

**ATTACHMENT 2**  
**(Equipment Specifications)**

# 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

## SolBank 3.0

### 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

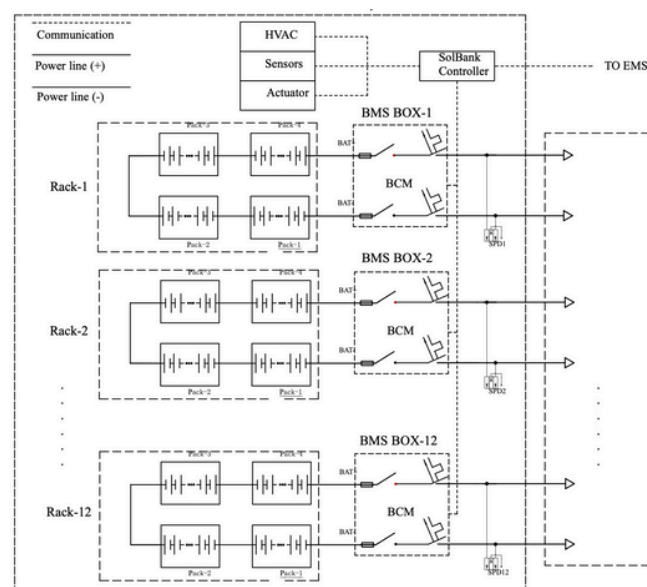
Enclosure	20ft. high-cube container
Dimensions (L*W*H)	6058*2438*2896 mm (238.50*95.98*114.02 in)
Weight (Battery Included)	43,000 kg (94,800 lbs)
Enclosure Ingress Rating	IP55 / NEMA 3R
Painting/Coating	RAL9003 / C4 Coating
Seismic Parameter	Zone 4

### 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.

### SolBank 3.0

#### Circuit Diagram



Date: Feb 14, 2022



MODEL	50-100181					CAB1000/AC-3L2				
AC	AC configuration   max. cables per phase (1)					3-wire (3P3W)   6 x 600 kcmil or 6 x 300 mm²				
	Nominal AC voltage (+/- 10%) (2)		480 VRMS	600 VRMS		630 VRMS	660 VRMS	690 VRMS		
	Nominal AC current (export/import)					1255 ARMS				
	AC export/import capacity @ 40°C (3)		1043 kW	1304 kW		1369 kW	1435 kW	1500 kW		
	Export power overload capacity @ 40°C, starting from 66% full load.					120 % for 3 sec and 116 % for 5 min				
	Reactive power capacity (4), (5)					Power Factor 0.8...1 leading/lagging				
	Allowed grid short ckt. current ratios					Current mode: >4   Voltage mode: all				
	Max. fault current allowed from AC source					100 kA (AC RMS) throated version   180 kA (AC RMS) non-throated version				
	Nominal frequency range					50 / 60 Hz (configurable)				
	Harmonic distortion					UL1741 / IEEE 1547, <2% TDDi at rated power per IEEE 519 <3% according to VDE-AR-N 4110/4120				
DC	Efficiency (@ 690 VAC): Peak   CEC   Euro					98.8%   98,4%   98,5%				
	DC voltage range, maximum (6)		720 - 1500 VDC	900 - 1500 VDC		945 - 1500 VDC	990 - 1500 VDC	1035 - 1500 VDC		
	DC voltage range, at nominal power (6)		761 - 1200 VDC	951 - 1500 VDC		999 - 1500 VDC	1046 - 1500 VDC	1094 - 1500 VDC		
	Recommended minimum battery voltage					1,65 x nominal AC voltage				
	Maximum DC current					1400 ADC				
	Max. fault current allowed from DC source					180 kA (with internal DC fuses, per input)				
	Number of DC inputs   max. cables per pole					1   8 x 600 kcmil or 8 x 300 mm²				
	Max. deviation of DC voltage between parallel units					150 VDC				
Environmental	Ambient temperature (operation)					-20°C to 60°C (-40°C as option)				
	Ambient temperature (storage)					-40°C to 60°C				
	Relative humidity					5 to 100% non-condensing				
	Protection degree					Outdoor: IP54 / NEMA 3R. Salt fog kit available for coastal sites.				
	Max elevation					3,000m+ [9,842 ft.+] (Consult EPC for any higher elevation)				
	Airborne noise					<75 dBA @ 3m				
	Seismic					ICC-ES AC 156 Sds @ 1.35 G				
	Altitude derating (current)					10% per 1,000m above 1000m elevation				
Cabinet	Temperature de-rating					1.7% per degree °C from 40-55 °C				
	Maximum dimensions (H x W x D)					mm: [2281 x 1000 x 1636] in.: [89.8 x 39.4 x 64.4]				
	Weight					1370 kg [3020 lb.]				
	Mounting					Pad mount / skid mount				
	Cooling					Hybrid liquid / air, temperature controlled				
Certifications	Safety					UL 1741   C22.2 No. 107.1-16   IEC 62477-1, IEC 62909-1				
	EMC					FCC Part 15 subpart B   IEC/EN 61000-6-2, 6-4   EN 55011   CISPR 32; CISPR 11   IEEE C37.90.2				
	Utility interconnect					UL 1741 (SA)   IEEE 1547-2003   CA Rule 21   Hawaii Rule 14   AS4777.2   VDE-AR-N 4110/4120   EN 50549-2				
Protections	AC disconnection					Contactor				
	DC disconnection					Motorized disconnect				
	AC fuses   DC fuses (7)		2 x 1000 A, 200 kAlc (24kA SC min)			3 x 750 A, 210 kAlc (20kA SC min)				
	AC   DC surge protection (SPD)					Type 2 (Optionally Type 1-heavy duty)		Type 1-heavy duty		
	Safety features					F-stop, AC / DC overvoltage, AC timed overvoltage, inst. & timed overcurrent, overtemperature (both instantaneous and time-overload), condensation, etc.				
	Ground fault detection (optional)					IMD				
Control	Control interface					CAN, Modbus TCP/IP				
	Command latency					1 ms (CAN), 3 ms (Modbus TCP/IP)				
	Response time; (time to accomplish full power step)					2 ms; adjustable longer via parameters				
	On-off grid transitions (optional)					Yes   UPS mode available				
	Black-start capable (optional)					Yes; requires external control power				
	Grid-tied control modes					Voltage mode   PQ (power)   DQ (current)   cos ϕ (pf)   STATCOM				
	Grid-support functions					Active/Reactive control   Volt/VAR   Hz/Watt   Volt/Watt   L/HVRT & L/HFRT   Inertia   ramp rate, etc.				
	Islanded control modes					V&f   droop control   VSG   Ok to parallel with other sources				
	Island overload avoidance					active inrush limiting for starting large loads				
	Control power voltage					208 V 1-ph 60 Hz or 240 V 1-ph 50 Hz				
	Self-consumption: Abs. Max.   Typ. 100% load, 30C   50% load, 30C [standby]					2400 W   1500 W   1200 W [160 W]				

(1) Throat connection available as an option. Max 4 unit parallel connection allowed with throat connection due to current limit. Up to 6 inverters parallel connection allowed when using cable connection for AC.

(2) Nominal voltage 480-690 VAC +/- 10%. Consult EPC Power for ratings of alternative AC voltages.

(3) Power ratings at nominal AC voltage and at cos φ = 1. Available power reduced in proportion to any AC voltage reduction from nominal.

(4) With nominal DC and nominal AC voltage. Reactive power capability will vary depending on DC and AC voltage range requirements at inverter terminals. Additional reactive power capability available as option.

(5) Overexcited (leading) is reactive power that increases AC voltage at inverter terminals. Underexcited (lagging) is reactive power that decreases the reactive power at inverter terminals.

(6) DC voltage range at nominal AC voltage and at cos φ = 1. Minimum DC voltage increases with higher AC voltage and if reactive power is required. See manual for details.

(7) Consult EPC Power for higher interrupt current requirements. Minimum available grid fault currents must be observed for proper operation of AC fuses.