



All-in-one Air-cooled ESS Cabinet ECO-E101WX User Manual



Content

1. Application Scope	1
2. Normative References	1
3. Product Introduction	2
4. Technical Parameters of System	2
5. Product Introduction	3
5.1 PACK	3
5.2 DC High-voltage Box	6
5.3 Control Box	7
5.4 Optional Functions	9
6. Packaging, Transportation and Storage	10
6.1 Packaging of Product	10
6.2 Transportation of Product	10
6.3 Storage of Product	11
7. Warranty Statement	11
8. Safety Usage Guidelines	12

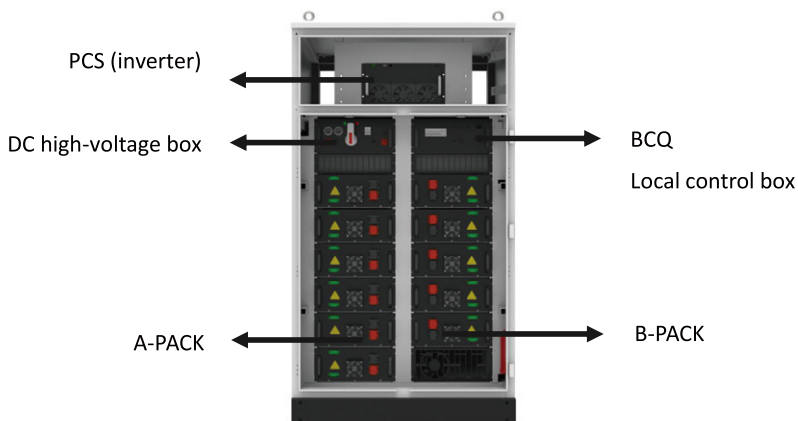
1. Application Scope

The Specification sets forth the performance indicators, transportation and storage requirements, usage conditions, precautions, and risk warnings of the all-in-one liquid-cooled ESS Cabinet ECO-E101WX (hereafter referred to as ECO-E101WX, or the ESS Cabinet, or the Cabinet, or the Product) produced by Sunpal Power Co., Ltd. for energy storage scenarios

2. Normative References

IEC 62619-2022	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications
IEC 63056-2020	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries for use in electrical energy storage systems
IEC 62477-1	Safety requirements for power electronic converter systems and equipment - Part 1 General
GB/T 36276-2023	Lithium ion battery for electrical energy storage
GB/T 34131-2023	Battery management system for electrical energy storage
GB/T 34120-2023	Technical requirements for power conversion system of electrochemical energy storage system
GB/T 36547-2018	Technical rule for electrochemical energy storage system connected to power grid
GB 4208-2008	Degrees of protection provided by enclosure (IP code)
GB/T 17626	Electromagnetic compatibility - Testing and measurement techniques
GB/T 14048.1-2006	Low-voltage switchgear and control-gear - Part 1: General rules
IEC 60068-2-6	Environmental testing - Part 2-6: Test Fc: Vibration (sinusoidal)

3. Product Introduction



Layout of ECO-E101WX

No.	Part	Quantity	Remarks
1	PCS (inverter)	1	
2	High-voltage box	1	/
3	BCQ	1	local control box
4	A-PACK	6	Grouping mode is 1P24S
5	B-PACK	5	Grouping mode is 1P24S
6	Cabinet body	1	W_1250 * D_1200 * H_2150 mm

4. Technical Parameters of System



Physical Image of ECO-E101WX

Item	Specifications	Remarks
Product model	ECO-E101WX	
DC Side Parameters		
Battery type	LFP 120Ah	
Grouping method	1P264S	
Rated energy	101kWh	100%DOD, 25°C, 1P
Rated capacity	120Ah	
Rated voltage	844.8V	
Recommended voltage range	DC 739.2-950.4V	Cell volt lower limit 2.8V Cell volt upper limit 3.6V
AC Side Parameters		
Rated output power	100kW	
Max AC power	110kW (continuous, 1 minute)	
Grid Voltage	400Vac/3P+N+PE	
Grid Frequency	50Hz/60Hz	
THDi	< 3%	
DC component	< 0.5%I _{pn}	
Power factor range	-1 lagging to 1 leading	
System Parameters		
Energy conversion efficiency	≥89%	Excluding auxiliary power consumption
Charging/discharging rate	1P	Constant power
Discharge depth	95%DOD	
Cycle life	≥5000 times (25±2°C)	Rated operating conditions: 25±2°C, 1P, and 95%DOD
Protection level	IP55	
Cooling method	Forced air cooling	
Operating temperature	-25 to 55°C	
Relative humidity	0-95%RH, without condensation	
Altitude	≤2000m	Derated use for altitude above 2,000m
Dimensions (W*D*H)	1250*1200*2250mm	
Total weight	Approximately 1850kg	
Fire protection system	Smoke/temperature detection + fully-submerged aerosol fire extinguishing	
Communication	Ethernet/RS485	
Standards complied with	UN38.3, IEC62619, UL1973, UL9540, and CE-EMC	

5. Product Introduction

5.1 PACK

This cabinet contains two types of battery PACK: A PACK and B PACK:

A-PACK is located on the left side of the cabinet, while B-PACK is on the right. They are with symmetrical front panels and the same internal module composition.



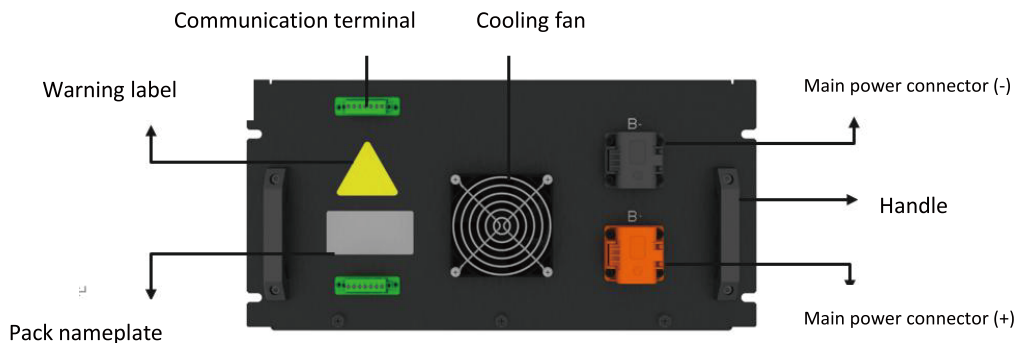
Diagram of B-PACK



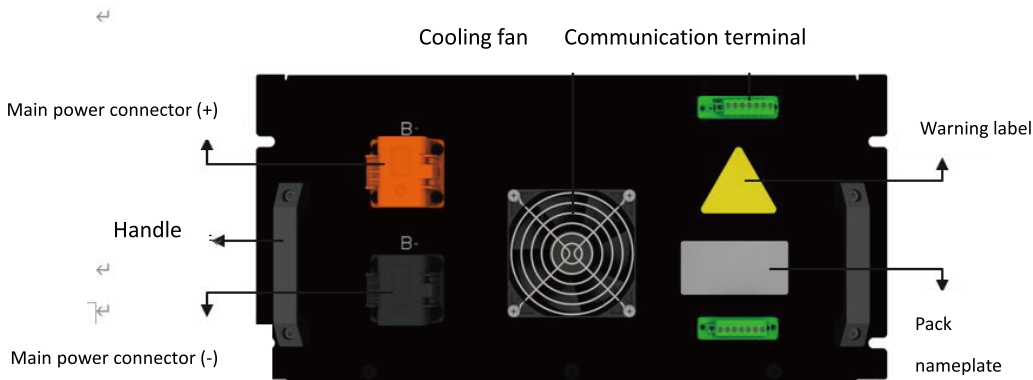
Diagram of A-PACK

The parameters are as per the table below:

No.	Item	Parameter	Condition
1	Model	ECO-P1P24WX	/
2	Cell capacity	120Ah	Standard charge/discharge
3	Series-parallel connection mode	1P24S	/
4	Nominal energy	9.216kWh	Standard charge/discharge
5	Nominal voltage	DC 76.8V	Standard charge/discharge
6	Recommended voltage range	67.2-86.4V	Cell voltage 2.8-3.6V
7	Charging rate	1P	Constant power
8	Cooling method	Air-cooling	
9	Dimensions (W * D * H)	470*830*196mm	See drawings
10	Weight	Approximately 98kg	Including connecting copper bars
11	Ingress Protection level	IP20	
12	Operating temperature range	0 to 55°C (discharging)	Cell temperature
13		0-55°C (charging)	
14	Recommended working temperature range	20-30°C	
15	Storage temperature range	-20 to 45°C	Batteries must be charged and maintained once every 3 months of storage
16	Storage humidity	<75%RH, without condensation	
17	Applicable system voltage level	≤1000Vdc	
18	Communication method	CAN	/
19	Shipping SOC	30%-50%	(25±2)°C
20	Warranty operating conditions	(25±2)°C	/



Schematic Diagram of A-PACK Panel:



Schematic Diagram of B-PACK Panel:

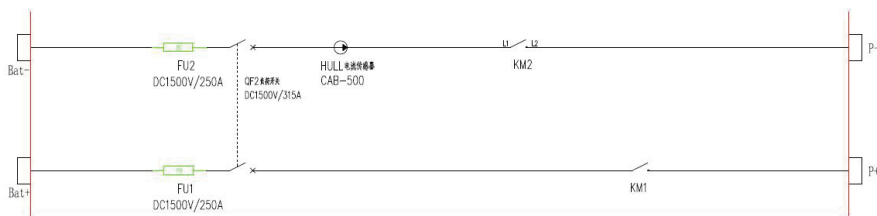
No	Part	Model	Q'ty	Remarks
1	B+	C-ES-FTB 25-70 OG	1	High voltage output (+) from module
2	B-	C-ES-FTB 25-70 BK	1	High voltage output (-) from module
3	Communication	LC2AM-5.08-7P-140-00A	2	BMU communication

	terminal			
4	Cooling fan	TX9232H24B-G	1	/
5	Warning label	Live label	1	Pay attention to the danger of electrification
6	PACK nameplate	80×50 self-adhesive	1	Displaying PACK parameters
7	Handle	Equipped on shell	2	Maintenance of PACK

5.2 DC High-voltage Box



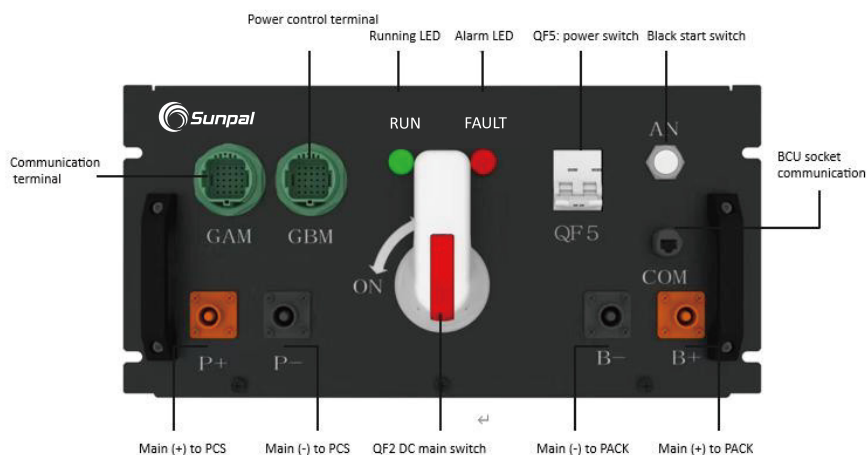
Diagram of High-voltage Box



Main Wiring Diagram of High-voltage Box

No.	Item	Parameter	Remarks
1	Dimensions(W*D*H)	470*830*196mm	See drawings
2	Weight	Approximately 37.4kg	
3	Power input	AC 220V	Power supply of

			high-voltage box
4	Low-voltage output	DC 24V	DC power output for communication
5	Rated high-voltage output	DC 844.8V	DC 672V - DC 864V
6	Operating temperature	-20 to 55°C	
7	Current accuracy	±1%FSR	
8	Voltage accuracy	±1%FSR	
9	Protection level	IP20	



High-voltage Box Panel Layout

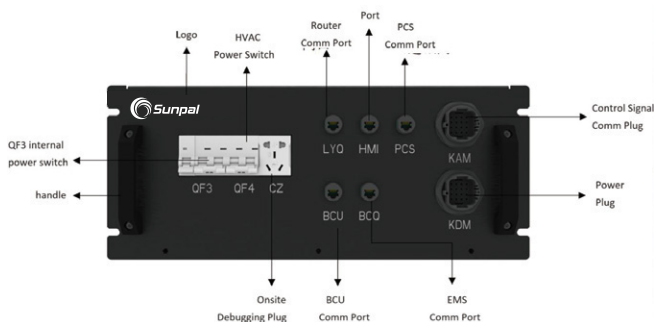
No.	Part	Model	Q'ty	Remarks
1	P+	ES-FT-BPC-B/S 35-70 OG	1	+ Polarity to PCS
2	P-	ES-FT-BPC-B/S 35-70 BK	1	- Polarity to PCS
3	B+	ES-FT-BPC-B/S 35-70 OG	1	+ Polarity to PACK
4	B-	ES-FT-BPC-B/S 35-70 BK	1	- Polarity to PACK
5	GAM	USCM016-004	1	Communication terminal
6	GBM	USCM016-004	1	Power signal terminal
7	QF2	NDG3VH-315	1	DC main switch
8	QF5	SFB3-100H C10A	1	Power control switch
9	AN	LA38-22/20E	1	Black start switch
10	RUN	AD11-16/21 green	1	BCU output RUN signal
11	FAULT	AD11-16/21 red	1	BCU output FAULT signal
12	COM	SPRJS-5EPFFJ-TC7002	1	BCU socket communication

5.3 Control Box

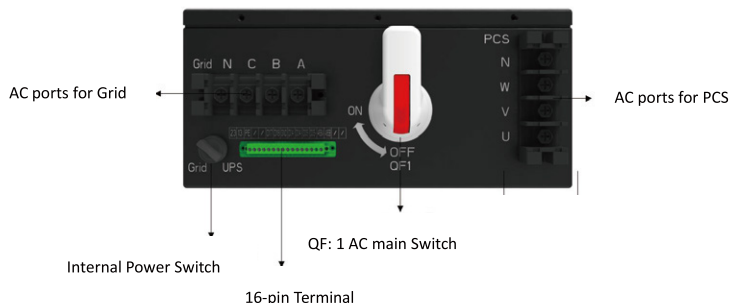


Schematic Diagram of Control Box

No.	Item	Parameter	Remarks
1	Dimensions (W*D*H)	470*830*196mm	See drawings
2	Weight	Approximately 35.4kg	
3	Power output	AC 220V	Power supply for whole cabinet
4	Secondary side power input	DC 24V	Controlled power input of high-voltage box
5	Primary side AC voltage	AC 380V	Grid-tied side voltage
6	Operating temperature	-20 to 55°C	
7	Current accuracy	±1%FSR	
8	Voltage accuracy	±1%FSR	
9	Low-voltage power consumption	≤40W	Power consumption inside the control box
10	Ingress Protection level	IP20	



Schematic Diagram of Front Panel of Control Box



Schematic Diagram of Rear Panel Layout of Control Box:

No	Part	Model	Q'ty	Remarks
1	QF1	NDG3-250	1	AC side main switch
2	QF3	SFB3-100H C25A/2P	1	Power switch inside the Cabinet
3	QF4	SFB3-100H C20A/2P	1	HVAC power switch
4	KAM	USCM025-004	1	Control signal communication socket
5	KDM	USCM124-004	1	Power socket
6	LYQ	SPRJS-5EPFFJ-TC7002	1	Router communication network port
7	HMI	SPRJS-5EPFFJ-TC7002	1	Touch screen communication port
8	PCS (front)	SPRJS-5EPFFJ-TC7002	1	PCS communication network port
9	BCU	SPRJS-5EPFFJ-TC7002	1	BCU communication network port
10	BCQ	SPRJS-5EPFFJ-TC7002	1	EMS communication network port
11	PCS (rear)	DSTB80-04 C4	1	AC380V to PCS
13	Grid (1)	DSTB80-04 C4	1	AC380V to grid-tied side
14	Grid (2)	HBDY5-KA-22X/21/H	1	Transfer switch
15	UPS	LC10MG-5.08-16P-1Y-00A	1	Wall through terminal

5.4 Optional Functions

PV+ESS integration is achievable for ECO-E101WX via 2 methods below:

◆ Through add-on DC-DC modules:

Conventional PCS does not come with PV charging function. Here with ECO-E101WX, inside the Cabinet, installation space for PV charging module is

already reserved. To realize PV charging, all we have to do is to add a PV charging module connecting to the PCS.

- ◆ PV+ESS integration is also achievable through upgrading PCS to HYBRID inverter:

To realize PV charging function BEFORE SHIPMENT, the normal PCS can be replaced with hybrid inverter at Sunpal factory. The hybrid inverter is with PV charging circuit with MPPT module, a special DC-DC module for PV application.

6. Packaging, Transportation and Storage

6.1 Packaging of Product

- ◆ By default, this product is packed in one package upon delivery:
- ◆ Remove the copper bars connecting the PACKs, wrap the bars together in one parcel, attaching packing-list; The bar parcel is shipped together with ESS Cabinet
- ◆ Place shock-absorbing cotton between battery PACKs;
- ◆ Place ESS Cabinet on a wood pallet and fix the cabinet to the pallet with bolts by the feet of cabinet;
- ◆ Place pearl cotton around the cabinet and fix it with wrapping film;
- ◆ Put corrugated card board outside the fixed pearl cotton, attaching a packing list of ESS Cabinet, and fix it again with wrapping film.



6.2 Transportation of Product

- ◆ Transportation Status

Upon delivery, the SOC of this product is 30%-50%, and all power (circuit) shall be disconnected: The positive and negative copper bars between PACKs, as well as the power cables of high-voltage box and control box, are removed to ensure the safety

during transportation. This cabinet shall be transported in one package.

◆ Transportation Requirements

- ✓ The transportation of ESS Cabinet assembly shall meet the relevant requirements of UN 3536;
- ✓ The lifting point for the Cabinet is the lifting rings on top of cabinet, and the lifting equipment's load capacity shall meet the requirements;
- ✓ The battery PACKs shall be protected from inversion, severe vibration, external impact, and compression during transportation;
- ✓ The ESS Cabinet may be transported by vehicles such as truck, train and ship;
- ✓ During transportation, recommended speed of vehicle is below 80km/H on Grade-I highway, below 60km/H on Grade-II highway and below 36km/H on Grade-III highway. Measures shall be taken to avoid damage or deformation to the Cabinet;
- ✓ The spare parts and other components shipped together with the cabinet shall be packed in good condition, with basic information of names and quantities showing on the attached packing list, so as to meet the requirements of sea transportation.

6.3 Storage of Product

The SOC of ECO-E101WX shall be maintained within the range of 20%-50% during storage. In case that the Cabinet is to stay idle for a period of 1~3 months, the cabinet shall be charged and discharged (one cycle) in advance to keep the SOC at 20%-50%. Sunpal shall not be held liable for any loss of capacity due to failure of complying with this requirement.

7. Warranty Statement

Refer to Limited Warranty Letter for Sunpal ESS Products (Standard Edition).

The warranty conditions are also subject to terms and conditions of a **contract**.

- ◆ For the purpose of continuously improving client satisfaction, our products and product manuals are being constantly updated. Due to version difference, discrepancies of warranty conditions and product specifications may take place: In this case, confirmed contract shall prevail. For any question, please contact us.
- ◆ Software Licensing
 - ✓ It is prohibited to use all or any of the data in the firmware or software

developed by us for commercial purposes in any way.

- ✓ It is prohibited to decompile, decrypt, or perform any other operation that may damage the original program design on the software developed by us.

8. Safety Usage Guidelines

- ◆ In order to avoid battery damage or personal injury caused by misuse of square lithium-ion battery module, please carefully read the following safety guidelines before using square lithium-ion battery:
- ◆ Improper use and storage of battery poses a risk of fire, explosion, and burn. Do not decompose, crush, incinerate or heat battery, or put battery into fire;
- ◆ If it is necessary to replace the battery, the battery produced by the same manufacturer shall be used. mixing batteries from different manufacturers may cause performance degradation, even fire and explosion;
- ◆ Do not put the battery into water or wet it; Do not short-circuit, overcharge, or over-discharge the battery;
- ◆ Do not install, use, or store the battery-based energy storage device near any heat source (such as fire or heater);
- ◆ Do not puncture the battery shell, and do not hit, throw, step on, press heavily, or roll the battery;
- ◆ Do not dismantle, repair or modify the battery product in any way without authorization;
- ◆ If the battery emits any odor, heats up, gets deformed, gets discolored, or has any other abnormal phenomenon, immediately stop using it, and transfer the abnormal battery to the emergency disposal site;
- ◆ If the battery catches fire, immediately cut off the high and low voltage circuits and use dry powder fire extinguishers or sand to extinguish the fire. If water is used for fire extinguishing, it is necessary to use an absolutely sufficient amount of water for long-term submergence, and it is prohibited to splash insufficient water onto the battery device.
- ◆ Without the consent of Sunpal, it is prohibited to dismantle the Cabinet, or modify or change the design and architecture of the Product; otherwise, the performance of the battery may get affected.

(END)