

e-STORAGE

A subsidiary of Canadian Solar

UTILITY-SCALE ENERGY STORAGE



SolBank 3.0

ENERGY STORAGE SYSTEM

S-5016-2H-NA | S-5016-4H-NA

Capacity: 5.0 MWh

e-STORAGE, a subsidiary of **Canadian Solar**, is a world-class energy storage solution provider, specializing in storage system design, manufacturing, and integration of battery energy storage systems for utility-scale applications.

The company offers value-added system consulting and turnkey EPC services, in addition, we provide customers with our proprietary LFP battery solution SolBank.

Together, we are building a brighter, greener future for all.

Key Features

Enhanced Energy Density

- Utilizes 314 Ah battery cells and compact integration, increases single container energy density up to 45%
- Reduces land cost by up to 35% in a 100MWh project

Safety

- IP67-rated pack design
- Up to 20% faster detection of abnormal and automatic protection
- Advanced pack thermal isolation, electrical redundancy protection, and multi-level fire protection, effectively minimize potential issues

SolBank 3.0 Highlights

- **Cutting-Edge Technology:** SolBank 3.0 features high-density LFP cells, an active balancing BMS, and an innovative liquid cooling TMS, ensuring optimal safety.
- **Compliance and Certifications:** SolBank 3.0 adheres to all industry standards: NFPA855, NFPA69, NFPA72, NFPA70E, and optional NFPA68. Certified under UL1973, UL9540, UL9540A, UN38.3/UN3536, ensuring rigorous safety and performance criteria.

Intelligent Control

- Liquid cooling cuts auxiliary consumption up to 30%
- Active balance and string-level management, guarantee high efficiency and availability

Compatibility & Installation

- Supports various PCS topologies
- Turn-key integration and stationery certification, reduce project schedule risks by up to 40%
- Plug-and-play setup for streamlined commissioning

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System Parameter

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General		
Product Model	CSI-SolBank-S-5016-2h-NA	
	CSI-SolBank-S-5016-4h-NA	
Battery Chemistry	Lithium Iron Phosphate (LFP)	
Pack Configuration	1P104S (104 Cells)	
Rack Configuration	1P416S (4 Packs)	
System Configuration	12P416S (12 Racks)	
Nominal DC Voltage	1331.2 V	
Operation DC Voltage Range	1164.8 V ~ 1497.6 V	
Performance		
Charging/Discharging Mode	0.5 P / 0.5 P	0.25 P / 0.25 P
Rated DC Power	2350 kW	1200 kW
Initial Storage Capacity	4700 kWh	4800 kWh
Duration @Rated DC Power	2hrs	4hrs
Round Trip Efficiency (RTE)	93%	94%
Auxiliary Load (Standby/Peak)	1.5 kVA / 50 kVA	1.5 kVA / 22 kVA
Max. Short Circuit Current	10 kA*12	10 kA*12
Operating Temperature (Ambient)	-30 °C to 55 °C (derating from 45°C to 55°C)	
Relative Humidity	≤95% (non-condensing)	
Altitude	≤4000 m (derating from 2000 m to 4000 m)	
Noise Sound Pressure Level (LPA) at 1 meter distance	≤75 dB(A)	
Auxiliary Systems		
Auxiliary Power Interface	AC480 V / 60 Hz, 3P5W	
Thermal Management System	Smart liquid cooling/heating	
External Communication Interface	Ethernet connection, Modbus TCP/IP protocol	

Notes

1. The unit is rated at 1164.8V~1497.6V for optimized product performance, the maximum voltage range for the battery system is 1060.8V~1497.6V
2. Rated DC Power is measured at the product DC terminal, the Rated DC Power and Initial Storage Capacity is limited to the use of two SolBank 3.0 units connected in parallel
3. Initial Storage Capacity is the usable product capacity at FAT, contact e-STORAGE for capacity at COD per project schedule
4. DC RTE is measured during capacity test at Rated DC Power, refer to the product warranty document for the complete procedure

Due to ongoing innovation, improvements, and product enhancements, the technical specifications in this document are subject to change and are not guaranteed. Canadian Solar reserves the right to update or change its products or this technical data without prior notice and customers should not rely upon these or any technical specifications which are not made part of a definitive binding agreement.

Mechanical

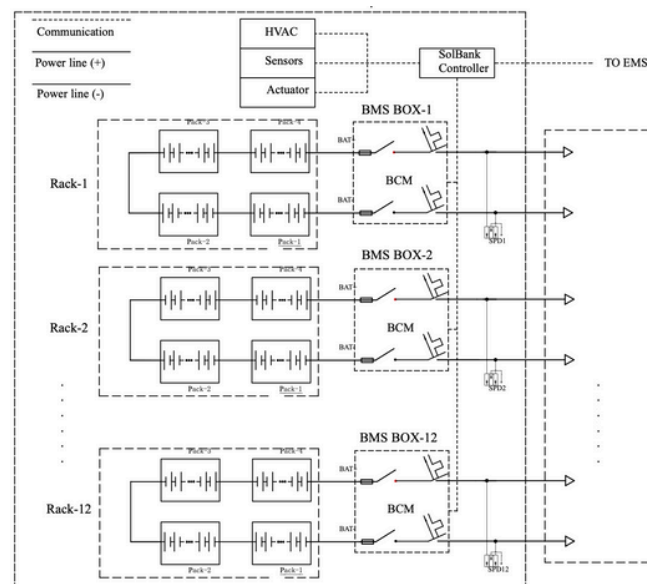
Enclosure	20ft. high-cube container
Dimensions (L*W*H)	6058*2438*2896 mm (238.50*95.98*114.02 in)
Weight (Battery Included)	43,000 kg (94,800 lbs)
Enclosure Ingress Rating	IP55 / NEMA 3R
Painting/Coating	RAL9003 / C4 Coating
Seismic Parameter	Zone 4

Safety

Fire Detection and Alarm	Fire alarm panel, heat and smoke detection, alarm bell and strobe
Explosion Prevention	Combustible gas detector with active ventilation
Uninterrupted Power Reserve	Container level UPS for 2-hr control system backup; dedicated fire safety UPS for 24-hr fire alarm backup
Emergency Stop/Automatic Shut-off	Local and Remote
Fire Suppression Options	Aerosol-based suppression system. Dry pipe sprinkler system.

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Circuit Diagram



TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSM

REFERENCES	FP4200M2	FP4201M2	FP4200M4	FP4201M4
AC	AC Output Power (kVA/kW) @40°C ^[1]		4200	
	AC Output Power (kVA/kW) @50°C ^[1]		3900	
	Operating Grid Voltage (kV)	34.5kV ±10%	13.8kV ±10%	34.5kV ±10% 13.8kV ±10%
	Operating Grid Frequency (Hz)		60Hz	
	Current Harmonic Distortion (THDi)		< 3% per IEEE519	
	Power Factor (cos phi) ^[2]		0.5 leading ... 0.5 lagging	
	Reactive Power Compensation		Four quadrant operation	
DC	DC Voltage Range ^[3]		934V - 1500V	
	Maximum DC Voltage		1500V	
	DC Voltage Ripple		< 3%	
	Max. DC Continuous Current per Input (A)	2295	1148	
	Max. DC Short Circuit Current per Input (kA)		250 kA with a time constant of 3 ms	
	Battery Technology		All type of batteries (BMS required)	
	Number of Separate DC Inputs	2	4	
EFFICIENCY & AUX. SUPPLY	Efficiency (Max) (η) (preliminary)		97.80% including MV transformer	
	Euroeta (η) (preliminary)		97.51% including MV transformer	
CABINET	Dimensions [WxDxH] (ft)		21.3 x 6.5 x 7.2	
	Dimensions [WxDxH] (m)		6.5 x 2.0 x 2.2	
	Weight (lbs)		30865	
	Weight (kg)		14000	
	Type of Ventilation		Forced air cooling	
ENVIRONMENT	Degree of Protection		NEMA 3R	
	Operating Temperature Range ^[4]		From -25°C to +60°C, >50°C power derating	
	Operating Relative Humidity Range		From 4% to 100% non-condensing	
	Storage Temperature Range		From -15°C to +40°C	
	Max. Altitude (above sea level) ^[5]		2000m	
CONTROL INTERFACE	Communication Protocol		Modbus TCP	
	Power Plant Controller		Optional. Third party SCADA systems supported.	
	Keyed ON/OFF Switch		Standard	
PROTECTIONS	Ground Fault Protection		Insulation monitoring device	
	Humidity Control		Active heating	
	General AC Protection & Disconn.		MV switchgear (20 or 25 kA)	
	General DC Protection & Disconn.		DC switch-disconnectors ^[6]	
	Overvoltage Protection		Type 2 protection for AC and DC (optionally, Type 1+2 for DC side)	
CERTIFICATIONS & STANDARDS	Safety		UL 1741 / CSA 22.2 No.107.1-16	
	Installation		NEC 2020	
	Utility Interconnect ^[7]		IEEE 1547:2018 / UL 1741 SA & SB	

[1] Values at 1.00-Vac nom and cosφ=1.

Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar) = \sqrt{(S(kVA))^2 - P(kW)^2}$.

[3] Consult Power Electronics for derating curves.

[4] Optional available for temperatures down to -35°C

[5] Consult Power Electronics for altitudes above 1000m.

[6] Battery short circuit disconnection must be done on the battery side.

[7] Consult Power Electronics for other applicable standards / grid codes.

TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSM

REFERENCES	FP4105M2	FP4106M2	FP4105M4	FP4106M4
AC	AC Output Power (kVA/kW) @40°C ^[1]		4105	
	AC Output Power (kVA/kW) @50°C ^[1]		3810	
	Operating Grid Voltage (kV)	34.5kV ±10%	13.8kV ±10%	34.5kV ±10% 13.8kV ±10%
	Operating Grid Frequency (Hz)		60Hz	
	Current Harmonic Distortion (THDi)		< 3% per IEEE519	
	Power Factor (cos phi) ^[2]		0.5 leading ... 0.5 lagging	
	Reactive Power Compensation		Four quadrant operation	
DC	DC Voltage Range ^[3]		913V - 1500V	
	Maximum DC Voltage		1500V	
	DC Voltage Ripple		< 3%	
	Max. DC Continuous Current per Input (A)	2295	1148	
	Max. DC Short Circuit Current per Input (kA)		250 kA with a time constant of 3 ms	
	Battery Technology		All type of batteries (BMS required)	
	Number of Separate DC Inputs	2	4	
EFFICIENCY & AUX. SUPPLY	Efficiency (Max) (η) (preliminary)		97.76% including MV transformer	
	Euroeta (η) (preliminary)		97.50% including MV transformer	
CABINET	Dimensions [WxDxH] (ft)		21.3 x 6.5 x 7.2	
	Dimensions [WxDxH] (m)		6.5 x 2.0 x 2.2	
	Weight (lbs)		30865	
	Weight (kg)		14000	
	Type of Ventilation		Forced air cooling	
ENVIRONMENT	Degree of Protection		NEMA 3R	
	Operating Temperature Range ^[4]		From -25°C to +60°C, >50°C power derating	
	Operating Relative Humidity Range		From 4% to 100% non-condensing	
	Storage Temperature Range		From -15°C to +40°C	
	Max. Altitude (above sea level) ^[5]		2000m	
CONTROL INTERFACE	Communication Protocol		Modbus TCP	
	Power Plant Controller		Optional. Third party SCADA systems supported.	
	Keyed ON/OFF Switch		Standard	
PROTECTIONS	Ground Fault Protection		Insulation monitoring device	
	Humidity Control		Active heating	
	General AC Protection & Disconn.		MV switchgear (20 or 25 kA)	
	General DC Protection & Disconn.		DC switch-disconnectors ^[6]	
	Overvoltage Protection		Type 2 protection for AC and DC (optionally, Type 1+2 for DC side)	
CERTIFICATIONS & STANDARDS	Safety		UL 1741 / CSA 22.2 No.107.1-16	
	Installation		NEC 2020	
	Utility Interconnect ^[7]		IEEE 1547:2018 / UL 1741 SA & SB	

[1] Values at 1.00-Vac nom and cosφ=1.

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TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSM

REFERENCES	FP4010M2	FP4011M2	FP4010M4	FP4011M4	
AC	AC Output Power (kVA/kW) @40°C ^[1]				
	4010				
	AC Output Power (kVA/kW) @50°C ^[1]				
	3720				
	Operating Grid Voltage (kV)	34.5kV ±10%	13.8kV ±10%	34.5kV ±10%	13.8kV ±10%
	Operating Grid Frequency (Hz)				
	60Hz				
	Current Harmonic Distortion (THDi)				
	< 3% per IEEE519				
	Power Factor (cos phi) ^[2]				
	0.5 leading ... 0.5 lagging				
	Reactive Power Compensation				
	Four quadrant operation				
	DC	DC Voltage Range ^[3]			
891V - 1500V					
Maximum DC Voltage					
1500V					
DC Voltage Ripple					
< 3%					
Max. DC Continuous Current per Input (A)					
2295		1148			
Max. DC Short Circuit Current per Input (kA)					
250 kA with a time constant of 3 ms					
Battery Technology					
All type of batteries (BMS required)					
Number of Separate DC Inputs					
2		4			
EFFICIENCY & AUX. SUPPLY	Efficiency (Max) (η) (preliminary)		97.80% including MV transformer		
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CABINET	Dimensions [WxDxH] (ft)		21.3 x 6.5 x 7.2		
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	Operating Relative Humidity Range		From 4% to 100% non-condensing		
	Storage Temperature Range		From -15°C to +40°C		
	Max. Altitude (above sea level) ^[5]		2000m		
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	Power Plant Controller		Optional. Third party SCADA systems supported.		
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