

## GEN2 and GENX Warranty Document

### After sales service and Limited Warranty Letters

This limited warranty (hereinafter Warranty) specified below applies to Battery Energy Storage system referred to as GEN2 or GENX and the accessory Components (hereinafter "Products") supplied by DC Rebel (Pty) Ltd (hereinafter or "DC Rebel") to End User through Authorized Seller (hereinafter or "Seller").

End User Definition

End User (hereinafter "Buyer") is the buyer who puts the Products into operation for the first time via the way authorized by DC Rebel.

Authorized Seller

Authorized Seller is the Agents, Distributors, Partners, etc. authorized by DC Rebel.

#### 1. Purpose

The primary purpose of Limited warranty letters is to clearly define the matters related to warranty policy of Products.

### Applicable Product Document



DC Rebel (Pty) Ltd warrants to the End User as follows:

#### Product Warranty

##### 3.1 Warranty Period

The Products warranty period is three (3) years for GEN2 from the sales date as mentioned in the Seller's invoice to the End User ("Invoice Date") and ten (10) years for GENX.

This Warranty covers a capacity equivalent to no more than 1 full cycle per day. Full cycle discharge. the nominal capacity of a fully charged battery and fully charge it afterwards.

With a certified G2 Battery Balancer on the GEN2 systems provided by DC Rebel, this will extend the warranty to 5 years, at one cycle per day from date of installation.

Micro cycles sum up to full cycles according to amount of energy charged and discharged.

Note. Products are unavailable to communicate with inverters through a communication protocol. The specific Lithium product technology is on basis of "lead acid/gel replacement".

## 4. Performance Warranty (standard)

### 4.1 Capacity performance warranty

DC Rebel warrants that the Products retains seventy percent (70%) of the Nominal Energy for three (3) years from the Invoice Date (if it is held to correct charging and discharging protocols).

The calculation of performance has been done at 1 cycle per day at no more than 35 degrees Celsius at a maximum of 60Amp charge and discharge as a new guide line.

Product Type Nominal Energy

GEN2 (12.8V LiFePO4) 210Ah (2.56kWh)

GENX (12.8V LiFePO4) 230Ah (3kWh)

### 4.2 Capacity measurement condition

Ambient temperature: 25~30C (Degree Celsius)

Initial battery temperature from BMS: 25~30C (Degree Celsius)

## Charging/discharging method

Charge: (0.5) (based on C rate of BMS) CC/CV (Constant voltage: dependant on capacity of installation

Discharge: (0.5) (based on C rate of BMS) CC (Cut-off voltage: dependant on capacity of installation

Current at maximum 15-60Amp charge and 15-60Amp discharge Dependant on installation capacity please refer to data sheet.

Note. Current and voltage measurement at battery DC side

## 5. Exclusion of Warranty

Damage to the Products resulting from any of the following activities is not covered by this Limited Warranty:

**NO INSTALLATION WILL BE WARRANTED BY DC REBEL OR RESELLER IF A ENGINEER AND/OR MASTER ELECTRICIAN HAS NOT COMPLETED A FULL C.O.C (NOT JUST AMENDED). QUALIFICATIONS ARE TO BE EMAILED THROUGH TO DC REBEL.**

A site photo of the installation clearly indicating fuse or breaker protection of the battery modules that need to be combined with a single line diagram and full customer details. The warranty will be null, and void should this not be done within 2 weeks after the installation. Installation warranty will be voided if the battery modules have changed location and installed on a new site without notifying DC Rebel.

1. Not complying with DC Rebels' official user manual of the product and "Appendix 1 - Usage and Transportation requirements".

2. Product damage caused by modification, alteration, disassembly, removal of security seal.

3. Damage or defect arise due to the buyer's unauthorized use of his own design, materials, mixed, function changed or service to the Products.

4. Appearance damage, deformation, abrasion, stain, rust, mildew, or similar external influences caused by the buyer during use.

5. Improper transportation, storage, installation, wiring and use with faulty or incompatible devices by Buyer. If Buyer fails to use the original packaging materials provided by Seller during the transportation of the equipment, the Products damage or failure shall not fall under the warranty scope of the product.

6. The model number, nameplate or product serial number of the product has been altered, erased or unrecognizable or the tamper-evident logo has been arbitrarily damaged.
7. Products suffered any external influences including unusual physical, natural force, electrical stress (power failure surges, inrush current, lightning, flood, fire, accidental breakage, etc.)
8. Product damage caused by external force, force majeure (causes of natural disasters such as unforeseeable, unavoidable and insurmountable objective events, including but not limited to war, civil war, strike, riot or other activities intervened by government, terrorism, war, riots, strikes, unavailability of suitable and sufficient labour or materials and other events which are out of control of DC REBEL
9. Damage of Products arise due to renewal of the national or regional laws or regulations.
10. Product damage and defect caused by End User deliberately or by wilful act.
11. Use of an incompatible inverter, rectifier, or PCS. Use of non-lithium chargers or controllers
12. Products failure is not reported to Seller or DC Rebel within 2 weeks of appearance.
13. To verify whether an inverter/charger/rectifier can charge lithium refer to the operations manual for the specific product. The rule of thumb is that if it doesn't indicate on the inverter or if there is no option on the settings menu and/or indicate any wording on the specifications sheet, it will not charge lithium batteries correctly and therefore DC Rebel will not warrant the batteries as it could cause damage to the BMS and/or cells. Should the client not be sure about the specifications of the inverter, please contact DC Rebel.
14. The defect cannot be overcome under the technology condition when the Product sold to End User.
15. The following warranty document will enforce a specific guideline to all versions of GEN2 and GENX lithium supplied by DC Rebel no matter capacity, age, design, or year of supply and/or sales of the GEN2 and GENX battery module. These guidelines will change from time to time without prior notice. Please refer to our website for the latest Warranty Document.
16. Purchase and installation of the Product in an area other than the South Africa.
17. Products installed by non-qualified technical personnel/installer without any solar qualifications or electrical qualification.
18. Warranty period specified above has already expired.
19. Batteries not fused correctly, 60Amps/60V Max
20. Internal overheating due to over charge or discharge as per recommendation displayed on data sheet
21. Any use of the GEN2 or GENX battery storage in conjunction with any heating element e.g. geysers, underfloor heating, heating lamps, air heaters, oil heaters, stoves, ovens, convectional ovens, heat pumps, industrial baking and heat guns, welders.
22. Each 48V battery bank must have a dc disconnect on the positive and negative sides before bus bar connect.

23. Minimum cable requirement not smaller than 25mm square and not exceeding 75mm square
24. All battery lug connectors to have correct heat shrink and not insulation tape
25. Positive and negative lines on the dc system to and from battery or batteries must have equal resistance and not exceeding one or the other. This means if the resistance total of the positive side is 1Ω it needs to be equal to the negative side. This includes breakers, bus bars, lugs, cable thickness etc
26. All cables to be exact mm squared regardless of length.
27. "Slow blow connections" will void any warranty(connection of all positives and or negatives to a single bolt or nut etc).
28. Using a trickle charger in any event
29. Directly charging from a solar panel without a lithium charge controller
30. Using an alternator to charge the battery or batteries
31. Using wind powered system to charge the battery.
32. Using a grid tied inverter to discharge or charge the battery.
33. Using an MPPT without a battery inverter, hybrid inverter, off grid inverter to charge or discharge.
34. The series connection of more than 4 batteries together exceeding 60v.
35. Non supply of qualifications in ac and dc connections
36. Use of any other terminal screws than provided.
37. Any arch on terminals
38. Any short circuit
39. Negligence during transportation
40. Over tightening of terminal screws
41. The mix of GEN2 or GENX with any other lithium

## **6. Fault Handling**

1.If the product fails, the Buyer shall co-operate with the Seller to obtain the faulty equipment usage information, including but not limited to: faulty equipment serial number, working temperature, usage mode, supporting energy storage inverter manufacturer/model/specification, power consumption equipment power information, PV system configuration information, fault phenomena, operating procedures, battery operation logs, etc.

2.When both parties agree that the product belongs to the warranty scope, Buyer can use spare parts to replace the fault equipment, before using of spare parts to replace the fault equipment, the Buyer shall confirm with the Seller in writing and provide the serial number of the failure equipment and the serial number of the spare parts to be installed in time

3. If the two parties disagree with whether the faulty equipment meets the warranty conditions, the products may be tested jointly by the ways approved by both parties, or the products shall be submitted to the third-party testing institutions recognized by both parties. Both parties can provide reasonable opinions on the test methods, basis and conclusions. The testing fee shall be borne by the Buyer first. If the testing result proves that the product meets the warranty conditions, the Seller shall pay the transportation fee and testing fee generated in full to the Buyer and assume the responsibility for the faulty equipment warranty.

4. Any costs to send products for testing to DC Rebel will be at the cost of the buyers account to and from the testing facility. No charge will be levied for the testing by DC Rebel.

5. No GEN2 or GENX will be tested without proper documentation, i.e warranty registration.

## Appendix 1

### Usage and Transportation requirements

This product includes Lithium iron phosphate battery and the Accessory Components. In order to ensure that the buyer is entitled to full warranty policy, the following clauses should be strictly observed in the transportation and use of products. The product failure or damage caused by violation of the following requirements is not covered by this Limited Warranty.

#### Operating environment requirements

- Working temperature: 20~35 Degrees Celsius
- Working humidity: 5%~85% RH
- No conductive dust and corrosive gas
- Installation location should be away from the sea to avoid brine and high humidity environment.
- The ground is flat and level.
- There is no flammable explosive near to the installation places.
- Keep away from dust and messy zones, water source and heat source, prevent equipment from entering water and overheating.

#### Storage environment requirements

- Short-term storage environment:
  - Within 3 months of temperature no more than 30C. Relative humidity <85%RH. No corrosive gases.
  - More than 3 months long-term storage environment: temperature range for -10~35oC
  - Relative humidity <65% RH No corrosive gases
  - If long-term storage is required, it should be recharged every 6 months, and no less than 80% of SOC should be charged.

#### Transportation requirements

•When the product is transported separately, the individual products should be transported with the original packaging materials of the Seller. If long-distance transportation such as sea transportation is required, additional packaging measures should be taken to ensure the safety of transportation. The product stack in transportation does not exceed 6 layers.

•If the product does not use Seller's original packaging material transportation, Buyer shall fully consider the risks of vibration, drop and collision in the transportation process, and adopt adequate product protection measures.

## Equipment installation requirements

### 1. Visual Inspection

a. Check the appearance for damage and check the attachment variety and quantity according to the packing list.

### 2. Electrical Specification Confirmation

a. The rated working voltage of the energy storage PACK is 48V (4 x batteries) and it should be confirmed that the storage energy and inverter battery power interface parameter is matched.

b. Confirm that the maximum charging and discharging current designed by the system meets the specification requirements of the energy storage PACK.

c. The external power supply should not generate a surge that causes damage to the battery or BMS

### 3. Connection

a. When connecting the power line, pay attention to the positive and negative electrode, avoid reverse connection and short circuit.

b. It is forbidden to connect the battery directly to ac power.

c. The battery can be used in series.

d. Do not mix batteries with other factory batteries or other types of batteries

e. The battery should be reliable grounding, grounding resistance should be less than  $1 \Omega$

f. All batteries to be fused correctly before inverter connection.

### 4. Equipment Use

#### 1. Charging

a. The batteries long-term continuous charging current should be no more than 60 amps

b. If the battery capacity is empty, please charge it within 48 hours after the battery is empty

#### 2. Discharging

a. The long-term continuous discharge current of the battery should be no more than 60 amps

b. The recommended maximum discharge depth of PACK is no more than 90%

#### 3. Cycles

a. This warranty covers a capacity equivalent to 1 full cycle per day for 3 years. Unless a certified battery balancer is added to the system only provided by dc rebel

b. Full Cycle: Discharge the usable capacity of a fully charged battery and fully charge it afterwards. Micro Cycles sum up to full cycles according to amount of energy charged and discharged.

c. 3650 cycles expect cycle life at test condition of 0.5C

d. Charging/Discharging @ 25C to 30C(Degree Celsius) 90% DOD

#### 4. Move

a. To remove the battery, disconnect the external power supply and turn off the switch.

#### 5. Maintain

a. It is forbidden to open the battery shell or dismantle the components before obtaining the written authorisation of

Seller.

#### 6. Fire Emergency

a. In case of emergency, for the use of fire-fighting equipment use only dry powder fire extinguishers.

The above have been tested and calculated at 30 to 35 degrees Celsius to obtain maximum health and energy projection.

Please do not only use solar to charge modules unless the min constant current is 20 Amp per battery (12v to 24v systems) and min 50 Amp per 48v system as it causes a dc ripple that signals the charger to step into absorption mode which leads to the lifepo4 batteries only being charged with volt and not amp. These batteries need a constant current to charge 80 % of the battery capacity. Only charging with volts will give a false state of charge indication and under discharge will signal a voltage drop to the original capacity indicated. On any inverter it would be best to use the setting to charge with solar and utility where possible (indication is where solar array is equal or less than 3kW).

## Battery Balancing Procedure 12V

Before switching on any size of battery bank:

- 12V
- 24V
- 36V
- 48V

You would need to ensure that all batteries are pre-balanced before you connect them to the inverter. Also ensure proper fusing between battery pack and inverter, the BMS is not designed to protect the pack if a sudden surge or spike occurs.

Maximum Fusing – 60Amp

Minimum Fusing – 60Amp

For both negative and positive loads

### Step 1

Use a multi-meter and measure the individual 12V battery voltage.

### Step 2

Write down the separate voltages e.g. (48V)

1. 12.9V
2. 13.1V
3. 13.2V
4. 14.1V

As you can see this pack is not balanced at all.

### Step 3

Connect the highest battery (14.1V) with the lowest battery (12.9V) in parallel without load or charge on it. Simply connect the positive to positive and negative to negative, please ensure to connect the negative last to avoid spark and possibly damaging the BMS.

### Step 4

Wait 1 hour and measure the voltages again. You will see that the lower battery has increased, and the higher voltage battery has decreased. Leave the batteries like this until they are the same voltage.

Ideally you would want all the batteries in the pack to be within point 2 (0.2V) of each other. If you do not pre-balance the pack and/or packs will never balance. This procedure needs to be done every 6 months.

Even after balancing ensure that the battery with the lowest measured voltage is the last in the series connection, even if it differs with a point of a volt. e.g. 0.1V

Please note. The batteries cannot be used in parallel with an inverter, only in series to max 4 batteries (48V).

The parallel connection without inverter or charger is only to balance a battery with another.

### Step 5

Should one of the batteries be on 10V it will go into a Sleep mode to protect the battery cells from over discharge. You should see a very low or no voltage at all.

In this case first connect the battery with another battery of higher voltage in parallel and wait.

Alternatively connect the battery to a Lithium 12V charger over night at the lowest amp setting. This will awake the battery.

If none of these steps work, please return the battery to DC Rebel for inspection

Do not connect to inverter or non-lithium charger.

Should you need any additional information please contact DC Rebel directly.

### **Please provide the following:**

1. Installation C.O.C
2. Installation photo
3. Single Line Diagram
4. End User Details

### **Installer / Company**

1. \_\_\_\_\_ 2. \_\_\_\_\_  
**Name and Signature**                      **Date**

DC Rebel (Pty) Ltd

1. \_\_\_\_\_ 2. \_\_\_\_\_  
**Name and Signature**                      **Date**

1. \_\_\_\_\_ 2. \_\_\_\_\_  
**Name and Signature**                      **Date**

This is to confirm that upon submitting relevant documentation and sign off is done by DC Rebel, a 5 Year Warranty is now eligible with a G2 Battery Balancer installed at this site and/or a 10 Year Warranty for GENX Batteries

