



Lead Carbon Lead Acid Batteries Limited Product Warranty

AutoX (Pty) Ltd ("**AutoX**") warrants that its Lead Carbon Lead Acid battery (the "Battery") is free of material and workmanship defects for a warranty period as specified in Annexure 1 hereto from date of purchase when used for Solar and Reserve/Standby power, provided the correct battery in terms of type, capacity, normal use and service conditions is used in accordance with **AutoX**'s specifications and instructions for the Battery as contained in the Technical Documentation available at <https://rentech.co.za/downloads> and the Battery is properly installed and maintained as per the conditions stipulated below.

Definitions

- I. "**Solar**" means the Battery is used in a solar energy system with the inverter/charger's battery parameters set according to AutoX's data sheets, specifications and application instructions provided in the Technical Documentation. In line with international lead-acid battery application guidelines **the battery must be fully recharged after each discharge cycle** as per the re-charge table on the data sheet. The average discharge/recharge cycle rate shall not exceed one cycle per day. The depth of discharge shall not be more than 50%. The average and maximum charge rates shall not be more than 0.15C and 0.3C respectively and the average and maximum discharge rates not more than 0.3C and 0.5C respectively. The ambient temperature inside the battery cabinet shall be within 20°C to 30°C, with an average of 25°C.

- II. **Reserve/Standby power** means the Battery is used in a back-up power system such as an UPS (Uninterrupted Power Supply), with the UPS/charger's battery parameters set according to AutoX's data sheets, specifications and application instructions provided in the Technical Documentation. In line with international lead-acid battery application guidelines **the battery must be fully recharged after each discharge cycle** as per the re-charge table on the data sheet. The average discharge/recharge cycle rate shall not exceed one cycle per day. The depth of discharge shall not be more than 50%. The average and maximum charge rates shall not be more than 0.15C and 0.3C respectively and the average and maximum

discharge rates not more than 0.3C and 0.5C respectively. The ambient temperature inside the battery cabinet shall be within 20°C to 30°C, with an average of 25°C.

General Warranty Terms and Conditions

This warranty is further subject to the **Battery General Warranty Claim Terms and Conditions** available at <https://rentech.co.za/downloads>.

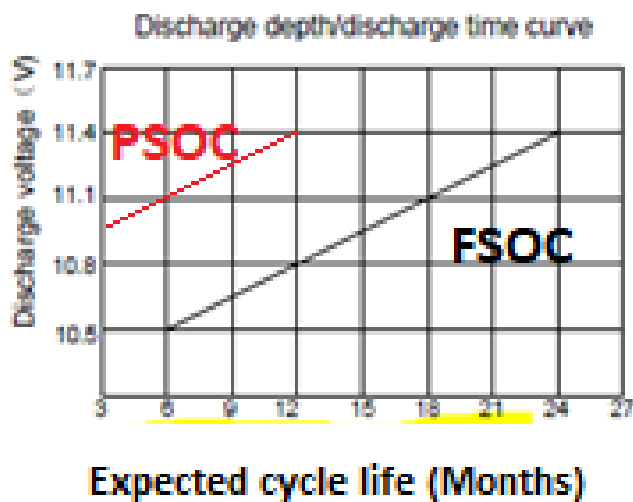
ANNEXURE 1: Warranty periods and specifications

SPECIFICATIONS:

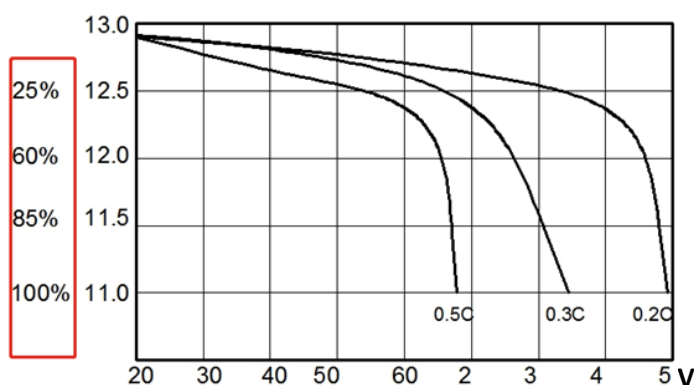
FSOC (“Full State Of Charge”): The battery is fully re-charged to 100% SOC (State of Charge) after every discharge cycle.

PSOC (“Partial State Of Charge”): The battery is operated in a continuous series of discharge and partial recharge cycles typically during the day and discharged at night and not fully re-charged to 100% SOC before the next discharge cycle is allowed.

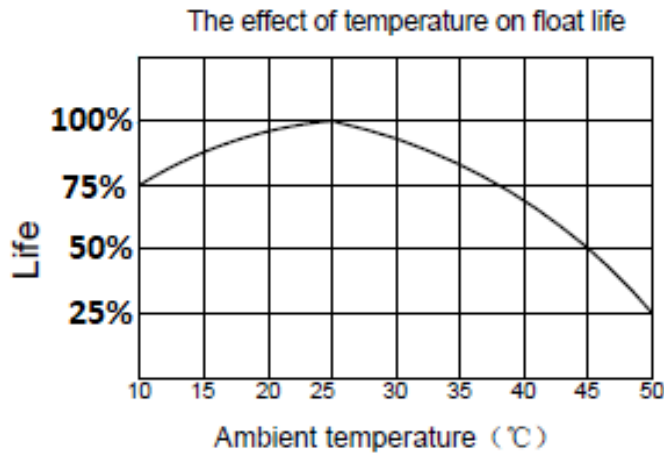
The expected cycle life of the Rentech Lead Carbon batteries versus depth of discharge (DOD) voltage is shown in the figure below.



The relationship of the %DOD versus DOD Voltage is shown in the figure below:



The effect of operating temperature on battery life is shown in the figure below:



The operating specifications for Rentech Lead Carbon batteries for Solar /Cyclic use are as follows:

1. Float voltage: 14.7V
 - a. Maximum %DOD 50%
 - b. Low voltage cut-off for 50% DOD level, 11.8V.
 - c. Maximum peak discharge rate not more than 0.5C and average discharge rate not more than 0.3C.
 - d. Maximum and average charge rates not more than 0.3C and 0.15C respectively.
 - e. Back to battery voltage setting on inverters: Battery fully charged (14.7V and charging current less than 10% of max charge rate).
 - f. Back to utility setting on inverters: 12V or higher.
2. Boost voltage: 15.0V (or disabled)
3. The ambient temperature inside the battery cabinet shall be within 20°C to 30°C, with an average of 25°C.

The operating specifications for Rentech Lead Carbon batteries for Standby/Reserve power use are as follows:

1. Float voltage: 13.5V
 - a. Maximum %DOD 50%
 - b. Low voltage cut-off for 50% DOD level, 11.8V.
 - c. Maximum peak discharge rate not more than 0.5C and average discharge rate not more than 0.3C.
 - d. Maximum and average charge rates not more than 0.15C and 0.1C respectively.
 - e. Recharge voltage before next discharge: Battery fully charged (13.5V and charging current less than 10% of max charge rate).
2. Boost: 13.7V (or disabled)
3. Equalization voltage: 13.8V
 - a. Equalization interval: 30 days
 - b. Equalization duration 24 hours
 - c. Equalization must be enabled
4. The ambient temperature inside the battery cabinet shall be within 20°C to 30°C, with an average of 25°C.

Mandatory Battery Monitoring System:

1. The equipment/installation must have a tamper proof battery monitoring system which records the following data for every charge and discharge event/cycle:
 - a. Battery current: peak and average
 - b. Battery voltage
 - c. Battery temperature
 - d. Date and time
 - e. Duration
2. The recorded data since first installation of the battery must be submitted with a potential warranty claim.

Warranty periods

1. Standby/Reserve power use: 24 months provided the recorded data specified above is submitted and proven to be accurate and complies with the Standby/Reserve power operating specifications above.
2. Solar/Cyclic use:
 - a. 12 months provided the recorded data specified above is submitted and proven to be accurate and the inverter/equipment battery charging, discharging, low voltage disconnect and cyclic settings at commissioning and for every change made are submitted and proven to comply with the FSOC operation and solar/cyclic operating specifications provided above.
 - b. 6 months provided the recorded data specified above is submitted and proven to be accurate and the inverter/equipment battery charging, discharging, low voltage disconnect and cyclic settings at commissioning and for every change made are submitted and proven to comply with the solar/cyclic operating specifications provided above, BUT the batteries were operated in PSOC.