

# **MARATHON BATTERIES PVT.LTD.**

## **MAXXIMA WARRANTY MANAGEMENT MANUAL**

### **1. PURPOSE:**

This manual establishes the Warranty Management procedures adopted by M/S MARATHON BATTERIES PVT. LTD. (MBPL) termed as company here in, in handling all warranty issues. This shall ensure prudent warranty Management practice and deal with all claims there by establishing if it qualifies under the settlement as brought out in this manual.

### **SCOPE:**

Scope is limited to charged Lead acid/factory charged storage batteries for Solar Maxxima batteries for Solar Off Grid Applications.

### **2. RESPONSIBILITY:**

An essential prerequisite of entertaining any claim will be that quarterly maintenance schedules have been filed with the company by the OEM/ customer by the 15th of the following months. This filing can be done by E-mail.

### **3. WARRANTY POLICY:**

3.1 All batteries carry warranty to the system integrator and for that it is essential that the warranty Management procedure is strictly followed.

3.2 Warranty is given against manufacturing defects only, which are as follows.

- Connection faults due to improper inter-cell welding, plate welding and/or welding at the terminal posts;
- Separator faults: puncture, missing cracks, chipped separator that cause short circuit;
- Acid leakage due to improper heat-sealing of the cover.
- Bad workmanship of the battery during warranty period.

3.3 In case of a 12 months Warranty battery, the warranty will be 15 months from the date of sales by MBPL or 12 months from the date of ultimate sale of the battery to the end user, whichever is earlier.

3.4 In case of 18 months Warranty battery, the Warranty will be 21 months from the date of sale by MBPL or 18 months from the date of ultimate sale of the battery to the end-user, whichever is earlier.

3.5 In case of 24 months Warranty battery, the Warranty will be 27 months from the date of sale by MBPL or 18 months from the date of ultimate sale of the battery to the end-user, whichever is earlier.

3.6 In case of 30 months Warranty battery, the warranty will be 33 months from the date of sales by MBPL or 30 months from the date of ultimate sale of the battery to the end-user, whichever is earlier.

3.7 In case of 60 months Warranty battery, the warranty will be 63 months from the date of sales by MBPL or 60 months from the date of ultimate sale of the battery to the end-user, whichever is earlier.

**S-10-11, DWARIKA TOWERS, CENTRAL SPINE, VIDYADHAR NAGAR, JAIPUR RAJASTHAN 302039**

**BOARD: 91.141.2339705. CUSTOMER CARE : 91.8290864714**

**[SERVICE@MARATHONBATTERIES.COM](mailto:SERVICE@MARATHONBATTERIES.COM) [WWW.MARATHONBATTERIES.COM](http://WWW.MARATHONBATTERIES.COM)**

- 3.8 The date of sale by MBPL for all shall be from the LR date.
- 3.9 No complaint will be entered by MBPL unless the correct quarterly maintenance schedule return have been filed on time .
- 3.10 Warranty is entertained
- Only for manufacturing defects arising out of poor workmanship of defective material used in the battery
  - Only if the battery continues to be used in the system on which it was originally fitted on as recorded in the warranty card/ original in-voice.
  - Only to the original purchaser and shall automatically expire on the event of change in ownership of the systems.
- 3.11 Warranty becomes null & void
- If the battery is overcharged or deeply discharged due to fault electrical system, shorting or misuse in the systems.
  - If there is physically damaged (container breakage, damage of terminal post etc.,) or tampered with after purchase.
  - If the battery is drained (without electrolyte), dried and Sulphated.
  - If the battery undergoes deep discharge.
- 3.12 After complete examination, if ,the company decides to replace the complaint battery, then
- The defective battery becomes the property of the company and no scrap value will be given.
  - In case MBPL takes the scrap from the OEM no scrap rebate will be applicable.
  - Warranty for the replaced battery will start from the original date of purchase and continue only for the rest of the period.
- 3.13 It is the company's right to replace with another model of similar type of battery performance suitable to the systems application.

As per guidelines for Off-Grid and Decentralized Solar Application No.5/23/2009-P&C dated 16.06.2010 issued by MNRE (Ministry of New and Renewable Energy), Govt. Of India, the following are the recommendations

- Bulk / Boost Charge 2.40 Volts per Cell at 250 C for at least 10 Hrs with auxiliary charging once in 10 days.
- Equalization Charge for 24 Hours per month at 2.50 Volts per Cell with auxiliary charging.
- Low Voltage Disconnect for discharge current I10 shall be 1.80 to 1.85 volts
- Low Voltage Disconnect for discharge current 10% of I10 shall be 1.95 to 2.00 volts
- Float Charge shall be 2.30 Volts per Cell
- Depth of Discharge on daily basis not to exceed more than 20%. The user is advised to size the System and Battery accordingly if it is above 20% DOD for maintaining desired state of charge.
- Regular recharge is to be ensured to maintain at least 90% SOC. Panel design and charge control settings to be adjusted and verified to ensure at least 90% of SOC is retained on daily basis.

## **Recommendation for Warranted Life**

- Low voltage cutoff should be 11.7V/23.4V/93.6V/117.0 V (i.e. 1.95 V/Cell for 30% of DOD) for a 12V/24V/96V/120V battery systems. Charging time should be a minimum of 04 hrs after every discharge.
  - Charging current should be minimum 0.15C10 and maximum 0.25C10 of Rated Capacity.
  - Charging voltage to be set @ 2.40V per Cell 28.8V/115.2V/144.0 Volts for 24V/96V/120V battery systems
  - Constant Potential, current limit charging maximum current limit of 0.25C10 or C/4 charging as per DIN 41773 to be followed.
4. The user shall follow strictly instructions as per installation and operating instructions manual.
  5. The user shall give freshening charge to all cells once in 6 months at least from the date of factory charge when stored at 27°C.
  6. Battery charging voltage, recharge time shall be maintained accordance to installation and operating instructions manual.
  7. In case of transit damages if any the same has to be informed to the manufacturer within 7 days from the date of receipt.

**The right to determine whether a battery/cell requires repair / replacement lies with**

**MARATHON BATTERIES PVT LTD**

## **ANNEXURE-I**

### **Once in a Month EQUILISATION CHARGE RECOMMENDATIONS:**

Once in a Month CP Boost Charge Recommended @ 2.50 VPC current limited to particular current limit of C/4, Boost Charge is recommend to ensure cell equalization in the battery string.

This has to be done in CP mode as it is administered once in a month for a period of 24 hours. The charger has to have IU characteristic as per DIN 41773 for CP charging.

The charger has to pump constant current till such time the battery reaches 30V/120V/150V for 24V/96V/120V battery systems and the current automatically tapers down and the charging continues for rest of the period to equalize the cells.

The charger should have IEI Characteristics as per DIN 41773. Equalization charge is essential when improper / inadequate charging is performed.

#### Details of Steps:

Step-1: With constant current & 0.25C up to voltage of Battery Bank reaches 30V/120V/150V for 24V/96V/120V battery systems (2.50VPC) as a period of 12 hours.

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Step-2: Automatically switch to constant voltage mode for a period of 10 hours

Step-3: Automatically switch to constant current mode with current of 0.0006C for 2 hours.

## **ANNEXURE-II**

For Optimum Service Life Recommendations are as follows

### **CYCLIC PERFORMANCE:**

In order to achieve the optimum cyclic life, batteries must be returned to full state of charge or at least 90 % state of charge once in a day (i.e. 24 hours) using the Flooded Battery compatible chargers with IU characteristics as per DIN 41773 employing the charge regime recommended by MBPL as per clause 1 prior to the commencement of next duty discharge cycle.

### **DISCHARGE:**

Depth of Discharge must be measured using an AH counting device with an accuracy +/- 1 % of full range of expected discharge cycle currents. The classification of the shunt should be minimum of 0.2A low voltage disconnect should be used to protect the battery from abusive deep discharge (typically 1.75 Volts)

### **RECHARGE:**

Optimum cycle life is achieved by controlling the amount of recharge back into the battery to a level where 110 % of discharged AH is returned. Controlled recharge can be achieved by AH counting

### **Minimum Recharge time:**

Recharge time is a function of rate, depth of discharge, recharge voltage, maximum charging current, desired SoC and temperature.

## **In Order to Claim Warranty the Following Data to be provided**

### **DATA RECORDING:**

In order for the warranty to be valid, the user must provide, by means of routine regular data logging, the following data:

- The number of cycles performed and the Depth of Discharge( % DOD) of each cycle
- The duration of each discharge and charge cycle, and Ah in and Ah out
- Full details of the recharge voltage / current profile for the last 50 cycles
- A full history of the ambient and battery surface temperatures, recorded at regular intervals throughout battery operation and life.
- The time and date of each “event” ( An “event” is defined as the start / stop of the battery discharge, the start / stop of the battery recharge, the start stop of any generator input power or other input power source, etc)
- Preventive Maintenance log sheet for every quarter with the data of distill water top up.

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