SOLUNA

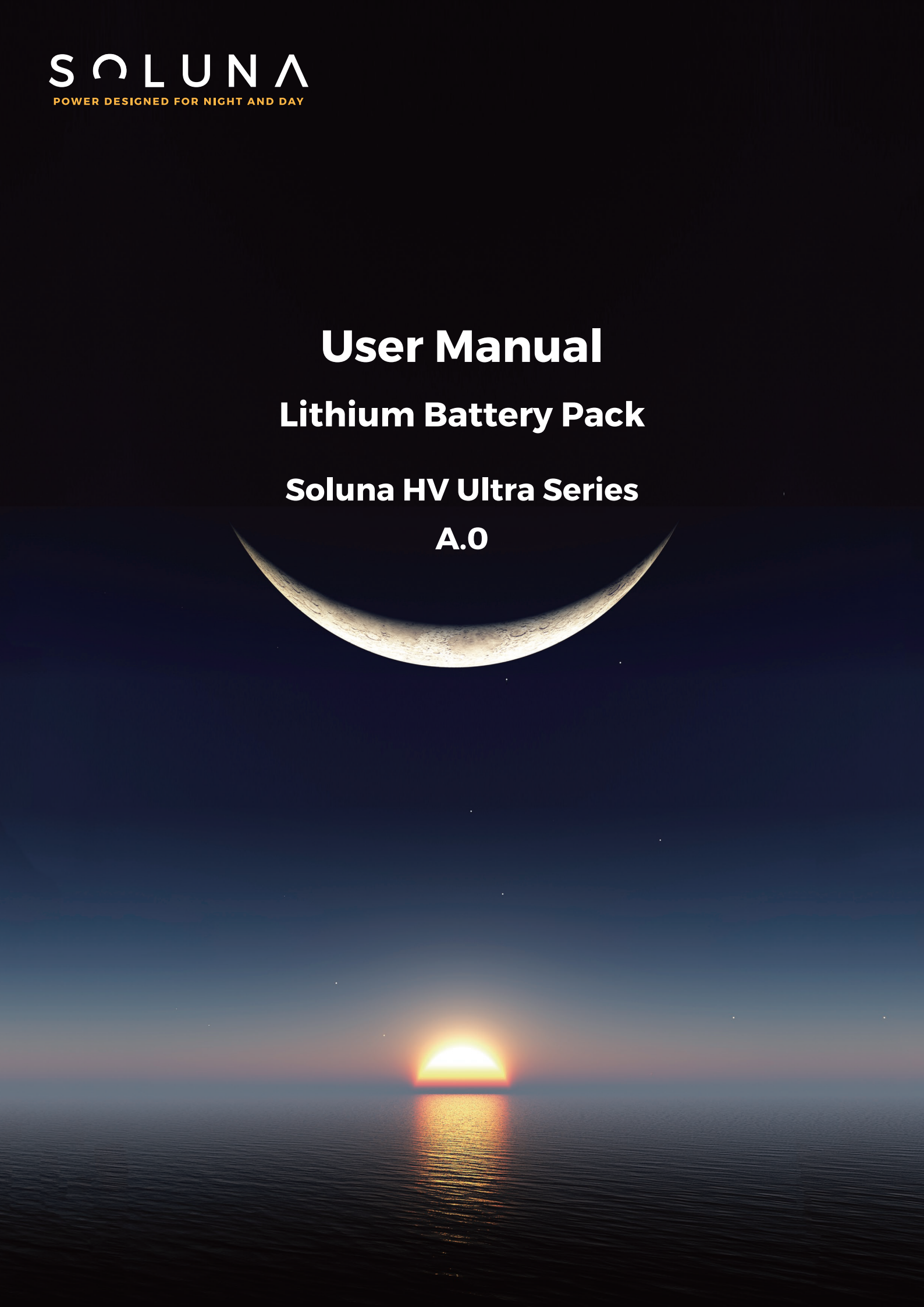
POWER DESIGNED FOR NIGHT AND DAY

User Manual

Lithium Battery Pack

Soluna HV Ultra Series

A.0



About this Specification

This manual provides comprehensive instructions for installing the Soluna HV Ultra series battery . It is imperative to thoroughly read this manual before attempting to install the product and to follow the instructions diligently throughout the installation process.

If you have any doubts about the requirements, recommendations, or safety procedures described in this manual, please contact Soluna immediately for advice and clarification.

The information contained in this manual is accurate at the time of publication. However, due to ongoing updates to product design and technical specifications, our company reserves the right to make changes at any time without prior notice. Additionally, the illustrations included in this manual are intended to aid in explaining system configuration concepts and installation instructions. The items depicted in the illustrations may differ from the actual items at the installation site.

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1 Introduction

The Soluna HV Ultra series battery is an advanced LFP lithium battery product designed to meet the highest standards of performance and safety. Equipped with a sophisticated Battery Management System (BMS), this low-voltage battery module features CAN/RS485 communication for seamless integration and monitoring. It includes comprehensive protections against under-voltage, over-voltage, over-current, over-temperature, and under-temperature, ensuring optimal performance and safety under various conditions.

With its high energy density, long lifespan, and robust reliability, the Soluna HV Ultra series battery stands out as a green environmental product you can trust. Its innovative design not only enhances efficiency but also contributes to sustainability, making it an ideal choice for Backup Power, Micro-grid Solutions, and Small Industrial & Commercial Energy Storage Systems.

2 Features

2.1 Features

- **Excellent Safety Performance**
  Ensures the highest level of safety under various conditions.
- **Long Cycle Life**
  Designed for extended usage without significant performance degradation.
- **Support for CAN-communication**
  Provides support for CAN-based communication between devices.
- **High energy density**
  Features high energy density for efficient power storage.
- **Excellent battery management system**
  Equipped with an excellent battery management system (BMS) for safety and efficiency.
- **Number of expandable battery module,at least 2, up to 5**
  Supports 2 to 5 expandable battery modules.
- **Wi-Fi monitor**
  Wi-Fi monitoring supported.
- **Active balancing function,manage the consistency of batteries more efficiently**
  Active balancing function for efficient battery consistency management.
- **Built-in fire extinguishing device**
  Built-in fire extinguishing device for enhanced safety.
- **Small size and light weight, easy installation and maintenance of standard module**
  Compact and lightweight design for easy installation and maintenance.

2.2 Application

- Back-up power
- Micro-grid
- Home Energy Storage system

3 Safety Precautions

3.1 Warning Signs

Warning signs are essential indicators designed to alert you to conditions that could result in severe injury or significant damage to the device. They serve as critical reminders to exercise caution and take necessary precautions to prevent hazardous situations. The table below outlines the warning signs used in this manual and their meanings:

Sign	Description
	High Voltage Warning: This battery pack operates at high voltage,which can cause severe injury due to electric shock.
	Correct Polarity: Ensure the battery polarity is correctly connected.
	Fire Safety: Keep the battery pack away from open flames or ignition sources.
	Child Safety: Store the battery pack out of reach of children.
	Installation Manual: Thoroughly read the manual before installing and operating the battery pack.
	Heavy Weight Warning: The battery pack is heavy, and improper handling may result in severe injury. Utilize proper lifting techniques.
	Electrolyte Leakage: The battery pack may leak corrosive electrolyte. Handle with care and adhere to appropriate safety procedures.
	Explosion Risk: The battery pack may explode under certain conditions.
	Disposal Instructions: Do not dispose of the battery pack with household waste at the end of its working life. Follow local regulations for disposal.
	Compliance Requirement: Failure to follow the provided requirements and guidelines may lead to physical injury or damage to the device.
	Do not short circuit.
	Grounding conductor This symbol indicates the position for connecting a grounding conductor.

3.2 Safety Instructions

For safety reasons, it is crucial that installers thoroughly familiarize themselves with the contents of this manual and all associated warnings prior to commencing the installation.

General Safety Precautions

Failure to adhere to the precautions outlined in this section can result in serious injury or property damage. Please observe the following safety guidelines:

3.2.1 Risks of Explosion

- Avoid subjecting the battery pack to strong impacts.
- Do not crush or puncture the battery pack.
- Never dispose of the battery pack in a fire.

3.2.2 Risks of Fire

- Do not expose the battery pack to temperatures exceeding 60˚C.
- Keep the battery pack away from heat sources, such as fireplaces.
- Avoid exposing the battery pack to direct sunlight.
- Ensure the battery connectors do not come into contact with conductive objects like wires.

3.2.3 Risks of Electric Shock

- Refrain from disassembling the battery pack.
- Do not touch the battery pack with wet hands.
- Keep the battery pack away from moisture or liquids
- Ensure the battery pack is kept away from children and animals.

3.2.4 Risks of Damage to the Battery Pack

- Do not allow the battery pack to come in contact with liquids.
- Do not subject the battery pack to high pressures.
- Do not place any objects on top of the battery pack.

3.3 Battery Handling Guide

- Use the battery pack only as directed.
- Do not use the battery pack if it appears defective, cracked, broken, or fails to operate correctly.
- Do not attempt to open, disassemble, repair, tamper with, or modify the battery pack as it is not user serviceable.
- Handle the battery pack with care during transportation to avoid damage.
- Avoid impacting, pulling, dragging, or stepping on the battery pack.

3.4 Response to Emergency Situations

The Soluna HV Ultra series battery pack comprises multiple batteries that are designed to prevent hazards resulting from failures. However, Soluna cannot guarantee their absolute safety.

3.4.1 Leaking Batteries

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. the electrolyte is corrosive and contact may cause skin irritation and chemical burns. If someone is exposed to the leaked substance, do these actions:

3.4.2 Inhalation

- Evacuate the contaminated area immediately.
- Seek medical attention without delay.

3.4.3 Eye Contact

- Rinse eyes with flowing water for at least 15 minutes.
- Seek medical attention immediately.

3.4.4 Skin Contact

- Wash the affected area thoroughly with soap and water.
- Seek medical attention immediately.

3.4.5 Ingestion

- Induce vomiting.
- Seek medical attention immediately.

3.4.6 Fire Response Procedures

In the event of a fire, always have an ABC or carbon dioxide extinguisher on hand.

The battery pack may ignite if heated above 150 ˚C. If a fire occurs where the battery pack is installed, follow these steps:

- **Extinguish Early**
  Attempt to extinguish the fire before the battery pack ignites.
- **Safe Relocation**
  If extinguishing is not possible but time allows, move the battery pack to a safe area before it catches fire.
- **Evacuate**
  If the battery pack has already caught fire, do not attempt to extinguish it. Evacuate the area immediately.

Caution: If the battery catches fire, it will emit noxious and poisonous gases. Do not approach the fire.

3.4.7 Wet Batteries

If the battery pack becomes wet or submerged in water, do not attempt to access it. Contact Soluna or your distributor for technical assistance immediately.

3.4.8 Damaged Batteries

Damaged batteries are hazardous and must be handled with extreme caution. They are unfit for use and may pose a danger to people or property.

If the battery pack appears damaged, pack it in its original container and return it to Soluna or your distributor.

Leakage and Flammability: Damaged batteries may leak electrolyte or produce flammable gas. If you suspect such damage, contact Soluna for advice and information immediately.

3.5 Qualified Installers

This manual, along with the tasks and procedures described herein, is intended for use by skilled professionals only. A skilled professional is defined as a trained and qualified electrician or installer who possesses all of the following skills and experience:

- **Functional Knowledge**

  Understanding of the principles and operation of on-grid systems.

- **Risk Awareness**

  Awareness of the dangers and risks associated with installing and using electrical devices and the acceptable methods for mitigating these risks.

- **Installation Proficiency**

  Expertise in the installation of electrical devices.

- **Adherence to Guidelines**

  Knowledge of and compliance with this manual, including all safety precautions and best practices.

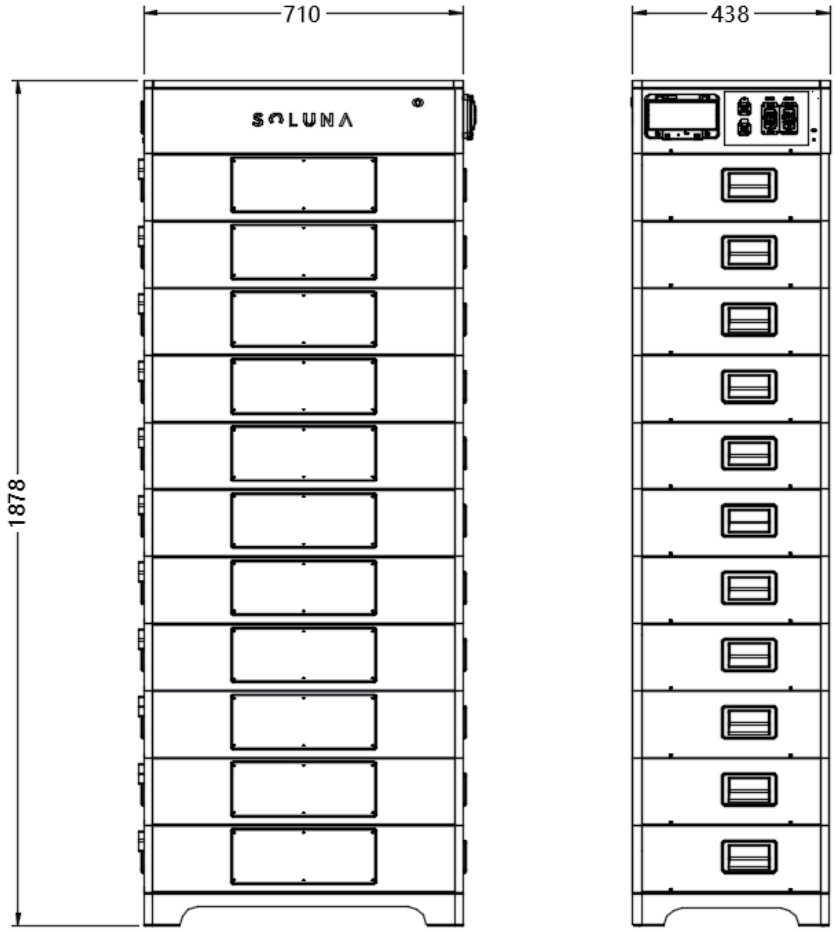
- **Battery Maintenance**

  Only authorized personnel should perform maintenance.Turn off the battery before maintenance.Periodically check voltage, SOC, and cables for damage or wear.Perform balancing maintenance (fully charge) every three months.

- **Installation Environment Requirements**

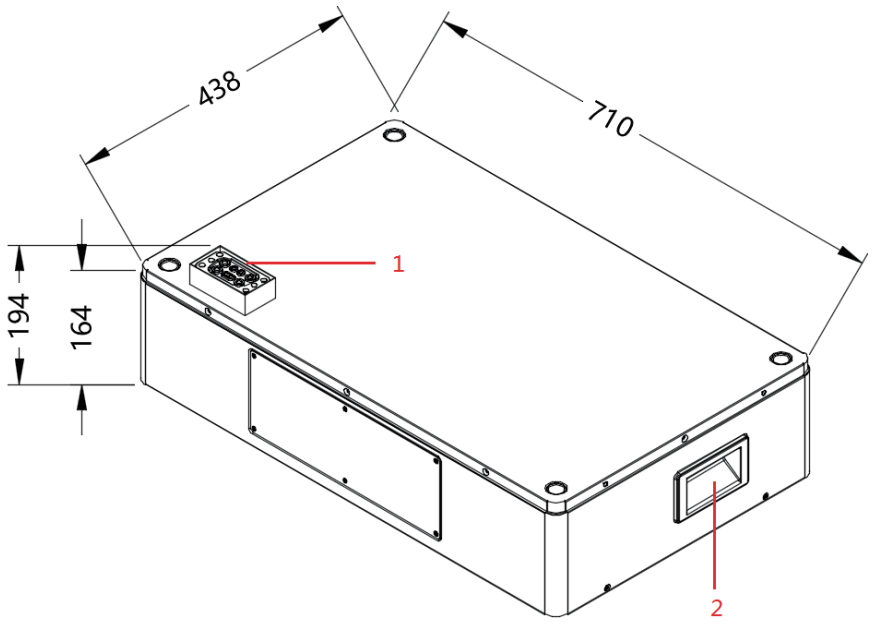
  Avoid flammable, explosive, or corrosive materials. Keep out of children's reach and avoid high temperatures.Ensure proper ventilation and avoid electromagnetic interference.Install in a sheltered, well-ventilated area, within the appropriate temperature and humidity range, and below 2000 meters altitude.

4 Appearance



Width	710	mm
Depth	438	mm
Height	1878	mm

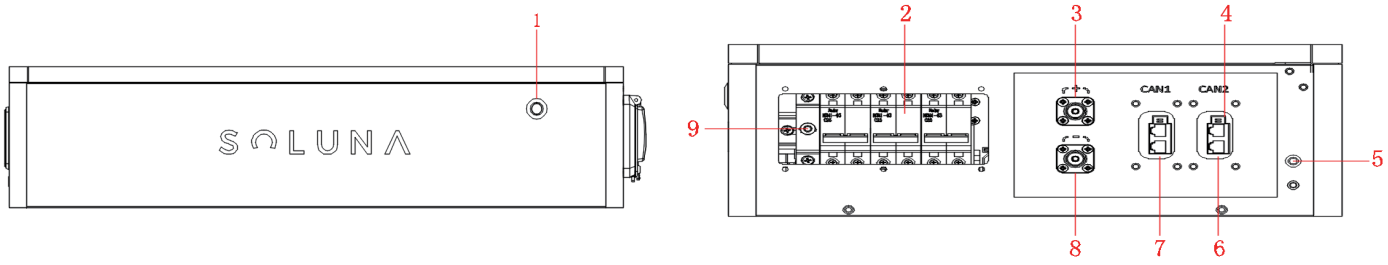
4 Appearance



Width	710	mm
Depth	438	mm
Height	164	mm

Number	Name	Description
1	Stacked connector socket	Battery module series connection port
2	Hands	

4 Appearance



Number	Name	Description
1	LED light	Status indicator light
2	Breaker	For controlling the output and cutting off the battery voltage
3	The positive port of the battery	Output positive of battery module
4	DIP switch	For parallel terminal resistors
5	PE	Ground point
6	CAN2 port	For communicate between batteries
7	CAN1 port	For communicate with the inverter
8	The negative port of the battery	Output negative of battery module
9	Black Start button	Press and hold for about 10 seconds to output the battery voltage

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5 Technical parameters

Model	2 unit	3 unit	4 unit	5 unit	6 unit
Physical characteristics					
Dimensions (W * D * H)	710x438x328	710x438x492	710x438x656	710x438x820	710x438x984
Weight(kg)	123.6	185.4	247.2	309	
Electrical characteristics					
Battery type	LFP				
Total Energy Capacity(kWh)	15.36	23.04	30.72	38.40	46.08
Usable Energy Capacity(kWh)	13.82	20.74	27.65	34.56	41.47
Battery Capacity (Nominal)(Ah)	100				
Voltage Range(Usable)(V)	134.4~168	210.6~273.6	268.8~336	336~420	403.2~504
Nominal Voltage(V)	153.6	230.4	307.2	384.0	460.8
Charge/Discharge Power (Nominal)(kW)	7.7	11.5	15.4	19.2	23.0
Max.Charge/Discharge Power (kW)	7.7/7.7	11.5/11.5	15.4/15.4	19.2/19.2	23.0/23.0
Charge/Discharge Current (Nominal)(A)	50A / 50A				
Charge/Discharge Current (Max)(A)	50A / 50A				
DOD	90%				
Round-Trip Efficiency	≥96%				
Self discharge @25℃	≤2%				
Cycle life (+0.5C/-0.5C, 25±2℃)	≥6000				
DC Disconnect	Contactor / Fuse				

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5 Technical parameters

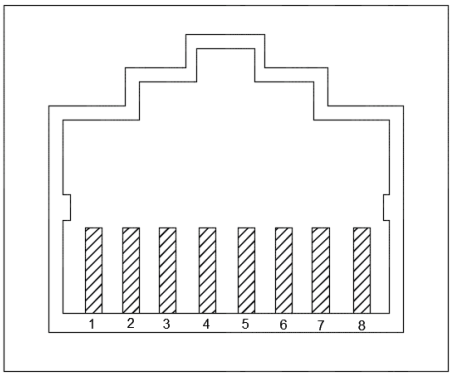
Model	7 unit	8 unit	9 unit	10 unit	11 unit
Physical characteristics					
Dimensions (W * D * H)	710x438x1148	710x438x1312	710x438x1476	710x438x1640	710x438x1804
Weight(kg)	432.6	494.4	556.2	618	679.8
Electrical characteristics					
Battery type	LFP				
Total Energy Capacity(kWh)	53.76	61.44	69.12	76.8	84.48
Usable Energy Capacity(kWh)	48.38	55.30	62.21	69.12	76.03
Battery Capacity (Nominal)(Ah)	100				
Voltage Range(Usable)(V)	470.4~588	537.6~672	604.8~756	672~840	739.2~924
Nominal Voltage(V)	537.6	614.4	691.2	768.0	844.8
Charge/Discharge Power (Nominal)(kW)	26.9	30.7	34.6	38.4	42.2
Max.Charge/Discharge Power (kW)	26.9/26.9	30.7/30.7	34.6/34.6	38.4/38.4	42.2/42.2
Charge/Discharge Current (Nominal)(A)	50A / 50A				
Charge/Discharge Current (Max)(A)	50A / 50A				
DOD	90%				
Round-Trip Efficiency	≥96%				
Self discharge @25℃	≤2%				
Cycle life (+0.5C/-0.5C, 25±2℃)	≥6000				
DC Disconnect	Contactor / Fuse				

5 Technical parameters

Number of expandable battery units	/
Monitoring parameters	System Voltage , System Current , Cell Voltage Cell temperature , SOC , Insulation
Operating Conditions	
Condition	Indoor & outdoor conditioned
Operating Temperature (Charge/Discharge)	0~55℃ / -25~55℃
Operating Temperature (Recommended)	15~30℃
Storage Temperature	-25~60℃
Humidity	5%~95%
Altitude	Max. 2,000 m
Cooling Strategy	Natural Convection
Reliability &Certification	
Certificates	
Transportation	
Ingress Rating	IP65
Physical Characteristics	
Please refer to SOLUNA WARRANTY CONDITIONS	

6 CAN communication interface definition

Once the cover plate of the Soluna Soluna HV series battery is opened, users can view the connection ports of the battery. Please refer to the images below for detailed visuals.



CAN1

1	2	3	4	5	6	7	8
—	—	—	CAN-H	CAN-L	—	—	—

CAN2

1	2	3	4	5	6	7	8
485A	485B	12V+	CAN-H	CAN-L	GND	CAN3H	CAN3L

Remark:

1) CAN1 is used for BMS parameters monitoring
2) CAN2 is used for Inverter communication

7 Installation

7.1 Packing List

The following table lists the numbers of each item included. If anything is damaged or missing, contact SOLUNA or your distributor.

Item	Name	Description	Qty (pcs)	Photo
1	M4 × 12 Countersunk Phillips Screw	used for secure, flush-mounted fastening	4	
2	M5 × 10 External Hex Phillips Screw	screw for versatile fastening	2	
3	M6 × 60 Expansion Bolt	used for secure anchoring in walls or masonry	6	
4	Wi-Fi Bracket	A bracket used to mount or support Wi-Fi devices	1	
5	Wall Mounting Bracket	A bracket used for secure wall-mounted installation	2	
6	4 × 12 Countersunk Phillips Screw	for flush-mount fastening	4	

7.2 Installation materials

These installation materials shall be prepared by installers.

- Charging cables
- Network cables
- DC breaker

7.3 Installation Lo cation

We recommend that Soluna HV Ultra series batteryis used in Soluna Home energy storage systems, if not, please Make sure that the installation location meets the following conditions:

- The building is designed to withstand earthquakes.
- The location is far away from the sea, to avoid salt water and humidity.
- The floor is flat and level.
- There are no flammable or explosive materials nearby.
- The ambient temperature is between 15 and 30˚C.
- The temperature and humidity stays at a constant level.
- There is minimal dust and dirt in the area.
- There are no corrosive gases present, including ammonia and acid vapor.
- The working temperature range:0 ~50˚C,optimum temperature: 15 ~30˚C.

If the ambient temperature is outside the operating range, the battery pack stops operating to protect itself. The optimal temperature range for the battery pack to operate is 15˚C to 30˚C. Frequent exposure to harsh temperatures may deteriorate the performance and lifetime of the battery pack.

Notice:

Do not place the battery system in direct sun light. it is suggested to build sunshade equipment in cold area the heating system is required.

7.4 Installation Tools Requirements

The following tools are required to install the battery pack:

Remark:
Use properly insulated tools to prevent accidental electric shock or short circuits.

Item	Photo	Name
1		Phillips-screwdriver bit
2		Wire cutters
3		Wire stripper
4		Tape measure
5		Pistol drill
6		Spirit level
7		Electrical insulating tape
8		Multimeter
9		Marker pen

When handling the battery pack, it is essential to wear the appropriate safety gear to protectagainst potential hazards, installers must adhere to the relevant reguirements of international standards, such as IEC 60364, or comply with domestic legislation.

1		Safety goggles
2		Safety shoes
3		Insulated gloves

7.5 Wiring Specification

In order to standardize the wiring specification of Soluna Soluna HV series battery, the following requirements are required for connecting wires of Soluna HV series battery.

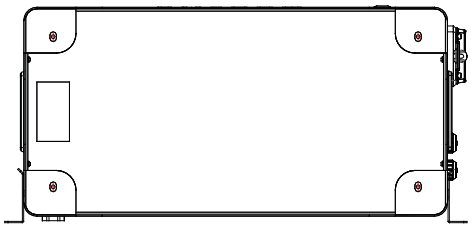
Battery Wire	Communication Cable
It is recommended to use 4AWG of conductor with double insulation	It is recommended to use standard communication cable with shielding function.

7.5 Install The Battery

Installation Steps

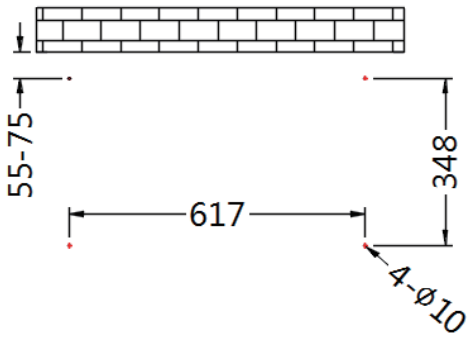
Step 1:

Use an impact drill to make 4 holes on the horizontal ground, with a size of 10*60mm; then fix the base with M6*60mm expansion screws. The distance between the base and the wall can be adjusted within 10-30mm.

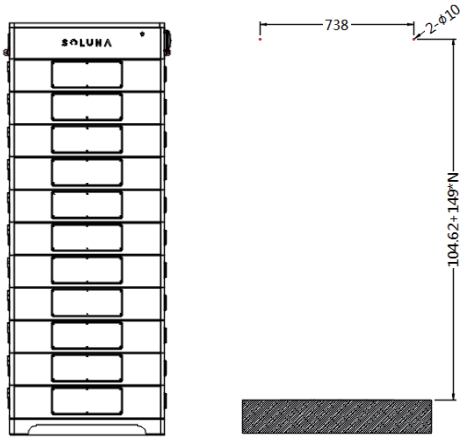


Step 2:

Use an impact drill to make two holes in the wall with dimensions 10 × 60.The drilling height is determined by the number of modules and follows the formula: 96.8 + 195 × N (where N is the number of modules).Then, use two M6 × 60 mm expansion bolts to mount the fixing bracket onto the wall.



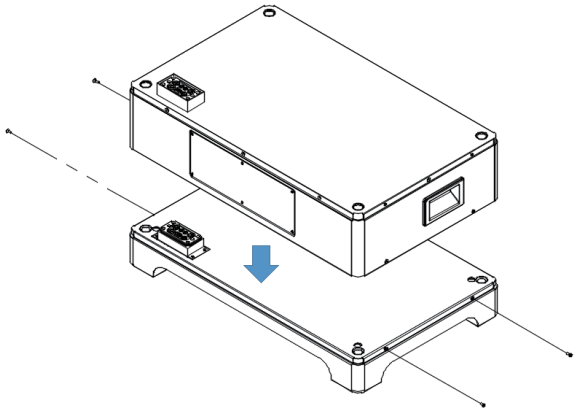
Example: Stack 11 modules and make holes according to the following dimensions



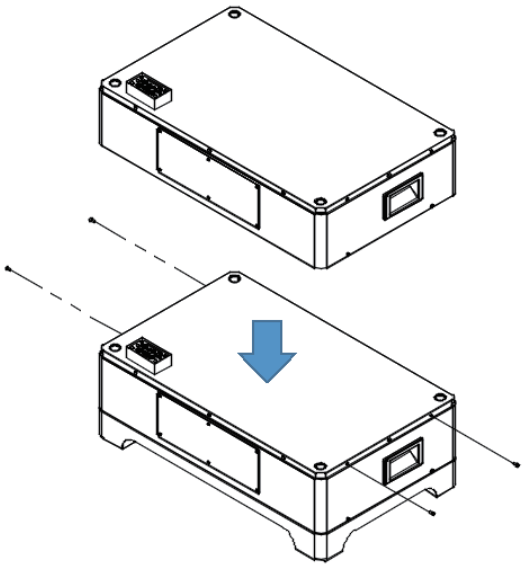
7.5 Install The Battery

Installation Steps

Step 3:
Take a module, align it with the base, and place it on. Then lock the M4 screws on both sides



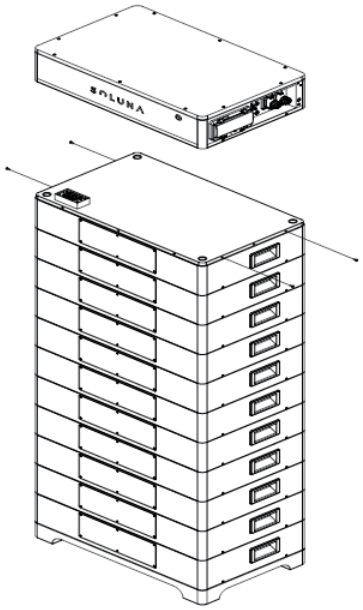
Step 4:
Take the next module and align it with the module installed in the previous step. Place it on top, then lock the M4 screws on both sides. Repeat this process for all the modules



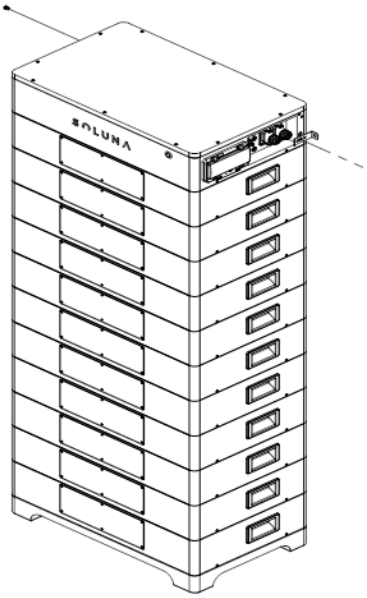
7.5 Install The Battery

Installation Steps

Step 5:
Align the BMU with the fixed module and place it on, then lock the M4 screws on both sides



Step 6:
Use M6*12mm screws to fix the BMU securely to the wall bracket



8 Electrical connection

8.1 Connection requirements

- Safety note: Power supply to the inverter and battery must be cut off before connection to avoid electric shock.
- Grounding Instructions: This product must be connected to a grounded, metallic, permanent wiring system.
- Note: Personal protective equipment, such as safety shoes, safety gloves, insulating gloves, etc. must be worn during electrical connection.
- All electrical connections should be made by qualified professionals.
- The cable colors in this document are for reference only. The cable specifications must comply with local laws and regulations.
- Equipment damage caused by incorrect wiring is not covered by the equipment warranty.

8.2 Connection steps

- Step 1
  Crimp the manufacturer-provided terminals onto both ends of the charging wires.Then connect the red wire to the positive terminal of the battery and the positive terminal of the inverter; connect the black wire to the negative terminal of the battery and the negative terminal of the inverter.

- Step 2
  Connect the communication cable to the BMS port of the inverter and the CAN1 port of the battery.

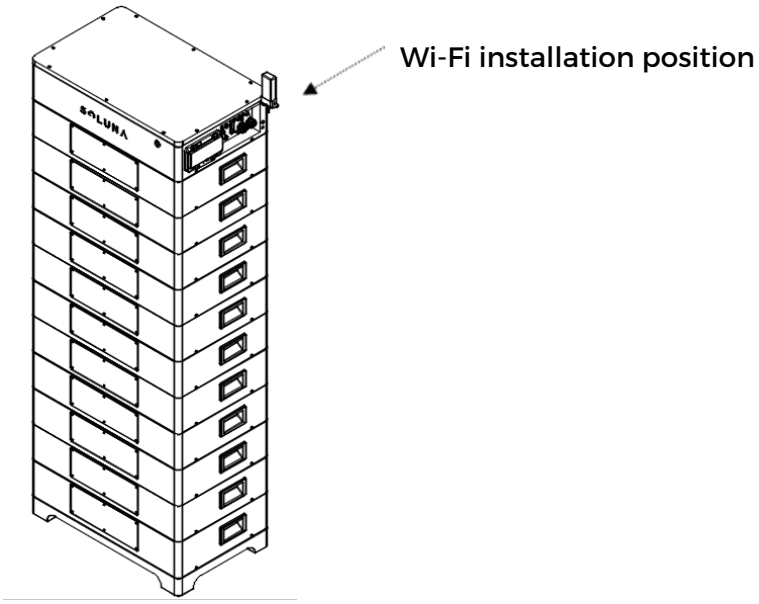
8.3 Wi-Fi module connection

8.3.1 Single unit connection

- Step 1
  Install the bracket of the WIFI module onto the BMU, and then fix the WIFI module onto the bracket.

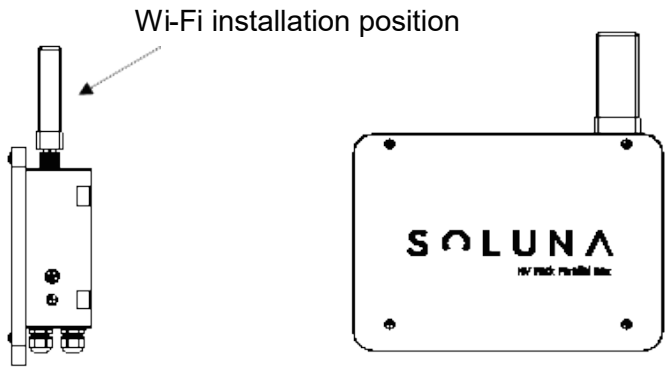
- Step 2
  Connect the communication cable of the WIFI module to the WIFI module and the CAN2 port of the battery.

8 Electrical connection



8.3.2 Parallel unit connection

User only need to install 1 unit Wi-Fi module on the HV parallel box, Please find the following position of Wi-Fi module for details.



Remark:

1)User can find the user manual of Wi-Fi module in the Wi-Fi packing box.

8.4 Electrical system connection diagram

Standalone

- Communication cable
- Battery positive pole
- Battery negative pole

8.4 Electrical system connection diagram

Multiple Clusters

- Communication cable
- Battery positive pole
- Battery negative pole

9 Operation instructions

9.1 Check before starting up

- The equipment should be installed firmly, the installation location should be convenient for operation and maintenance, the installation space should be convenient for ventilation and heat dissipation, and the installation environment should be clean and tidy.
- The protection ground cable, battery power cable, communication cable, and AC cable are properly and firmly connected.
- Cable bundling meets requirements and is reasonably distributed without damage.
- Before power-on, all switches are in the off state.

Notice:

- Do not reverse or short circuit the positive and negative electrodes of the battery, otherwise the battery pack will be damaged.
- Do not connect the BMS communication line incorrectly, otherwise the battery will not work or be damaged.
- Equipment damage caused by incorrect wiring is not covered by the equipment warranty.

9.2 Startup

- Step 1:
  Turn on the breaker, wait for about 10 seconds, the battery status indicator will light up.
- Step 2:
  Turn on the inverter power PV or power grid, and the inverter starts to run.
- Step 3:
  Select the correct battery protocol on the inverter, ensure that the battery and inverter are communicating normally.
- Step 4:
  Check whether the battery can be charged and discharged.

Notice:

- The soluna HV Ultra Series must communicate with the inverter normally to work normally.
- In pure off-grid mode, without PV and power grid, press the black start button for a long time to start the system.

10 Status indicator light introduction

Please find the following table for details.

Number	Color	Description
1	Red	1. Battery is on black start mode. To active battery black start mode, please press the black start button and hold for 10 seconds. Battery can power the inverter and active the communication with inverter if there is no power grid or solar panels. 2. BMS hardware anomaly.
2	Purple	Battery has lost communication with inverter for over 5 minutes.
3	Yellow	Battery is on protection model. The battery reached to the 3rd level protection alarm such as over voltage, under voltage, over temperature, low temperature, etc.
4	White	Battery is on working model. If there are more than one battery in parallel connection, it means this battery is the master battery on working model.
5	Green	Battery is on working model as a slave battery in parallel connection.
6	Blue	BMS hardware anomaly

11 Maintenance and troubleshooting

11.1 Maintenance

- It is recommended that the battery system needs to be recharged every 6 months from the time it leaves the factory.
- When the system is not used for a long time, it is necessary to disconnect the battery output to avoid battery exhaustion.
- During system operation, professionals should regularly check the system for abnormalities and faults. If any problems are found, please deal with them in time,Otherwise the battery system will be permanently damaged.
- Professionals should regularly clean the surface and interior of the system (with all power disconnected)
- During the storage period, professionals should regularly check the battery system for abnormalities, if any problems are found, please deal with it in time.

11.2 Troubleshooting

Faults	Cause	Maintenance method	Solution
LED light is purple	Compatible inverter firmware is not the latest reversion	Check the inverter APP or LCD/LED for firmware reversion	Update inverter's firmware
	Battery firmware is not the latest reversion	Check the Soluna smart energy cloud for firmware reversion	Update battery's firmware
	Installer didn't choose Soluna battery correctly on inverter APP or LCD/ LED	Check if the selection of battery is correct or not	Reselect Soluna battery on inverter
	Communication cable is loose or not correct	Check the communication cable status	Replug or change the communica-tion cable
	Inverter hardware fault	Change another inverter to try	Contact with inverter manufacture
	Battery hardware fault	If you checked all the items above and still can't target the reason, please contact with Soluna. Or change the battery	Contact with Soluna for further action

11 Maintenance and troubleshooting

Battery can't be charged or discharg-ed	Inverter setting incorrect such as disable the charging or discharging, and time setting, etc.	Check the inverter setting	Change the inverter setting
	Inverter can't read Soluna battery type correctly.	Check the battery type of product and product name shown in inverter side.	Contact with Inverter manufa-cture or Soluna for further action.
	Inverter hardware fault.	Change another inverter to try.	Contact with Inverter manufacture.
	Battery hardware fault.	Please change another battery to try.	Contact with Soluna for further action.
LED light is off or yellow	Off-grid installation, battery can't be charged for over 2 weeks due to no production of PV system(raining season, snow season, or PV system fault).	Check the battery voltage.If it is 22.5K,the voltage is less than 460.8V;18K is less than 345.6V, 13.5K is less than 230.4V, 9.5K is less than 115.2V,please turn off the battery and contact with Soluna.	Contact with Soluna for further action.
	Customer didn't turn off the battery for over 2 weeks in the scenario such as:A. Installation is not finished. B. System failure, not running.		
	The battery was stocked for over 2 years without charging.		
Battery firmware is not updated to latest	The battery firmware is continuously being optimized and updated	Check the Soluna smart energy cloud for battery firmware reversion.	Updating the battery firmware to the latest.
Master battery is white,but not all slaver battery are green	Battery communication cable is loose or not correct.	Check the communication cable status.	Replug or change the communicat-ion cable.
	Battery power cable is loose, or not correct connected.	Check the battery power cable.	Fasten the power cable.
	Communication terminal resistor is not dailed or not dailed correctly.	Check the parallel box for the resistor dailling.	Dail the terminal resistor according to manual or SOP.

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	Battery firmware is not the latest.	Check the Soluna smart energy cloud for battery firmware reversion.	Upgrade the firmware to the latest.
WIFI stick failed to configure the network	The Wifi network is not compatible	Check the ender user network type	Please choose only 2.4G wifi mode
	Connecting fail	APP will remind	Please read the SOP of wifi setting up
	System establish failed due to S/N invalid.	APP will remind	Contact with Soluna for further action
LED light is yellow	Battery reach to 3rd level alarm such as battery over voltage.	1.Check the inverter LCD/LED or APP for the battery alarm information. 2.Check the Soluna smart energy cloud for battery alarm information.	Battery will shut down, please contact with Soluna for further action.

Notice:
Damage to the battery system due to under voltages

- Charge the over-discharged system within seven days when the temperature is above 25˚C.
- Charge the over-discharged system within fifteen days when the temperature is below 25˚C.
- If the battery system doesn't start up, please contact Soluna local after-sales service within 48 hours.Otherwise, the battery could be permanently damaged.

12 Depth of Discharge(DOD) Setting for Inverter

To make sure the battery working smoothly, we recommend the DOD setting of inverter as follows.

On-Grid DOD: 80%

Off-Grid DOD: 70%

In energy storage systems, reducing the depth of discharge (DOD) of lithium batteries is aimed at improving system economics, extending battery life, enhancing safety, and optimizing performance. Below are the specific reasons:

1. Extending Battery Life

- The cycle life of lithium batteries is closely related to the depth of discharge. Deep discharge (e.g., 80%-100% DOD) accelerates battery aging, leading to faster capacity degradation.
- Reducing DOD (e.g., controlling it between 20%-80%) can significantly extend the battery's cycle life, thereby lowering long-term maintenance and replacement costs for the energy storage system.

2. Improving System Economics

- Batteries account for a significant portion of the cost in energy storage systems. Extending battery life means reducing the frequency of battery replacements and lowering the total lifecycle cost.
- Although reducing DOD decreases the available energy per cycle, the overall energy throughput (total charge-discharge capacity) may increase by extending battery life, there by improving economic efficiency.

3. Enhancing Safety

- Deep discharge increases the risk of over-discharge, causing the battery voltage to drop too low, which may lead to irreversible chemical damage (e.g., dissolution of the copper current collector in the anode).
- Reducing DOD can prevent over-discharge, minimize safety risks such as thermal runaway, and ensure stable operation of the energy storage system.

13 Register on the Website after Installation

After completing the installation of the battery system and confirming that it is operating normally, please log in to the Soluna official website to register your product installation and usage details. This registration is required for the product warranty to take effect. Follow the on-screen instructions on the website to complete the registration process.

https://soluna.co → SUPPORT & SERVICE → Warranty registration

14 Contact us

If you have any questions, feedback, or need assistance, please feel free to reach out to us. We are here to help!

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