**SanRase** 

# **User Manual**

**MODEL: SR BAT HV52S** Lithium-ion Battery

Clean Air Investments, LLC.



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# Contents

01	Safety	02
1.1	Safety instructions	02
1.2	Symbols in this document	02
1.3	Qualified personnel	02
1.4	Equipment requirements	03
1.5	Electrical requirements	03
1.6	Installation requirements	03
1.7	Environment requirements	03
02	Product introduction	04
2.1	Dimension and weight	04
2.2	Appearance	05
2.2.1	Battery system appearance	05
2.2.2	Battery control unit (BCU)	05
2.2.3	Battery module	06
2.3	Battery system specifications	07
2.4	Performance	07
2.5	Labels	08
2.5.1	Labels overview	08
03	Installation instructions	09
0.4		00
3.1		09
3.2	loois & instruments prepared	40
2.2	(not supplied)	10
<u> ৩.৩</u>	Installation location and clearance	10
3.4		12

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Please read this entire document carefully before installing or using battery system. Failure to do so or to follow any of the instructions or warning in this document can result in electrical shock, serious injury, or death, or can damage battery, potentially rendering it inoperable. Warranty claims are invalid if damage is caused by human error in a manner inconsistent with the installation manual's instructions.

The information included in this manual is verified to be accurate at the time of publication. However, due to the continuous improvement of products, this manual is subject to change without prior notice.

The illustrations in this manual are intended to help explain operating system configurations and installation instructions. Any confusion, please contact Clean Air Investments, LLC. immediately for advice and clarification. Thanks for your choice and trust.

04	Cable connection	14
4.1	External electrical connection of the	
	battery system	14
4.1.1	Installing an external grounding	15
4.1.2	Installing external DC power cables	15
4.1.3	Installing an external signal cable	16
4.1.4	Screw the wiring harness mounting	
	bracket	16
05	System commissioning	17
5.1	Inspection before power on	17
5.2	System power on	17
5.3	LED indicators	17
5.3.1	Normal state	17
5.3.2	LED indicator	17
5.4	Power off	18
06	System maintenance	18
6.1	Routine maintenance	18
6.2	Troubleshooting	19
07	What to do in case of an emergency	20
7.1	In case of fire	20
7.2	In case of flooding	20
7.3	In case of unusual noises	20
7.4	In case of unusual smell or smoke	20

## 01 Safety

#### 1.1 Safety instructions

For safety reasons, please read this entire manual before installing, servicing or using. Failure to comply with the instructions can result in electrical shock, serious injury, death or can damage the battery, potentially rendering it inoperable.

## 

Proper disposal of batteries is required. Please refer to your local regulations for disposal requirements.

#### 1.2 Symbols in this document

This manual uses the following symbols to highlight important information:

	WARNING
	CAUTION
4	RISK OF ELECTRIC SHOCK
	REFER TO OPERATING INSTRUCTIONS
X	DO NOT THROW AWAY
	RECYCLABLE
	HEAVY WEIGHT MAY CAUSE SERIOUS INJURIES
	GROUND (EARTH) CONNECTION
	RISK OF ELECTRIC SHOCK ENERGY STORAGE DISCHARGE TIME

#### 1.3 Qualified personnel

Battery Management System (BMS) installation and maintenance must be carried out only by certified install-ers who possess all following qualifications and experience:

- Knowledge of the installation of electrical devices.
- Knowledge of the functional principles and operation of on-grid and off-grid systems.
- Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.
- Knowledge of and adherence to this manual and all safety precautions and best practices.
- Knowledge of the protective measures to minimize hazards to themselves and others. •

#### 1.4 Equipment requirements

If the battery module seems to be damaged, pack it in its original container, and then return it to your distributor.

- Do not damage the battery module.
- Do not use water to clean electrical components inside or outside of the battery module.
- Do not stand on, lean on, or sit on the top of the battery module.
- Promptly repaint any scratches that occur during the transportation or installation of the battery module.
- Exposing a scratched battery module to the outdoors for extended periods is not advisable.

#### **Electrical requirements** 1.5

- ٠ Ensure that the power setting matches the rated input of this power supply.
- Make sure to connect the protective grounding to prevent an electric shock before activating the power.
- Never sever the internal or external protective grounding wire, or disconnect the wiring of protective grounding terminal. Such actions can create a shock hazard, potentially causing injury.
- ٠ Do not connect the battery module directly to photo-voltaic (PV) solar wiring.
- Do not short-circuit the wiring terminals of the battery module. Short circuits can cause a fire hazard.

## 

Before connecting cables, ensure that the equipment is intact. Otherwise, electric shocks or fire hazards may occur.

#### 1.6 Installation requirements

- Do not install, use, or operate outdoor equipment and cables in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Wear proper personal protective equipment (PPE) during operation. If there is a probability of personal feasible protective measures.
- Tighten screws using tools when installing the battery module.
- not blocked when the battery is running.
- After installing the battery module, remove idle packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

### **DANGER**

Do not work with power turned on during installation.

#### Environment requirements 1.7

Operating Temperature	Charge: 0°C~45°
Humidity	≤ 95%
Storage < =6 months	Stage of Energy (
Maximum Altitude	Max. 2000m (656

- Install the battery module in a dry and well-ventilated environment to ensure good heat dissipation. •
- Install the battery module in a sheltered place or install an awning over it.
- Install the battery module at a height that prevents damage from flooding.

Understand the components and functioning of a grid-tied PV power system and relevant local standards.

injury or equipment damage, immediately stop the operations, report the case to the supervisor, and take

To prevent fire due to high temperature, ensure that the ventilation vents of the heat dissipation system are

C(32°F~113°F) /Discharge: -20°C~50°C(-4°F~122°F)

SOE): 50% initial

2 ft)

#### SR BAT HV52S User Manual

- Avoid exposing the battery module to direct sunlight or water. •
- Do not install the battery module near heating equipment. ٠
- Do not place any flammable or explosive materials around the battery module. ٠
- Do not subject the battery module to high pressures. ٠
- ٠ Do not place any objects on top of the battery module.
- Do not expose the battery module to ambient temperatures above 60°C (140°F) or below -30°C (-22°F). ٠
- Children are not allowed to enter the installation position. •
- Operating or storing the battery module in temperatures outside its specified range might cause damage ٠ to the battery module.
- Ensure that there is minimal dust and dirt in the area.
- Ensure that no water sources are above or near the battery module, including downspouts, sprinklers, or • faucets.
- The battery module site must be equipped with qualified fire extinguishing facilities, such as fire extin-٠ guishing sands and powder fire extinguishers.

#### 

BCU

The recommended operating temperature ranges from 15°C to 30°C.

## **02 Product introduction**

#### Dimension and weight 2.1

- Battery control unit (BCU) is an electronic system to control battery modules.
- Battery module is the residential battery which can be charged and discharged into a load. ٠
- The base is an SPCC bottom support to make the battery module and BCU stable on the floor. ٠
- The battery system includes the BCU, battery modules and the base. •

W\*D\*H: 740\*366\*120mm



W\*D\*H: 740\*366\*1280mm

0 :--

Weight: 269KG

# 2.2 Appearance

Base

#### 2.2.1 Battery system appearance



W\*D\*H: 740\*366\*60mm

Weight: 7KG

#### 

The battery system supports power and capacity expansion. 1 BCU supports a maximum of 5 battery expansion modules in series.

This manual will show you the installation and cable connection of a battery system consisting of 5 battery modules.

#### 2.2.2 Battery control unit (BCU)









**6** USB Port

No.	Port Signs	Function Description
1	P+	Power + (BCU to PCS)
2	CAN	CAN COM cable port (BCU to PCS)
3		Grounding point (BCU to PCS)
4	Value	Balance the pressure in BCU
5	Р-	Power - (BCU to PCS)
6	Composite connector-Male	Power +/- and communication port (BCU to BAT)
7	B+	Power + (BCU to BAT)
8	٢	Grounding point (BCU to BAT)
9	В-	Power - (BCU to BAT)
10	COM-OUT	Com cable port (BCU to BAT)
11	USB	System update
12	SW	Switch on/off the battery system
13	LED	Indicates the battery system status, running green light, warning red light, SOC blue light

#### 2.2.3 Battery module



Battery Module Top

Battery Module Bottom

No.	Port Signs	Function Desc
1	LED	Indicates the batte
2	Composite connector-Female	Power +/- and cor
3	B+	Power + (BCU to
4		Grounding point (
5	В-	Power - (BCU to E
6	COM-IN	COM cable port (I
7	Composite connector-Male	Power +/- and cor
8	B+	Power + (BAT to E
9		Grounding point (
10	В-	Power - (BAT to B
11	COM-OUT	COM cable port (I

## 2.3 Battery system specifications

#### SR BAT HV52S SYS Configuration List

Model	HVRES-BWP -5.3kWh	HVRES-BWP -10.6kWh	HVRES-BWP- 15.9kWh	HVRES-BWP- 21.2kWh	HVRES-BWP- 26.5kWh
Total Energy [kWh]	5.3	10.6	15.9	21.2	26.5
Battery Module		SR B	AT HV52S 102.4V 5.3k	Wh	
Number of Battery Mo	dules 1	2	3	4	5
Cell Type			LFP (LiFePO4)		
Rated Voltage [V]	102.4	204.8	307.2	409.6	512
Operating Voltage [V]	80-116.8	160-233.6	240-350.4	320-467.2	400-584
Max Charge/ Discharge Current [A]	50	50	50	50	50
Dimension [W/D/H. mm]	740*366*400	740*366*620	740*366*840	740*366*1060	740*366*1280
Approximate Weight [KG]	69	119	169	219	269

#### 2.4 Performance

Recommend Depth of Discharge	90%
LED Indicator	4 LED (SOC: 25%
IP Rating of Enclosure	IP65 (Outdoor)
Operating Temperature	Charge: 0°C~45°C

rı	ntion	
•••	Puon	

tery system status, running green light, warning red light

mmunication port (BCU to BAT, BAT to BAT)

BAT, BAT to BAT)

(BCU to BAT, BAT to BAT)

BAT, BAT to BAT)

(BCU to BAT, BAT to BAT)

ommunication port (BAT to BAT)

BAT)

(BAT to BAT)

BAT)

(BAT to BAT)

~SOC 100% blue), 2 LED (working green, alarming red)

#### C/Discharge: -20°C~50°C

Storage Temperature	0°C~35°C
Humidity	≤95%
Altitude	≤2000m
Cycle Life	Up to 10 years, 6000 cycles (90% DOD, 25°C)
Installation	Stack, Floor-Mounted
Communication Port	CAN
Certification	UN38.3, UL1973, UL9540A, UL9540A

[1] DC usable energy, test conditions: 90% DOD, 0.5C charge & discharge at 25°C. System usable energy

may vary due to system configuration parameters.

[2] The current is affected by temperature and SOC.

#### 2.5 Labels

#### 2.5.1 Labels overview





Battery Control Unit (BCU) Label



#### **3** Battery Module Label

Product Name: Rechargeable L Model: SR BAT HV52S	ithium Ion Battery Module	<u>N1</u> /2	
Kominal Capacity: 52Ah Kominal Vataga: 02 AVA C. Max. Oharge? Usitharge Current: 50A Walable 50C Reng: 1054-1005 Agress Protection: 1955 Operating Darge Imperature: -045°C Operating Darge Imperature: -045°C Storage Temperature: 0-35°C	CAUTION: - Do not driassemble the battery pack. - Do not likesemble the battery pack of - Do not likese the battery nearby fire. - Do not likese the battery nearby fire. - Do not likese of battery intras. - Different fire, set or domaged, fur on of the senti- net gate any from the battery.	No direct sunlight!	Keep away from heat!
▲ ▲ sn:		CAUTION! De set di ager urg big the poser coldis when the BH system is er, doings o cold treack in au ar do Schrage which casi di cause serious harm!	CAUTION! Cround cannecter is mandatory.
		WARNING Hand & Wills Care. EAT is heary. Is Careful Will have Hands and Fast. Use of Ith equipment is recommended.	



03 Installation instructions

3.1 Installation contents

### Battery Module



Battery Module x 1

The following items are required for BCU installation.

Ball Plunger x 2

#### 3.2 Tools & instruments prepared (not supplied)

The following tools shall be prepared before installation.

No.	ΤοοΙ	Tool Name	Remarks
1		Driller	Drill holes on the wall
2		Wrench Set	Turning screws
3		Screwdriver	Turning screws
4	₫	Marker	Mark the drilling hole positions on the wall
5		Safety gloves	Protect the hand

#### **WARNING**

The battery modules are heavy. Wear appropriate personal protective equipment (such as gloves and safety shoes) when handling the unit. Only a sufficient number of trained movers should lift the battery modules. The use of lift equipment is recommended.

#### 3.3 Installation location and clearance

Installation Location Requirements:

- There must be no highly flammable or explosive materials nearby. •
- The ambient temperature should be within the range of -20°C to 50°C(-4°F to 122°F). •
- The battery module must be installed on flat leveled ground that can support its weight.
- Product shall be installed indoors (e.g. in a basement or a garage) or outdoors under an eave out of direct ٠ sunlight.

#### **Recommendations:**

- The building should be designed to withstand earthquakes. •
- The area should be waterproof and properly ventilated (IP65). ٠
- The product should be installed out of reach of children and animals.

#### **CAUTION**

If the ambient temperature is outside the operating range, the battery module will stop operating to protect itself. The optimal temperature range for the battery module to operate is from 15°C to 30°C (59°F to 86°F). Frequent exposure to harsh temperatures may deteriorate the performance and lifespan of the battery module.

#### **Clearance:**

Recommended clearance for the left, right and top of the product are shown in the figure for the proper ventilation and installer convenience.





\*The length of BCU-PCS cable provided in package is ≤3m, as this kind of cable is recommended.



#### 3.4 Equipment installation

#### **NOTE**

After the battery modules are assembled correctly, power on and test battery system before installing locking bracket and other wiring harnesses. Only after the battery system is running normally can the operator go on to the next step.

Install the battery system through the following steps: Step 1:

- Lay the base flat on the floor horizontally. •
- Align the installation base with the wall and keep 30mm away from the brick wall, or 150mm away from the ٠ wooden wall.
- Mark the drilling hole positions using a marker on the floor. ٠
- Then drill the hole and install the base with M8 expansion bolts. ٠
- Hole diameter 12mm and depth 60mm. Fix the M8 Expansion bolts, tightening torque: 20N.m. ٠





#### Step 2:

Place the first battery module on the base and tighten the 2pcs ball plunger.



#### **A** CAUTION

Place the battery module or BCU at both ends on the base. Otherwise, the composite connector pins will be damaged and the battery system cannot run.

#### Step 3:

Install the second, the third, the fourth and the fifth battery expansion module

## **A** CAUTION

Place the battery module or BCU at both ends. Otherwise, the composite connector pins will be damaged and the battery system cannot run.



#### Step 4:

- Position the Wall Mount Bracket on the BCU into the Locking Bracket, and align them with the battery module to determine the correct positions for the Locking Bracket on the wall.
- Mark the drilling hole positions with a marker on the wall. •
- After the device has been protected from dust, drill the hole and install the bracket with M8 expansion ٠ bolts.
- Hole diameter 12mm and depth 60mm. Fix the M8 Expansion bolts, tightening torque: 20N.m. •





# 04 Cable connection



#### 4.1 External electrical connection of the battery system

Route all the external cables through the rear of BCU.An external type C DC circuit breaker, rated at 100A @ 600VDC shall be installed.



#### 4.1.1 Installing an external grounding

Connect the ground point ()) of the cabinet to the external Electric Box. Otherwise, electric shocks may occur.

### **A** CAUTION

Do not connect the ground point (⊜) of the BCU to the external hybrid inverter. Otherwise, BMS maybe disturbed and can not work properly.



#### 4.1.2 Installing external DC power cables

Insert the positive and negative battery connectors into the corresponding DC input terminals (P+ and P-). The positive power cable (BAT+) is red and negative power cable (BAT-) is black. Before assembling DC connectors, label the cable polarities to ensure correct cable connections.





#### 4.1.3 Installing an external signal cable

Choose signal cable type (CAN cable) based on the Inverter when laying out a signal cable. Separate the Signal Cable from power cables when connecting it between the BCU and the Inverter and keep it away from strong interference sources to prevent communication interruption.



#### 4.1.4 Screw the wiring harness mounting bracket

After cables are correctly and securely connected, pull them out of the Wiring Harness Mounting Bracket, and screw the bracket to the BCU with screws.

### 

As next step commissioning needs the bracket off, please screw it after normal running.





#### 5.1 Inspection before power on

Table: Checklist and Acceptance Criteria

No.	Check Item	Acceptance Criteria
1	Installation	The installation is accurate
2	Grounding	The Groundling cable is co
3	Cable connection	The DC power cables, sign and securely.
4	Installation environment	The installation space is pro

#### 5.2 System power on

Power on the system through the following steps:

1. Press the Switch button (SW) on the equipment.

2. The green running LED should normally be ON.

3. If it is failed to switch on the system, check that all the electrical connections are correct.4. If the electrical connections are correct, but the system is still not able to switch on, contact our after-sale service within 48 hours.

#### 5.3 LED indicators

#### 5.3.1 Normal state

LED Indicator	SOC Indicator	Description
	○ ○ ○ ○ ○ ₩388 788 686 28	SOC=0%
	0 0 0 0 1058 778 558 28	0% <soc<25%< td=""></soc<25%<>
Working: Green light blinking for 1s	○ ○ ○ ● ● 1928 728 508 228	25%≤SOC<50%
	0 0 0 0 1058 778 558 28	50%≤SOC<75%
		75%≤SOC≤100%

#### 5.3.2 LED indicator



and secure.

nnected correctly and securely.

al cables and ground cables are connected correctly,

oper, and the installation environment is clean and tidy.

Button Indicator	LED & SOC Indicator	Fault Description
	○ ○ ○ ○ 1955 775 555 225 143 RM ● ○	Over voltage
Green light blinking for 1s		Over current
Red light on	○ ○ ○ ● 1005 755 505 255 AL ■ ■ ● ○	Under voltage
	○ ○ ● ● 1008 756 508 238 MM ● ○	Over temperature

#### 5.4 Power off

- Power off the system through the following steps:
- 1. Turn off the inverter.
- 2. Press the switch button(SW) to be OFF.
- 3. Ensure that all LED indicators are OFF and the system has shut down completely.
- 4. Disconnect all the system wiring.

#### **WARNING**

After the system powers off, residual electricity and heat may still pose risks of electric shocks and burns. Therefore, it is advisable to wear protective gloves and wait 15 minutes after the system has powered off before performing any operations on the system.

# 06 System maintenance

#### 6.1 Routine maintenance

To ensure that the system can operate properly for a long term, it is recommended to perform routine mainte-nance according to the description in this chapter.

#### 

Before cleaning the system, connecting cables, and ensuring the grounding reliability, power off the system.

_	Check Item	Check Method	Maintenance Period
	Appearance Status	Check that the battery module is not damaged or deformed.	Once every 6 months

System Running Status	Check that the battery module does not generate abnormal sound when it is in operation.	Once every 6 months
Electrical Connection	Check that cables are secured and intact, in particular, the parts touching the metallic surface are not scratched.	The first inspection is 6 months after the initial commissioning. From then on, the interval can be 6 to 12 months.
Ground Reliability	Check that ground cables are securely connected.	The first inspection is 6 months after the initial commissioning. From then on, the interval can be 6 to 12 months.

#### 6.2 Troubleshooting

Common alarms find troubleshooting measures as follows:

No.	Warning Messages	Description	Troubleshooting
1	Over voltage	○ ○ ○ ○   1005 758 505 255   ALM RIM ○ ○	Please contact your dealer or technical support.
2	Under voltage	○ ○ ●   1008 798 605 298   All NIN ●	Please contact your dealer or technical support.
3	Over temperature	O O O O 100% 78% 50% 22% ML RAN O O	Wait till the temperature of cell go back to the normal state.
4	Under temperature		Wait till the temperature of cell go back to the normal state.
5	Over current	○ ○ ○   1008 708 608 208   A.S. NIM ○ ○	Please contact your dealer or technical support.
6	PCB over temperature	○ ● ○ ●   1008 708 608 208   A.S NON ●	Wait till the temperature of cell go back to the normal state.
7	Precharge error	○ ● ○   1000 750 500 251   JAI NIN ○	Please contact your dealer or technical support
8	Relay error	○ ● ● ●   1000 755 505 255   ALL NIM ● ○	Please contact your dealer or technical support
9	Self-test failure	● ○ ○ ○ 1005 775 505 225 ALI ● ○	Please contact your dealer or technical support

# 07 What to do in case of an emergency

In the event of any threat to health or safety, always begin with these two steps before addressing the other suggestions below :

- 1. Immediately contact the fire department or other relevant emergency response team.
- 2. Notify all people who might be affected and ensure that they can evacuate the area.

#### **WARNING**

Only perform the suggested actions below if it is safe to do so.

#### 7.1 In case of fire

The battery module may catch fire when heated about 150°C.

- 1. Press the switch button (SW) to be OFF.
- 2. Turn off the breaker to the inverter.
- 3. Acceptable fire extinguisher types are CO2 and ABC.

#### 7.2 In case of flooding

- 1. Stay out of the water if any part of the battery module or any wiring is submerged.
- 2. Press the switch button (SW) to be OFF.
- 3. Turn off the breaker to the inverter.
- 4. If possible, protect the system by finding and stopping the source of the water, and pumping water away.
- 5. Let the area dry completely before use.

#### 7.3 In case of unusual noises

- 1. Press the switch button (SW) to be OFF.
- 2. Turn off the breaker to the inverter.

3. Ensure that nothing is inside the case, then restart the system and if there are still unusual noises, please contact your dealer or technical support.

#### 7.4 In case of unusual smell or smoke

- 1. Please ensure your safety first, then contact your dealer or fire department based on the actual situation to move to the next step.
- 2. Press the Switch button (SW) to be OFF.
- 3. Turn off the breaker to the inverter.
- 4. Ensure nothing is in contact with the battery system.