Genius BA

Operation Manual

2023.04 Ver:1.1

Table of Contents

1 Introduction

1.1 Product introduction

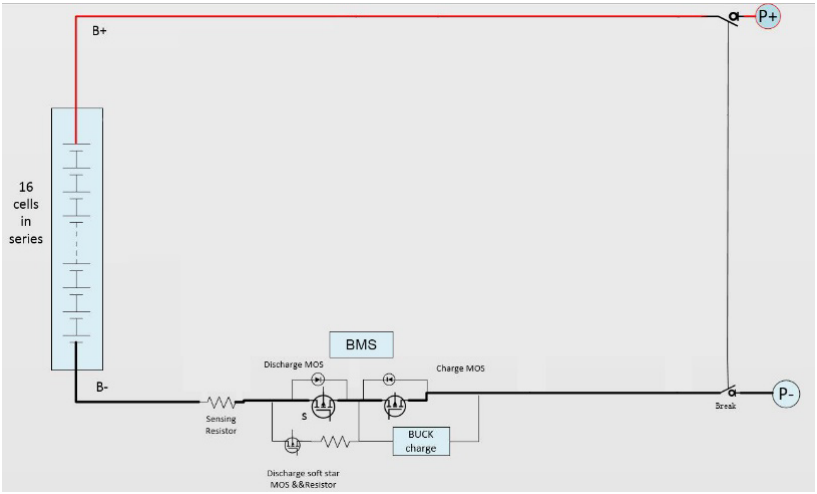
Genius BA can be used in conjunction with inverters and can store and release electrical energy according to the requirements of the inverters.

Each Genius BA5 battery pack is 5.12kWh. The below table explains the combinations of battery packs.

Genius BA Models	
Model Number:	Consists of:
Genius BA5	1x Genius BA5 Battery Pack
Genius BA10	2x Genius BA5 Battery Packs
Genius BA15	3x Genius BA5 Battery Packs
Genius BA20	4x Genius BA5 Battery Packs
Genius BA25	5x Genius BA5 Battery Packs

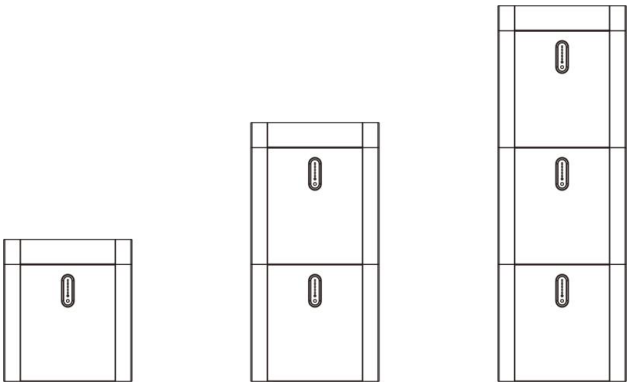
Electrical circuit diagram

There is an internal breaker in the battery pack, which can isolate all live (active and neutral) conductors as shown in figure below.

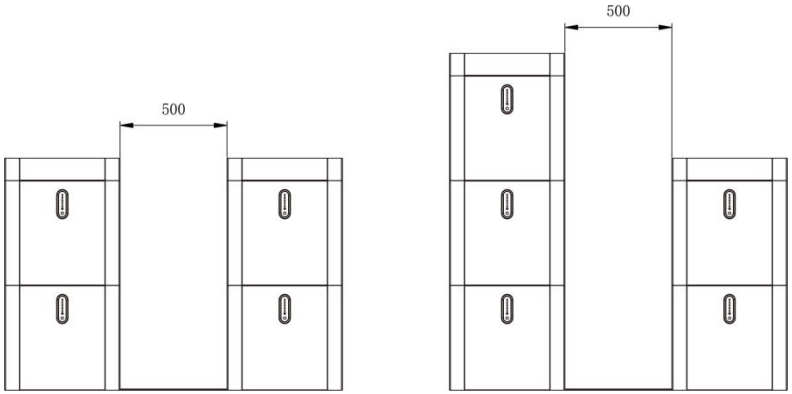


Storage capacity description

The battery system capacity can be increased by paralleling up to 5 Genius BA5 battery packs.



1 – 3 battery packs in parallel



4–5 battery packs in parallel

1.2 Information about safety

1.2.1 Manual preservation

This manual contains important information about equipment operations. Please read it carefully before any operation and carry out the operations strictly according to the instructions in the manual. Otherwise, it will cause equipment, personnel and property damage or loss. Be sure to keep this manual for maintenance and repair.

1.2.2 Operator requirements

The operator should have professional qualifications or be trained. The operator should be familiar with the composition and operating principle of the whole storage system including equipment. The operator should be familiar with the product manual. During maintenance, the maintenance personnel should not operate any equipment until all equipment is turned off and the power is switched off.

1.2.3 Warning signs

The warning signs contain important information for safe operation and shall not be torn or broken. Make sure that the warning signs are always placed properly. The broken sign must be replaced immediately.

This sign indicates a dangerous situation, which may cause death or serious injury if not avoided!

This sign indicates that there is a danger of high voltage and electric shock!

In order to prevent electric shock or personal injury, the inverter can be touched or used 5 minutes after being turned off or disconnected.

This sign indicates that the surface is hot. Be careful of the danger of burns!

Refer to the operation instructions.

1.2.4 Setting of safety warning signs

- During guidance, maintenance, and repair, please follow the instructions below to avoid non-professionals' misuse or accidents caused by non-professionals:
- Conspicuous signs should be placed at the front and rear switches to avoid accidents caused by mistake operation.
- A warning sign or cordon should be set near the operating area.
- The system must be reinstalled after maintenance or operation.

1.2.5 Measuring equipment

In order to ensure that the electrical parameters meet the requirements, relevant measuring equipment is required when the system is connected or tested. Make sure that equipment of matching specifications is connected and used in case arcs or shocks occur.

1.2.6 Moisture protection

Moisture is likely to damage the battery. For repair or maintenance, avoid or prevent operations in humid weather.

1.2.7 Operations after power-down

The battery system is part of the energy storage system, which can store life-threatening high voltages even when the direct current is turned off. Do not touch the battery socket. Even after the direct current or alternating current is cut off, the battery pack can still maintain a life-threatening voltage. Therefore, for safety's sake, be sure to test the voltage with a calibrated voltage meter before the installation personnel operates the equipment.

1.2.8 Dispose and recycle

Dispose and recycle batteries properly according to the management rules of waste batteries in different countries.

1.3 Battery safety specification

1.3.1 Information about dangers

This product is a lithium iron phosphate battery, which meets the requirements of the UN's recommendations for the transportation of dangerous goods, tests and the UN38.3 certification. For batteries, chemical substances are stored in a sealed metal box designed to withstand the temperature and pressure encountered during normal use. Therefore, there is no physical danger of fire and explosion and chemical danger of hazardous goods leakage during normal use. However, if the product is exposed to any fire, mechanical shock, or electrical stress arising from misuse or is decomposed, the gas release port will be activated. The casing of the battery box will be broken to the limit, and harmful substances may be released.

1.3.2 Safety data table

For more information, please refer to the battery safety data table.

1.4 General precautions

Danger

The high voltages of photovoltaic power generated, batteries and electric shocks are life-threatening. In direct sunlight, dangerous DC voltages are likely to be generated by photovoltaic power generation, which will remain in the DC wires and live parts of the inverter. There are likely fatal electric shocks due to contact with the DC wires or live parts. If the DC connector is disconnected from the inverter under load, it is likely to cause electric arcs and burns.

- Do not touch non-isolated cable ends.
- Do not open the battery. Do not wipe the equipment with a damp cloth.
- Only qualified personnel with corresponding skills can install and tune the inverter or battery.
- Before conducting any operation on the inverter or battery pack, please follow this document to disconnect the inverter from all power supplies.

Warnings

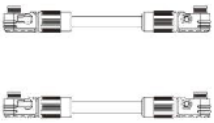
There is a danger of chemical burns from the electrolyte or toxic gases. During normal operations, there will be no electrolyte leakage in the battery pack and no toxic gases. If the battery pack is damaged or malfunctions, there may be electrolyte leakage or toxic gases.

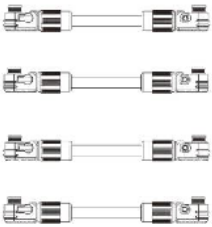
- Do not touch the battery with wet hands.
- Do not install or operate the battery in a potentially explosive environment or highly humid area.
- If moisture permeates the battery (e.g., due to the broken casing), do not install or operate the battery.
- Do not move the equipment that has been connected to a battery module. Fix the equipment in case it tilts.

- The battery pack must be transported by the manufacturer or designated personnel. The notes should be recorded and filed.
- A certified ABC fire extinguisher with a minimum capacity of 2 kg must be carried during transportation.
- During loading and unloading, do not smoke in and near the vehicle.
- If necessary, when replacing a battery module, please request new dangerous goods packaging and then package it before handing it over to the supplier for collection.
- In the event of contact with the electrolyte, please carry out a rinse with clean water and then seek medical attention immediately.
- There is a risk of injury when lifting or dropping the equipment. The battery pack is heavy. There is a risk of injury if the inverter or battery is improperly lifted or dropped when transported or attached to or removed from the wall.
- The battery pack must be lifted or handled by more than 2 people.

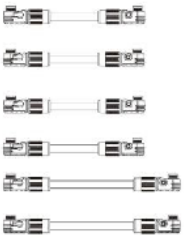
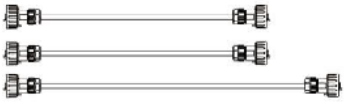
1.5 List of installation accessories

Check the parts list below to ensure that the accessories are complete.

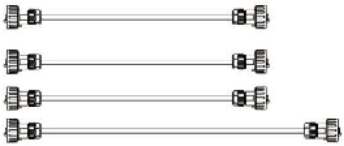
Genius BA10(includ two pieces Genius BA5)	
	
1xPower Cable(1 black,1red)	1xBattery Communication Cable

Genius BA15(includ three pieces Genius BA5)	
	
4xPower Cable(2 black,2red)	2xBattery Communication Cable

Genius BA20(includ four pieces Genius BA5)

	
6xPower Cable(3 black,3red)	3xBattery Communication Cable

Genius BA25(includ five pieces Genius BA5)

	
8xPower Cable(4 black,4red)	4xBattery Communication Cable

1.6 Limitation of liabilities

No direct or indirect responsibility will be assumed for product damage or property loss caused by the following situations:

- product modification, design alteration or parts replacement unauthorized by AVOL;
- the serial number or seal is changed, modified or erased by non-technical personnel;
- the design and installation of the inverter do not comply with the standards and regulations;
- failure to comply with local safety regulations;
- there is damage during transportation (including paint scratches caused by friction inside the packaging during transportation), where after the container/ package is unloaded and the damage is confirmed, a claim should be lodged immediately with the shipping or insurance company;
- failure to comply with any/all user manuals, installation guides and maintenance rules;
- improper or misuse of equipment;
- inadequate ventilation of equipment;
- failure to carry out maintenance in accordance with the standard maintenance procedure;
- force majeure (storms, lightning, fire, etc.);
- any damage caused by external factors.

2 Installation

2.1 Installation site and environment

2.1.1 General rules

The energy storage system composed of Genius BA batteries can be installed in an outdoor or indoor place. When installed indoors, the energy storage system must not be obstructed by any building structure, room furniture or equipment. The system is ventilated naturally. Therefore, the installation place should be clean, dry and fully ventilated. The installation place must be allowed to be accessed freely for installation and maintenance and the panel should not be covered.

Installation is not allowed in the following locations:

1. residential rooms;
2. holes in ceilings or walls;
3. the roof that is not particularly suitable;
4. an entrance/exit area or below a staircase/passage;
5. locations where humidity and condensed water exceed 90%;
6. places that salty and humid air can permeate;
7. earthquake zones where additional safety measures are required;
8. a site at an altitude of more than 2000 meters;
9. places with explosive environments;
10. a place exposed to direct Sunlight/rain or a place where the ambient temperature changes significantly;

11. places with flammable materials or gases or explosive environments.

2.1.2 Restricted locations

Do not install the Genius BA series battery pack in the following locations:

(a) the restricted position determined for the panel in the AS/NZS 3000;

(b) no more than 600mm from any heat source (such as hot water heater unit, gas-fueled heater, air conditioning unit or any other equipment);

(c) no more than 600mm from any exit;

(d) no more than 600mm from any window or air vent;

(e) no more than 900mm from the point connected to the 240V AC voltage;

(f) no more than 600mm from the sides of other devices.

Make sure that when the battery is installed in any corridor, lobby or any similar place leading to an emergency exit, there is an adequate distance of at least 1 meter from the safety exit.

2.1.3 Residential barrier

In order to prevent a fire from spreading in the space where the energy storage system is installed, install a non-combustible barrier on the side of the wall or structural surface with its other side installed with the energy storage system. If the installation surface is not made of a non-combustible material, a non-combustible barrier can be installed between the energy storage system and the wall or structural surface.

If the energy storage system is installed on a wall or at a distance of 300mm from the wall that isolates the energy storage system from a residential space, the distance from other structures or objects must be increased. Be sure to keep the

following distances:

(i) at least 500mm between both sides of the battery;

(ii) at least 500mm above the battery;

(iii) the interval between multiple units installed should be at least 500mm.

If the distance between the energy storage system and the ceiling or any object above it is less than 500mm, the ceiling or structural surface above must be made of non-combustible materials and its radius should be within 600mm.

The distance between the highest point of the installed energy storage system and the ground or platform should not exceed 2.2 meters.

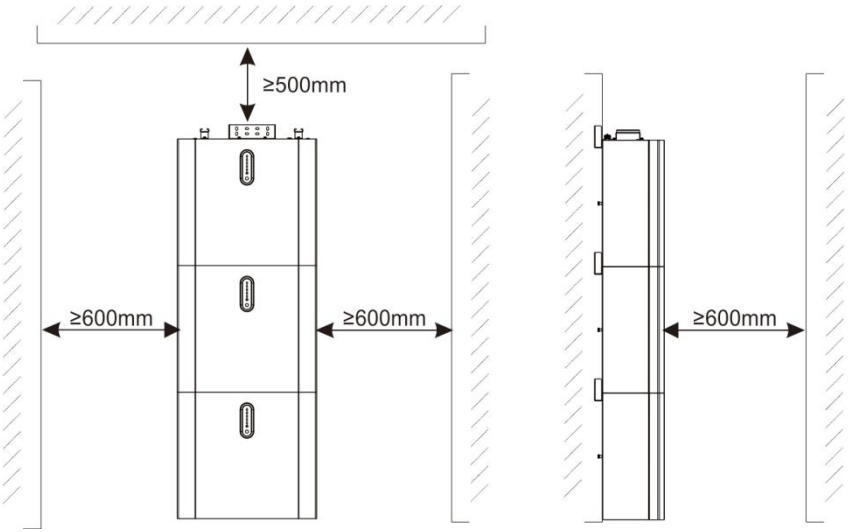
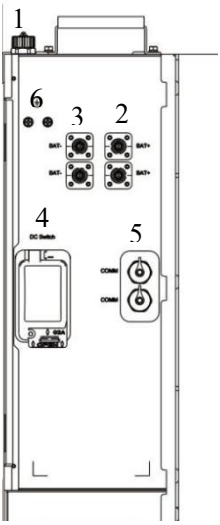


Figure 8 Installation distances from adjacent objects

2.2 Installation

Battery pack user interface description:

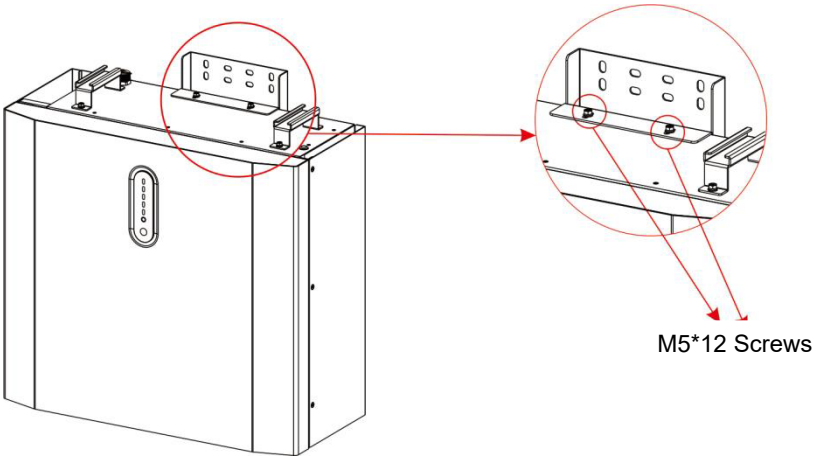


No.	Portal description
1	CAN Communication (BAT TO INV)
2	DC Positive
3	DC Negative
4	DC Breaker
5	RS485 Communication (BAT TO BAT)
6	Grounding

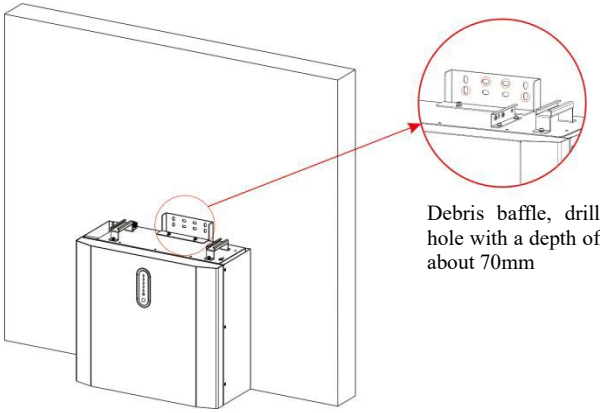
2.2.1 Battery installation

1. Unpack the battery.

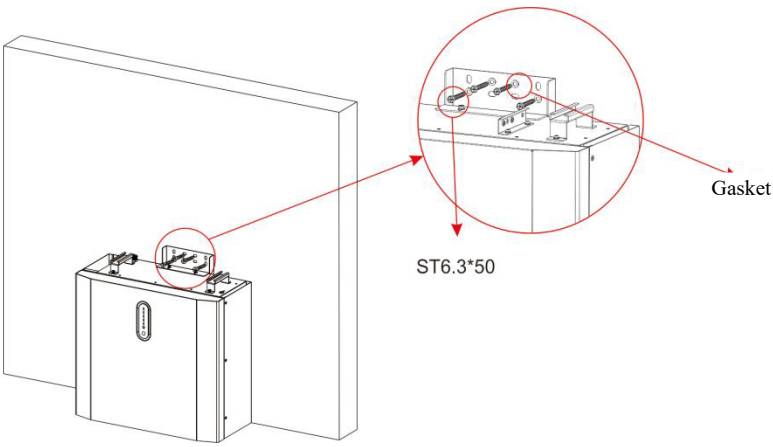
2. Assemble the battery mount panel to the battery.



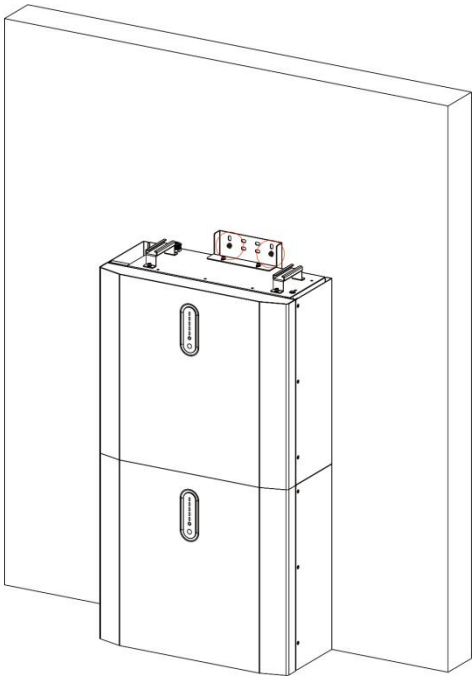
3. Place the battery in a position parallel to the wall, and use a Φ8mm drill to drill a hole with a depth of about 70mm in the wall for fixing the mount panel.



4. Remove the debris baffle, and fix the battery with screws and gaskets to the wall.

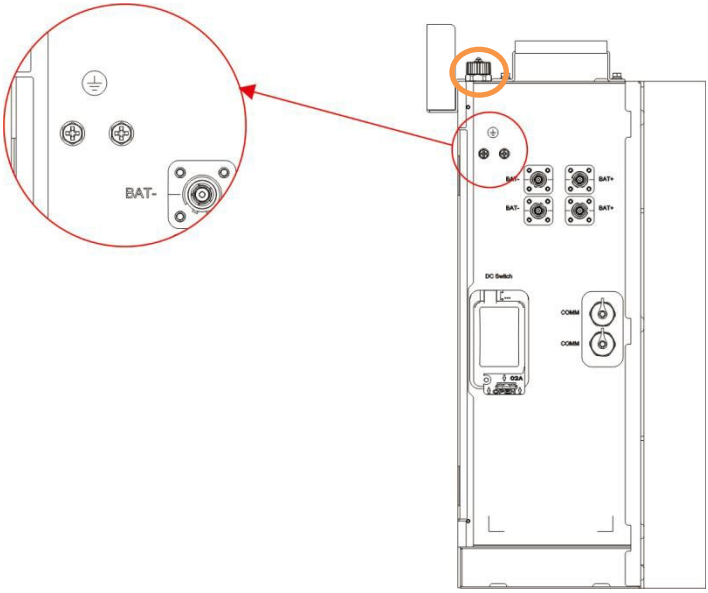


5. When needing to assemble the second battery (and all others), repeat step 5 to carry out the installation.



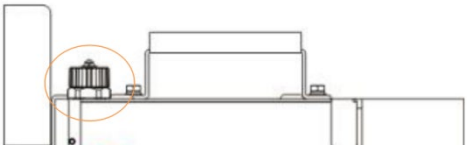
2.2.2 Cable connection

1. Use ground wires to connect the batteries' parts in pairs with grounding marks and use a ground wire to connect one of the batteries to the grounding protection system.

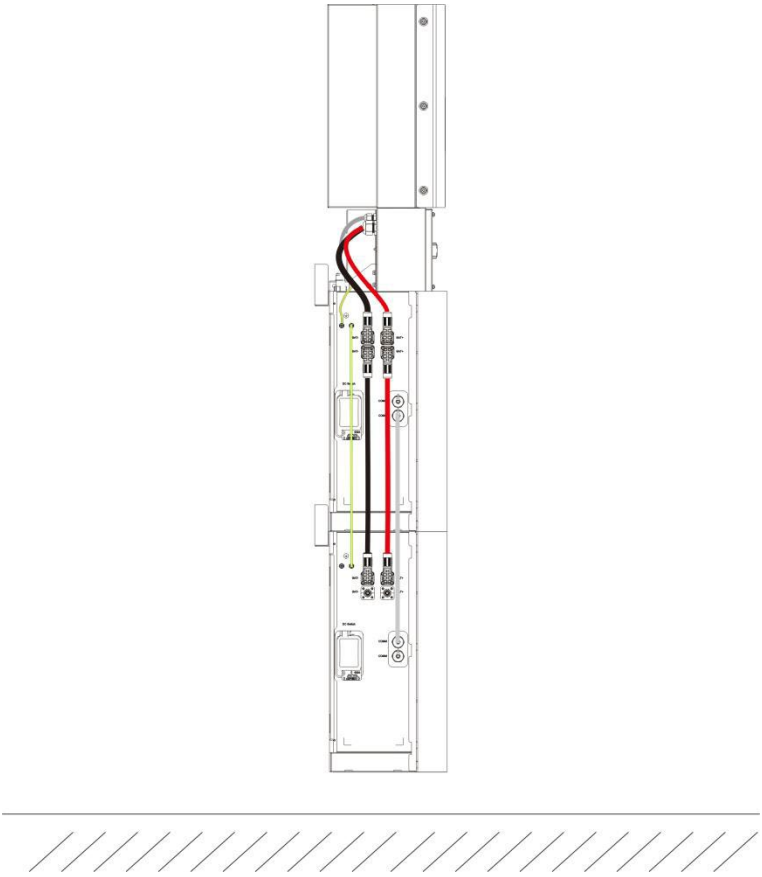


Both batteries' parts shown in the figure should be connected with a ground wire.

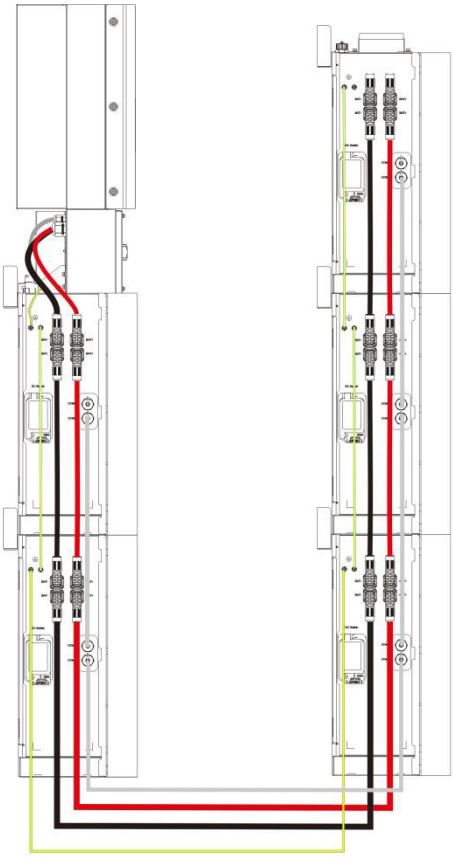
After installing the INV port, solidify the cable gland with glue to prevent it from twisting off.



2. Connect the power wire of the bottom battery to the side terminal of the top battery, the red one cannot be connected to the black one. (Note: The black and red cables are power cables. The green and yellow mixed cable is the grounding cable. The gray cable is the communication cable.)



2 batteries in parallel



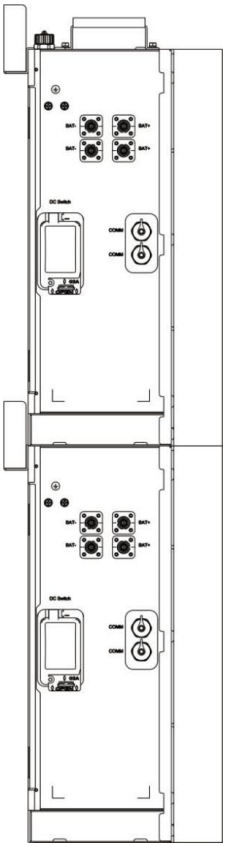
3–5 battery packs in parallel

Precaution:

1. When installing equipment to be grounded, the protective ground wire must be installed first. When dismounting the equipment, the protective ground wire must be removed last.
2. This product is not equipped with a ground wire, so you need to prepare a matching ground wire, which is recommended to be a green-yellow wire with a diameter of 10AWG or above and a length depending on the actual
3. For Australian market, an overcurrent protection and isolation device that operates both positive and negative conductors simultaneously is required between the inverter and the battery system. A bi-polar 125A is recommended.
4. All terminals (included communication terminal) of the battery are considered as DVC-C circuit. Installer shall make sure no terminal is access to ordinary person after installation.
5. The battery shall used with AVOL hybrid inverter Genius IA Series

2.2.3 Communication connection

Take the communication cable set from the battery pack accessories. Connect the batteries to each other through the corresponding connectors. Close all lids after connecting all modules together (if you want to connect more battery modules, you must install them before closing the lids). Communication connection between batteries and inverter are done through one CAN port on the top of battery pack nearest to the inverter.

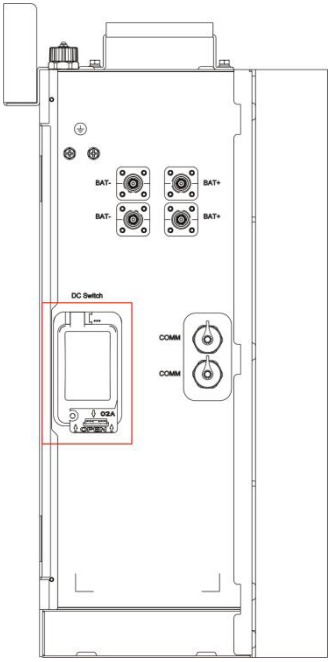


3 System operation

3.1 Start

1. Switch on the external breaker between the battery system and inverter.

2. Open the battery switch cover and switch on the battery switch.



3. Press the power button (3~6s) until the indicator lights of all batteries are on.

Precaution:

When using battery packs in parallel, if the indicator light of one of the batteries does not work, please check whether or not the cable of this battery is connected properly.

3.2 Turn-off

1. Open the battery switch cover and switch off the battery switch.
2. Press the power buttons (3~6s) until the indicator light goes out.
3. Switch off the external breaker between the battery system and inverter.

Precaution:

Please make sure that the battery is not being charged or discharged before performing a shutdown.

3.3 Emergency procedure

3.3.1 Emergency response plan

1. Check the control power supply, if it is normal, check the power supply again to find out the cause.
2. Please record every detail related to the fault for analysis and troubleshooting. Do not perform any operation on the equipment while it is malfunctioning. Please contact AVOL service support as soon as possible.
3. Since the battery contains a small amount of oxygen, and all batteries have explosion-proof valves, there is almost no chance of explosion.
4. When the battery indicator is lit red to indicate a fault, check the fault type through the communication protocol and contact our aftersales personnel for consultation.

3.3.2 Hazards

If the battery pack leaks the electrolyte, avoid contact with the leaking liquid or

gas. If you come into contact with the leaking matter, take the following measures immediately:

Inhalation: Leave the contaminated area and seek medical attention.

Eye contact: Rinse eyes with tap water for 5 minutes and then seek medical attention.

Skin contact: Wash the affected area thoroughly with soap and water and seek medical attention.

Eating by mistake: Seek medical attention if vomiting occurs.

3.3.3 Fire

If a fire occurs at the battery pack installation location, please perform the following operations:

Fire extinguishing media

No respirator is required for normal operations. Burning batteries cannot be extinguished with ordinary fire extinguishers but special fire extinguishers, such as Novec1230, FM-200 or dioxin fire extinguishers. When not caused by a battery, a fire can be extinguished with ordinary ABC fire extinguishers.

Fire protection instructions

1. If a fire occurs while the battery is charged, disconnect the battery pack and cut off the circuit breaker of the charging power supply under safe conditions.
2. If the battery pack has not caught fire, please put out the fire before the battery pack catches fire.
3. If the battery pack catches fire, do not try to extinguish the fire but evacuate people immediately.

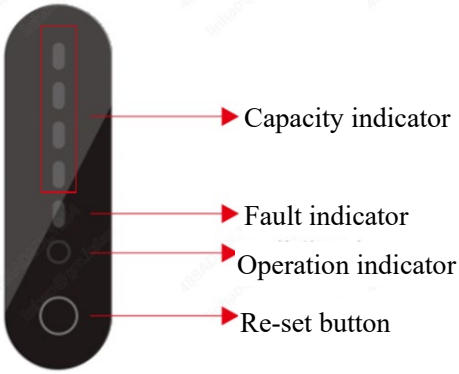
	**Precaution:** When the temperature of the battery exceeds 150° C, it may explode. The burning battery pack will leak toxic gases, do not approach it.

Effective ways to deal with accidents

Batteries in dry environments: Place the damaged battery in an isolated place and notify the local fire department or service engineer. Batteries in humid environments: If any part of the battery or inverter or any wiring part is submerged, do not touch any of them. Do not use again the damped or submerged battery, please contact the maintenance engineer in time.

4 Battery status description

4.1 Panel description



4.2 LED indicator description

Table 4.1 LED operating status indication

<table>
<tr><th rowspan="2">Status</th><th rowspan="2">Normal/Alarm/Protection</th><th>RUN</th><th>ALM</th><th colspan="4">Battery Level Indicator LED</th><th rowspan="2">Description</th></tr>
<tr><th>●</th><th>●</th><th>●</th><th>●</th><th>●</th><th>●</th></tr>
<tr><td>Shutdown</td><td>Hibernation</td><td>Off</td><td>Off</td><td>Off</td><td>Off</td><td>Off</td><td>Off</td><td>All off</td></tr>
<tr><td rowspan="2">Idling</td><td>Normal</td><td>Blinks once</td><td>Off</td><td colspan="4" rowspan="2">Indicates the actual battery level</td><td>Idle state</td></tr>
<tr><td>Alarm</td><td>Blinks once</td><td>Blinks three times</td><td>Low voltage of the module</td></tr>
<tr><td rowspan="3">Charging</td><td>Normal</td><td>Constantly on</td><td>Off</td><td colspan="4" rowspan="2">Indicates the actual battery level
(The LED blinks twice to indicate the maximum battery level)</td><td rowspan="2">The LED blinks (twice) to indicate the maximum battery level, while the overcharge alarm ALM does not blink.</td></tr>
<tr><td>Alarm</td><td>Constantly on</td><td>Blinks three times</td></tr>
<tr><td>Overcharge protection</td><td>Constantly on</td><td>Off</td><td>Constantly on</td><td>Constantly on</td><td>Constantly on</td><td>Constantly on</td><td>The indicator light is idle</td></tr>
</table>

								during no charging.
	Temperature, overcurrent and failure protection	Off	Constantly on	Off	Off	Off	Off	The charging stops
Discharge	Normal	Blinks three times	Off	Indicates the actual battery level				
	Alarm	Blinks three times	Blinks three times					
	Under-voltage protection	Off	Off	Off	Off	Off	Off	The discharging stops
	Temperature, overcurrent, short circuit, reverse connection and failure protection	Off	Constantly on	Off	Off	Off	Off	The discharging stops
Failure		Off	Constantly on	Off	Off	Off	Off	The charging and discharging stop

Table 4.2 Battery level indication

Status		Charging				Discharge			
Battery level indicator		L4 ●	L3 ●	L2 ●	L1 ●	L4 ●	L3 ●	L2 ●	L1 ●
Battery level (%)	0 – 25 %	Off	Off	Off	Blinks twice	Off	Off	Off	Constantly on
	26 – 50 %	Off	Off	Blinks twice	Constantly on	Off	Off	Constantly on	Constantly on
	51 – 75 %	Off	Blinks twice	Constantly on	Constantly on	Off	Constantly on	Constantly on	Constantly on
	76 – 100 %	Blinks twice	Constantly on	Constantly on	Constantly on	Constantly on	Constantly on	Constantly on	Constantly on
Operations indicator ●		Constantly on				Blinks (three times)			

Table 4.3 LED blink description

Blink Mode	On	Off
Blinks once	0.25S	3.75S

Blinks twice	0.5S	0.5S
Blinks three times	0.5S	1.5S

Note:

1. The LED indicator alarm can be enabled or disabled through the host and is enabled by default as a factory setting.

2. Battery performance monitoring can also be achieved using the inverter monitoring app "SOLARMAN Smart". Information on setup and configuration can be found on page 72 of the "AVOL Hybrid Inverter User Manual".

5 Battery storage and recharging

5.1 Battery storage requirements

1. Storage environment requirements:

- ambient temperature: -10℃–45℃; recommended storage temperature: 20℃–30℃;
- relative humidity: 0%RH–90%RH;
- in a dry, ventilated and clean place;
- no contact with corrosive organic solvents, gases and other substances;
- no direct sunlight;
- less than 2 meters from any heat source.

5.2 Storage expiration

In principle, it is not recommended to store the battery for a long time. Be sure to use it in time. The stored batteries should be disposed according to the following requirements.

Required Storage Temperature	Actual Storage Temperature	Recharge Interval
-10℃～+45℃	-10℃≤T≤30℃	12 months
	30℃＜T≤45℃	8 months

Table 5.2 Stored lithium battery recharging interval

1. If a battery is deformed, broken or leaking, discard it immediately regardless of its storage time.

2. The allowable maximum stored battery recharging period is 3 years and the allowable maximum stored battery recharging times is 3. For example, if recharging is performed once every 8 months, the allowable maximum recharging times is 3 times; if recharging is performed once every 12 months, the allowable maximum recharging times is 3 times; if the allowable maximum stored battery recharging period or times is exceeded, it is recommended to discard the battery.

3. A lithium battery will have its capacity decreasing after being stored for a long time, and typically will have its capacity irreversibly decreasing by 3%–10% after being stored at the recommended storage temperature for 12 months. If the customer conducts the discharge test and acceptance according to the specification, there is a risk that the battery with a capacity less than 100% after being stored will fail the test.

5.3 Inspection before battery recharging

Before recharging a battery, check its appearance: Deformation/Shell damage/Leakage

5.4 Recharge Operation Steps

Step 1 Connect power cables to the battery charger correctly. The maximum number of battery pack connected parallel is 5.

Step 2 Turn on the battery pack DC breaker to ON; Press the battery “start key” for 3 second to start the battery pack. Check the LED on the battery pack is on.

Step 3 Turn on the battery charger.

Step 4 Set charging parameter on the battery charger.

Case #1, One battery pack is charged. Set the charge limited voltage 56.5V; Set the charge limited current 50A;

Case #2, Two ~ Five battery packs are charged. Set the charge limited voltage 56.5V; Set the charge limited current 100A;

Step 5 After the battery is charged, switch off the battery charger and then the battery DC breaker. Disconnect the DC cables and then press the battery “start key” for 3 second to switch off the battery pack.

6 SOC change description

1. When the battery is almost fully charged, how does the SOC change from 99% to 100%?

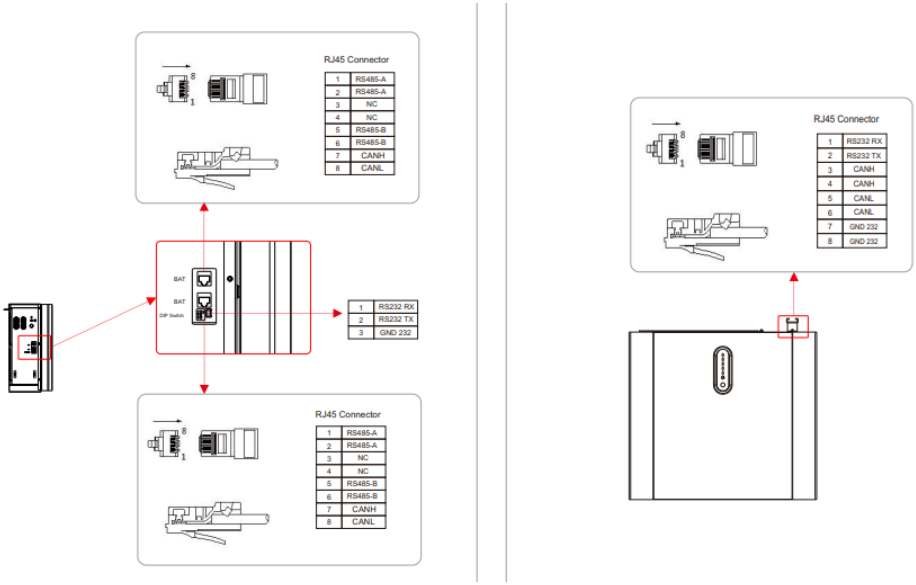
When the SOC is greater than 99%, it will switch to a quasi-charge state, and the charging current will gradually decrease until the SOC reaches 100% finally.

2. When the battery temperature is low, the indicated charging power continues to be about 200W, but why the SOC does not change?

When the internal cell temperature of the battery is less than 5℃, the internal heating component will start to heat the battery, and the heating power is about 200W. While the heating component is operating, the battery is not charged and the SOC does not change. After the internal cell temperature of the battery is above 5℃, the charging of the battery will start, and the heating inside the battery will stop when the internal cell temperature of the battery reaches 15℃. Heating is conducive to making the battery at low temperatures meet charging requirements, and can keep the battery cell at an appropriate operating temperature and improve the service life of the product.

7 Battery port definition and parameters

7.1 Port definition



7.2 Battery parameters

Model	Genius BA5	Genius BA10	Genius BA15	Genius BA20	Genius BA25
Battery type	LFP (LiFePO4)				
Voltage range	44.8~56.5 Vd.c.				
Rated voltage	51.2Vd.c.				
Energy capacity	5.12kWh	10.24 kWh	15.36 kWh	20.48 kWh	25.6 kWh
Usable capacity	4.6kWh	9.2 kWh	13.8 kWh	18.4kWh	23kWh
Maximum charge/discharge current	50Ad.c./80Ad.c.	100Ad.c./100Ad.c	100Ad.c./100Ad.c	100Ad.c./100Ad.c	100Ad.c./100Ad.c
Maximum charge/discharge power	2.825kW/4.096kW	5.65kW5.12kW	5.65kW5.12kW	5.65kW5.12kW	5.65kW5.12kW
fault current	640A peak, 300us	1280A peak, 300us	1920A peak, 300us	2560A peak, 300us	3200A peak, 300us
short circuit withstand current, Icw	4kA/0.5s	4kA/0.5s	4kA/0.5s	4kA/0.5s	4kA/0.5s
Operating temperature range	0~+50°C(Charging), -10~+50°C(Discharging)				
Protective class	Class I				
Ingress protection	IP65				
Altitude	≤ 2000m				

8 Routine maintenance

Note that the maintenance should be conducted by certified electricians.

8.1 Maintenance plan

1. Check whether or not any wire connection is loose.
2. Check whether or not any cable is aging/broken.
3. Check whether or not any cable insulation peels off.
4. Check whether or not any cable terminal screw is loose and whether or not there is any sign of overheating.
5. Check whether or not the grounding connection is proper.

8.1.1 Operating environment

(Every six months) carefully observe whether or not the battery system equipment malfunctions or is broken; listen for abnormal noises in various parts of the inverter when the inverter is running.

While the inverter is running, check whether or not the parameters such as the voltage, temperature, etc. of the battery and other equipment parameters are normal.

8.1.2 Equipment cleaning

(Once every six months to a year, depending on the site environment and dust content, etc.) make sure that the ground is clean, the maintenance channel is unobstructed and that the warning and guidance signs are clear and intact. Monitor

the temperature of the battery module and clean the battery module if necessary.

8.1.3 Equipment inspection

Once every six months to one year

1. Check whether or not any cable connection is loose.
2. Check whether or not any cable is aging/broken.
3. Check whether or not any cable tie falls off.
4. Check whether or not any cable terminal screw is loose and whether or not there is any sign of overheating in the terminal position.
5. Check whether or not any management system of the inverter and battery equipment, monitoring system or other related equipment malfunctions or is broken.
6. Check whether or not the equipment is well grounded and the grounding resistance is less than 10 ohms.

8.2 Cautions

After the equipment stops running, please pay attention to the following matters during maintenance:

1. Operations and maintenance shall comply with the relevant safety standards and regulations.
2. Disconnect all electrical connections to prevent the equipment from being energized.
3. Appropriate protective measures should be taken during maintenance, such as insulating gloves, shoes, noise-proof earplugs, etc.

4. Life is priceless. Make sure that no one will get hurt first.

5. In the case of deep discharge, if the whole inverter is in a static state (i.e., the battery has not been charged for two weeks or more), the battery must be charged to an SOC of 30% to 50%.

6. Equipment maintenance can only be carried out by professionals. Maintenance personnel are forbidden from opening any equipment module by themselves.

This manual is only used as a guide and reference for installation and operations. If there is any matter not specified in this manual, please contact us in time.

9. Fault codes and solutions

When you encounter any of the following problems, please refer to the following solutions. If the problem is still not resolved, please contact your local distributor. The following table lists some basic problems that may occur during actual operations and corresponding basic solutions to the problems.

Error codes and troubleshooting

0x340 DATE2，3	Warning Flag	Troubleshooting
BIT0	Battery cell overvoltage alarm	The warning unit overcharging voltage is 3650mV, where the inverter should stop charging and the BMS should not turn off the charging MOS.
BIT1	Battery cell under-voltage alarm	The warning unit over discharging voltage is 2800mV, where the inverter should stop discharging and the BMS should not turn off the discharging MOS.
BIT2	Battery pack overvoltage alarm	The warning overall overcharging voltage is 57.6V, where the inverter should stop charging and the BMS should not turn off the charging MOS.
BIT3	Battery pack under-voltage alarm	The warning overall over discharging voltage is 44.8V, where the inverter should stop discharging and the BMS should not turn off the discharging MOS.
BIT4	Charging overcurrent alarm	The warning charging overcurrent is 100A, where the inverter should stop charging and the BMS should not turn off the charging MOS.

BIT5	Discharging the overcurrent alarm	The warning current of discharging overcurrent 1 is 100A where the inverter should stop discharging and the BMS should not turn off the discharging MOS. This alarm will automatically stop after 1min or when the charging current is greater than 1A.
BIT6	Reserved	
BIT7	Reserved	
BIT8	Charging high temperature alarm (cell temperature)	The protective limit of charging high temperature is 57℃ where the BMS should forcibly turn off the charging MOS.
BIT9	Discharging high temperature alarm (cell temperature)	The warning discharging high temperature is 55℃, where the inverter should stop discharging and the BMS should not turn off the discharging MOS.
BIT10	Charging low temperature alarm (cell temperature)	The warning charging low temperature is 2℃, where the inverter should stop charging and the BMS should not turn off the charging MOS.
BIT11	Discharging low temperature alarm (cell temperature)	The warning discharging low temperature is -18℃, where the inverter should stop discharging and the BMS should not turn off the discharging MOS.
BIT12	High ambient temperature alarm	The warning high ambient temperature is 65℃, where the inverter should stop charging and discharging and the BMS should forcibly turn off the charging and discharging MOS.
BIT13	Low ambient temperature alarm	The warning low ambient temperature is -15℃, where the inverter should stop charging and the BMS should forcibly turn off the

		charging MOS.
BIT14	MOSFET high temperature alarm	The warning MOS over-temperature is 90℃, where the inverter should stop charging and discharging and the BMS should not turn off the charging and discharging MOS.
BIT15	Low SOC alarm	The warning low battery SOC is less than 5%, where the inverter should stop discharging and the BMS should not turn off the charging and discharging MOS and should not alarm during charging.

Protection codes and description

0x340 DATE4，5	Protecting Flag	Troubleshooting
BIT0	Battery cell overvoltage protection	The unit overcharging protection voltage is 3700mV, where the inverter should stop charging and the BMS should forcibly turn off the charging MOS.
BIT1	Battery cell under-voltage protection	The unit over discharge protection voltage is 2500mV, where the inverter should stop discharging and the BMS should forcibly turn off the discharging MOS. After 30 seconds of over discharge protection, if the battery still cannot be restored, it will enter a low power consumption mode.
BIT2	Battery pack overvoltage protection	The overall overcharge protection voltage is 59V, where the inverter should stop charging and the BMS should turn off the charging

		MOS.
BIT3	Battery pack under-voltage protection	The overall over discharge protection voltage is 40V, where the inverter should stop discharging and the BMS should forcibly turn off the discharging MOS. After 30 seconds of over discharge protection, if the battery still cannot be restored, it will enter a low power consumption mode.
BIT4	Charging overcurrent protection	The protective limit of charging overcurrent is 120A, where the BMS should forcibly turn off the charging MOS. This state will be locked and not be exited automatically if it occurs continuously for 10 times.
BIT5	Discharging overcurrent protection	The protective limit of discharging overcurrent 1 is 130A and the protective limit of discharging overcurrent 2 is 200A with a delay of 100ms, where the BMS should forcibly turn off the discharging MOS. This state will be locked and not be exited automatically if it occurs continuously for 10 times.
BIT6	Short circuit current protection	The short circuit protection current is no less than 350A with a delay of 300us, where the BMS should forcibly turn off the discharging MOS.
BIT7	Charging overvoltage protection	The overall overcharge protection voltage is 59V, where the inverter should stop charging and the BMS should turn off the charging MOS.
BIT8	Charging high temperature protection (cell temperature)	The protective limit of charging high temperature is 57℃, where the BMS should

		forcibly turn off the charging MOS.
BIT9	Discharging high temperature protection (cell temperature)	The protective limit of discharging high temperature is 57℃, where the BMS should forcibly turn off the discharging MOS.
BIT10	Charging low temperature protection (cell temperature)	The protective limit of charging low temperature is 0℃, where the BMS should forcibly turn off the charging MOS.
BIT11	Discharging low temperature protection (cell temperature)	The protective limit of discharging low temperature is -20℃, where the BMS should forcibly turn off the discharging MOS.
BIT12	MOSFET high temperature protection	The protective limit of MOS over-temperature is 110℃, where the BMS should forcibly turn off the charging and discharging MOS.
BIT13	High ambient temperature protection	The protective limit of high ambient temperature is 70℃, where the BMS should forcibly turn off the charging and discharging MOS.
BIT14	Low ambient temperature protection	The protective limit of low ambient temperature is -25℃, where the BMS should forcibly turn off the charging and discharging MOS.
BIT15	Heating function fault	Reset the battery pack; If the fault is not clear, contact the service engineer.

0x340 DATE6，7	Status/Fault Flag	Troubleshooting
BIT0	Charging MOSFET malfunction	Restart the battery pack, if the fault still exists, contact the manufacturer and lock it until the technical personnel resolve the problem.
BIT1	Discharging MOSFET malfunction	Restart the battery pack, if the fault still exists, contact the manufacturer and lock it until the technical personnel resolve the problem.
BIT2	Temperature sensor malfunction	Restart the battery pack, if the fault still exists, contact the manufacturer and lock it until the technical personnel resolve the problem.
BIT3	Cell voltage sampling fault	Reset the battery pack; If the fault is not clear, contact the service engineer.
BIT4	Battery cell malfunction	Restart the battery pack, if the fault still exists, contact the manufacturer and lock it until the technical personnel resolve the problem.
BIT5	Front-end sampling communication failure	Restart the battery pack, if the fault still exists, contact the manufacturer and lock it until the technical personnel resolve the problem.
BIT6	Heating control Mosfet fault	Reset the battery pack; If the fault is not clear, contact the service engineer.
BIT7	Reserved	
BIT8	Reserved	
BIT9	Reserved	

BIT10	Reserved	
BIT11	Reserved	
BIT12	Reserved	
BIT13	Reserved	
BIT14	Reverse DC connection	Check whether or not the wiring between the battery pack and the positive and negative wires of the inverter battery is proper.
BIT15		

10 Quality commitments

If the product malfunctions during the warranty period, AVOL or its distributors will provide free service or replace it with a new product.

Documents

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be intact and clear. Otherwise AVOL has the right to refuse to fulfil the warranty.

Criteria

• The unacceptable product replaced will be disposed by AVOL.

• The customer should allow AVOL or its distributors to take reasonable time to repair the malfunctioning equipment.

Exemption from liabilities

In any of the following cases, AVOL has the right to refuse to fulfil the warranty:

• the warranty period of the whole device/parts has expired;

• the equipment is broken during transportation;

• the equipment is installed, reinstalled or used improperly;

• the equipment is used in any of the harsh environments described in this manual;

• the malfunction or breakage is caused by installation, repair, modification or disassembly performed by the service provider or the personnel other than AVOL's or its authorized partners' personnel;

• the malfunction or damage is caused by abnormal use or use non-compliant

with AVOL’s standards.

Components or software

- The scope of installation and use does not comply with relevant international standards.
- Any damage caused by accidental natural factors.

For the product that malfunctions in any of the above cases, if the customer requires maintenance, we can provide paid maintenance services based on AVOL’s judgment.

11 Contact information

Address: 8 Precision Place, Mulgrave, NSW, 2756, Australia

Email: info@cornick.com.au

Tel.: 02 4545 2598 (within Australia)

Tel.: +61 2 4545 2598 (International)