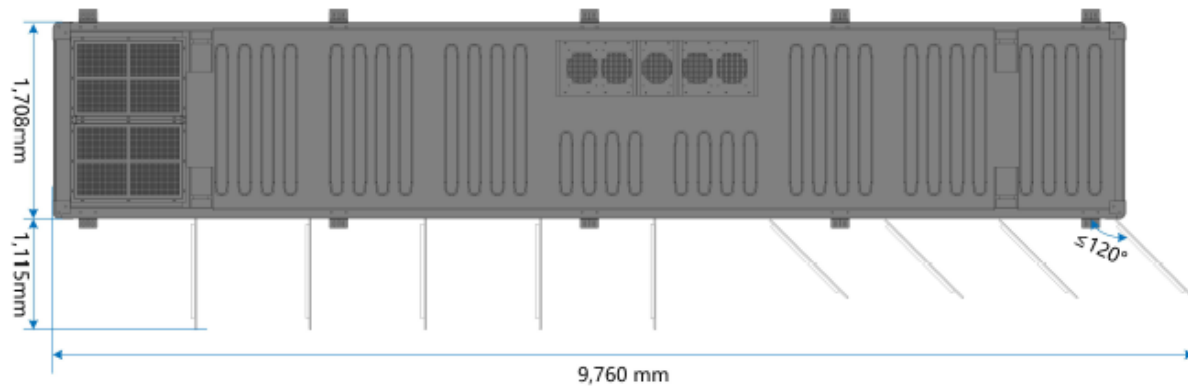
The following sections show the external dimensions and required clearance spaces for single and multiple BESS and a PCS skid installation. A recommended layout with multiple BESS and MVS containers for this project to be provided later in the installation guide or drawings separately.

a. BESS container

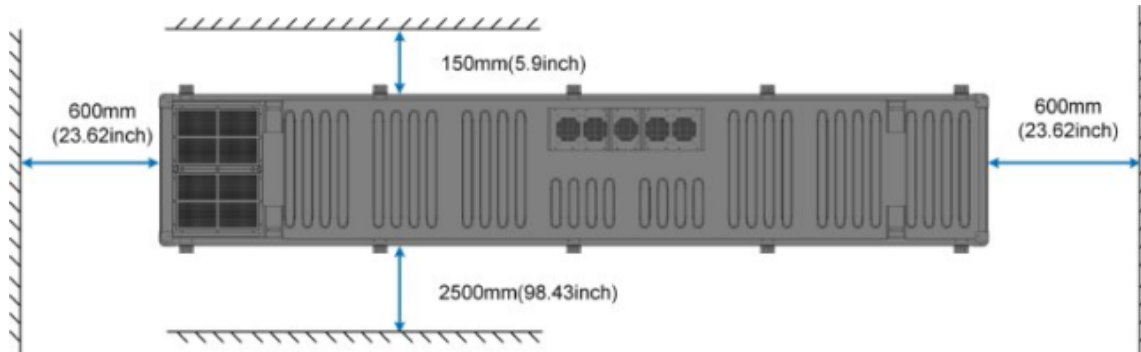
- The figure below shows the external dimensions of the BESS container.



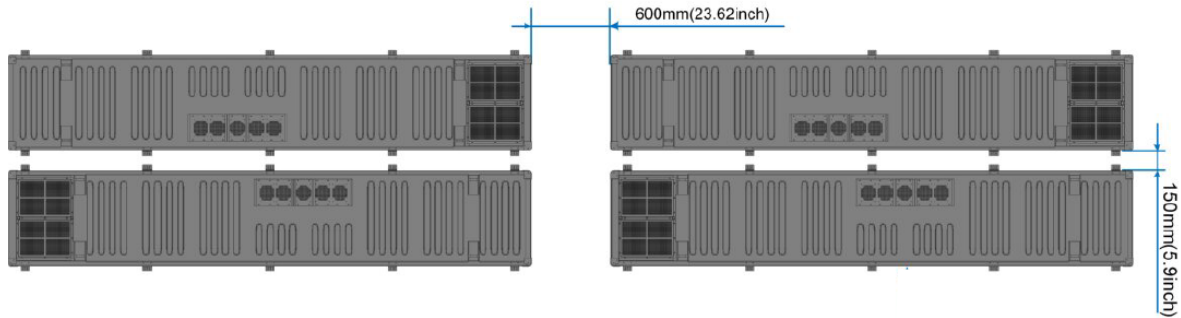
- The figure below shows the required clearance space when the doors of a BESS container are opened.



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

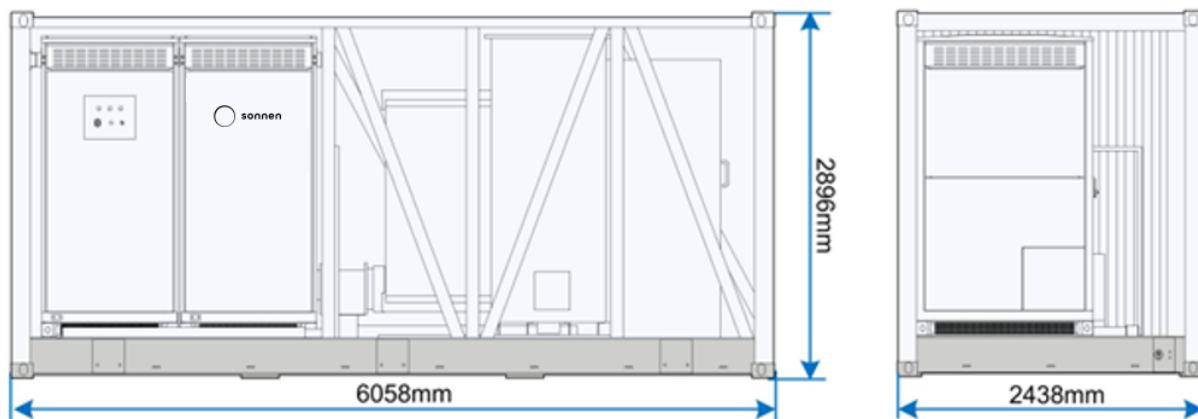


- The figure below shows the required clearance space for multiple BESS containers when installed side-by-side or back-to-back.

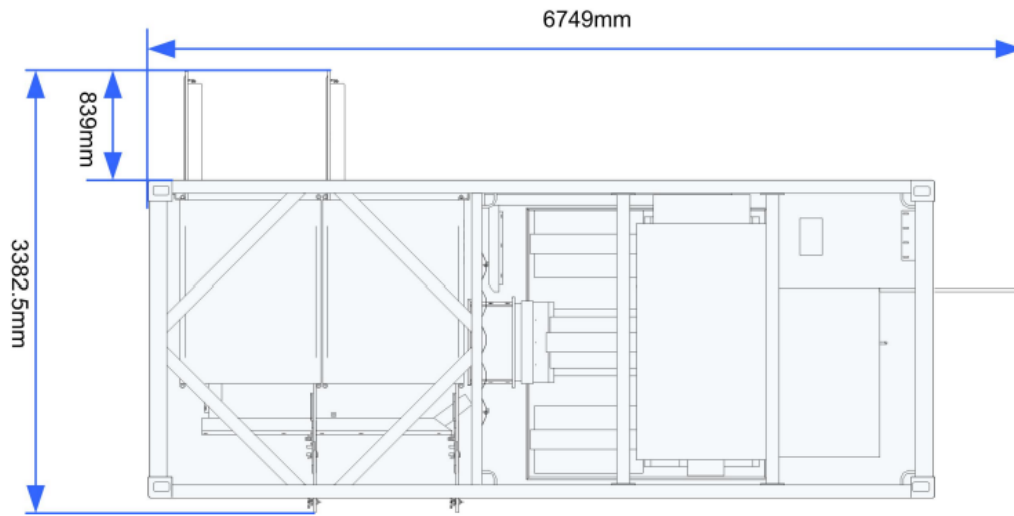


b. PCS + MVT Skid

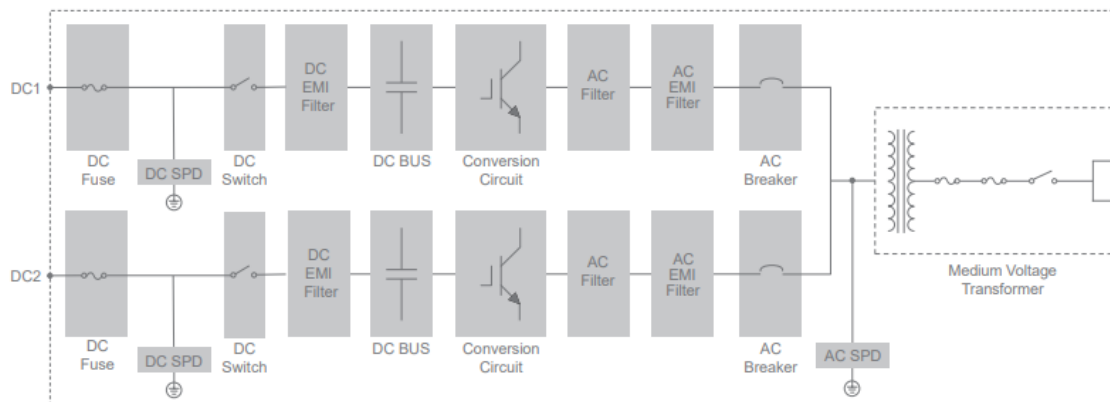
- The figure below shows the external dimensions (without rain cover) of the PCS skid.



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



6. Circuit diagram of the PCS skid



7. SLD of the BESS

