Elecnova

All-in-one Liquid-cooled

ESS Cabinet ECO-E233LS Specifications

SOLSHARE DISTRIBUTION

CAPTURING ENERGY FOR A CLEANER FUTURE

Shanghai Elecnova Energy Storage Co., Ltd.

Revision History

Version	Description	Editor	Date	Remarks
A/1	New release	Sun Jianyao	March 1, 2024	

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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-E233LS (hereafter referred to as ECO-E233LS, or the ESS Cabinet, or the Cabinet, or the Product) produced by Shanghai Elecnova Energy Storage Technology Co., Ltd. (hereafter referred to as “Elecnova”) 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 34120-2017 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

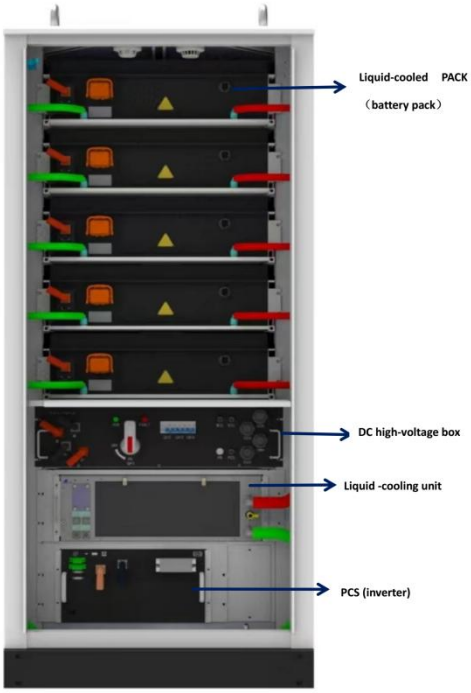
GB 4208-2008 Degrees of protection provided by enclosure (IP code)

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



Physical Image of ECO-E233LS **Layout of ECO-E233LS**

No.	Part	Quantity	Remarks
1	PCS (inverter)	1	
2	High-voltage box	1	/
3	Fire protection unit	1	/
4	PACK	5	Grouping mode is 1P52S
5	Liquid-cooling unit	1	5KW（W18/L35）
6	Cabinet body	1	W_1050 * D_1350 * H_2400 mm

4. Technical Parameters of System

Item	Specifications	Remarks
Product model	ECO-E233LS	
DC Side Parameters		
Cell type	LFP 280Ah	
Grouping method	1P260S	
Rated energy	232.96KWh	100%DOD,（25±2）℃,0.5P
Rated capacity	280Ah	
Rated voltage	832V	
Recommended voltage range	DC 728-936V	Cell lower limit voltage 2.8V Cell upper limit voltage 3.6V
AC Side Parameters		
Rated output power	100kW	
Maximum AC power	110kW (continuous for 1 minute)	
Grid voltage	400V ac/3P+N+PE	
Grid frequency	50Hz/60Hz	
THDi	≤3%	
DC component	＜0.5%Ipn	
Power factor range	-0.98 to 0.98	
System Parameters		
Energy conversion efficiency	≥89%	Excluding auxiliary power consumption
Charging/discharging rate	≤0.5P	
Discharge depth	95%DOD	
Cycle life	≥8000 times (25±2℃)	Rated operating conditions: 25±2℃, 0.5P and 95%DOD

Protection level	IP55	
Cooling method	Active liquid cooling	
Operating temperature	-25 to 55℃	
Relative humidity	0-95%RH, without condensation	
Altitude	≤2000m	Derated above 2,000m
Dimensions (W*D*H)	1050*1350*2400mm	
Total weight	Approximately 2670kg	
Fire protection system	PACK-level aerosol + Cube-level aerosol fire extinguishing	
Communication	Ethernet/RS485	
Standards complied with	GB/T 36276, GB/T 34120, GB/T 34131, UN38.3, IEC62619, UL1973, UL9540, and CE-EMC	

5. Product Introduction

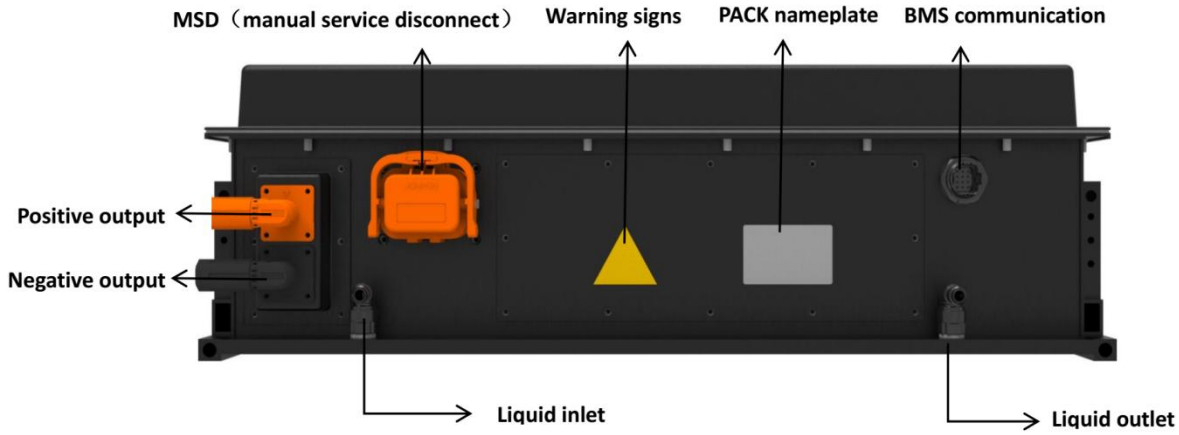
5.1 PACK

Each ECO-E233LS contains 5 units of liquid-cooled PACK (model nr. ECO-P1P52LS), PACK #5 at the top. PACK #1 at the bottom. Each PACK is composed of 52 units of LFP-280Ah cell in series.

Diagram of Liquid-cooled PACK

The parameters are as per the table below:

No.	Item	Parameter	Condition
1	Model	ECO-P1P52LS	/
2	Cell capacity	LFP280Ah	Standard charge/discharge
3	Grouping mode	1P52S	/
4	Nominal energy	46.592kWh	Standard charge/discharge
5	Nominal voltage	DC 166.4V	Standard charge/ discharge
6	Recommended voltage range	DC145.6-187.2V	Cell voltage 2.8-3.6V
7	Charge/discharge rate	0.5P	Constant power
8	Cooling method	Liquid-cooling	
9	Dimensions (W * D * H)	800*1135*247.5 mm	See drawings
10	Weight	Appr. 342 kg	Including connecting copper bars
11	Protection level	IP65	
12	Cell operating temperature range	-20 to 55℃	discharging
13		0-55℃	charging
14	Recommended working temperature range	20-30℃	
15	Storage temperature range	-20 to 45℃	Batteries shall be charged and maintained once every 3 months in storage
16	Storage humidity	<75%RH, without condensation	
17	Applicable system voltage level	≤1500V DC	
18	Communication method	CAN	/
19	Shipping SOC	30%-50%	(25±2)℃
20	Warranty operating conditions	(25±2)℃	/

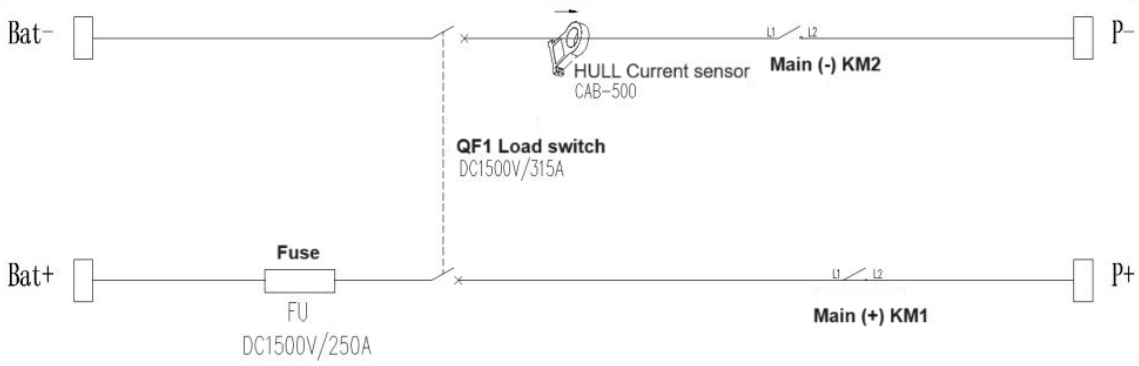


Schematic Diagram of Liquid-cooled 1P52S PACK Panel

No.	Part	Model	Q'ty	Remarks
1	Output positive pole	ES-FT-BPC-B/S 35-70 OG	1	PACK polarity **+**
2	Output negative pole	ES-FT-BPC-B/S 35-70 BK	1	PACK polarity -
3	MSD	DLQ5-Z-B,200A, DC750V	1	Manual maintenance switch
4	BMU interface	Plug: USCM012-R03_A	1	Communication interface
6	Inlet	Inner Diameter: 10	1	Inlet
7	Outlet	Inner Diameter: 10	1	Outlet

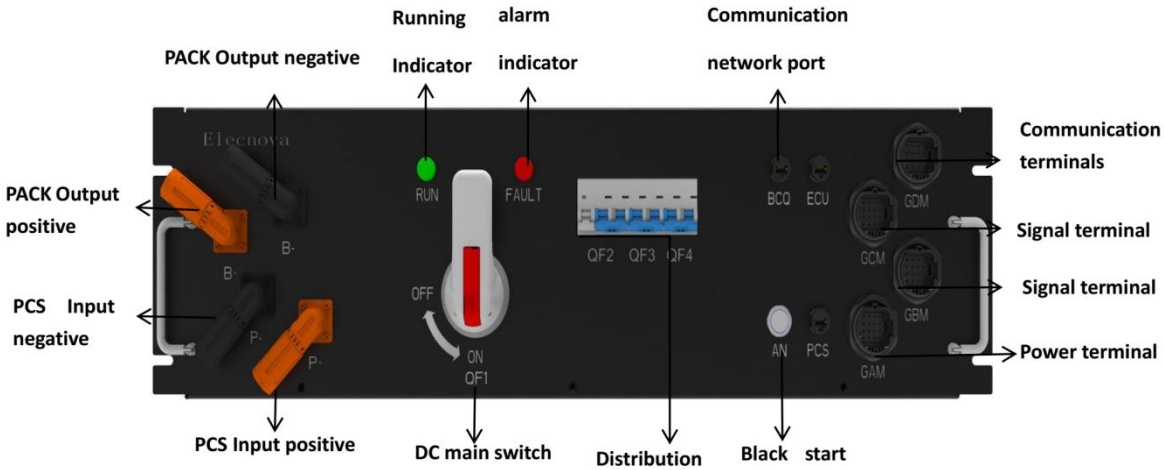
5.2 DC High-voltage Box

Appearance Diagram of High-voltage Box



No.	Item	Parameter	Remarks
1	Dimensions(W*D*H)	943*800*231mm	See drawings
2	Weight	Appr. 60kg	

3	Power input	AC 220V	Auxiliary supply of high-voltage box
4	Low-voltage output	DC 24V	Communication power of high-voltage box
5	Rated high-voltage output	DC 832V	DC 728V-DC 936V
6	Operating temperature	-25 to 55℃	
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-R03_A	1	Communication terminal A
6	GBM	USCM016-R03_A	1	Communication terminal B
7	GCM	USCM016-R03_A	1	Communication terminal C
8	GDM	USCM124-004-R03	1	Power terminal D
9	QF1	NDG3VH-315	1	DC main switch
10	QF2	SFB3-100HC32/2P	1	Whole-cabinet power switch
11	QF3	SFB3-100HC25/2P	1	HVAC power switch
12	QF4	SFB3-100HC10/2P	1	24V power switch
13	AN	HBDS1-AGQ22F-22E/J/S	1	Black start button
14	RUN	HBD16-16DS/DC24V/G	1	High-voltage box RUN indication
15	Fault	HBD16-16DS/DC24V/R	1	High-voltage box alarm indication
16	BCQ	SPRJS-5EPFFJ-TC7002	1	EMS network communication
17	ECU	SPRJS-5EPFFJ-TC7002	1	ECU network communication
18	PCS	SPRJS-5EPFFJ-TC7002	1	PCS network communication

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 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 the ESS Cabinet 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-1 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 must be packaged 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 the ECO-E233LS 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 to 20%-50%. Elecnova 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 Elecnova 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.

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;
- It is necessary to replace the battery or PACK with the one from the same manufacturer. The use of batteries from different manufactures may result in reduced performance, and even the risks of 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 Elecnova, 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.

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