Firefly “OASIS” G31 User’s Manual

August 2015

Congratulations on your purchase of the Firefly Oasis G31 Battery!

The Firefly "OASIS" battery uses a patented carbon Microcell Foam grid structure that is highly resistant to sulfation and grid corrosion. It has the longest life of any lead acid battery used for deep cycling, even at extreme temperatures and operation at less than full charge

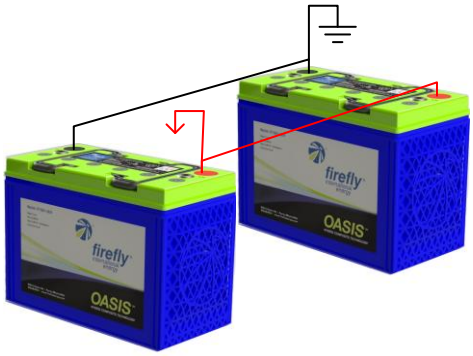
The Firefly batteries can have four times the life and two times the energy density of a traditional lead acid battery:

- Plate corrosion is inhibited.
- Plates are resistant to sulfation
- The high plate porosity allows the electrolyte to react more efficiently.

Installation

MOUNTING ORIENTATION
The Oasis battery can be installed in any orientation other than inverted without compromising the operation of the battery.

PARALLEL INSTALLATION



SERIES INSTALLATION

CONNECTING THE BATTERY
Take care not to short circuit the terminals on the battery. Make sure the terminals and connectors are clean and free of corrosion. Connect the positive cable to the positive (+) battery terminal. Connect the negative cable to the negative (-) battery terminal. The terminals are 3/8-16 UNC and should be torqued to 16 ft lbs.

Operation & Charging

- The Oasis battery can be operated in a partial state of charge for long periods of time without sustaining any permanent damage.
- The Oasis may emit gas during the first 10-20 charge cycles. This is normal.
- The maximum recommended discharge current is 0.7C for extended periods of time to ensure the longevity if the battery. The FF battery discharge faster than that for short periods.
- If you have hardware that requires a Peukert constant to be entered, use 1.07.
- For a complete charge cycle, charge the Oasis to 14.4V with temperature compensation (bulk phase) and continue charging until the charging current drops to 1.5A(absorption phase, time will vary). You DO NOT need to fully charge the Oasis each cycle in order to maintain the capacity and only need to perform a complete charge cycle when you want to maximize the capacity for the following discharge cycle.
- For charging sources that may be charging the battery for an extended period of time (solar, or an alternator if motoring for a while); set the float voltage to 13.2V or less. The Oasis does not require a float charge. But, if float charging, due to the Oasis's longer projected lifespan, it is important to keep the float voltage at or below 13.2V to ensure the battery lasts for as many cycles as possible. Reset to bulk phase: for programmable charging sources, adjust the "reset to bulk phase" to occur if the battery voltage drops below 12.0V for >1 minute.
- The optimum operating temperature for a lead-acid battery is 25°C (77°F). As a rule of thumb, every 8-10°C (14-18°F) rise in temperature will cut the battery life in half.

Restoration Charge

As stated, the Oasis can operate in a partial state of charge for long periods of time without sustaining any permanent damage. The usable capacity will decrease, however, with each cycle within a partial state of charge, up to a point. In order to regain the full original capacity and in some cases more, it is necessary to perform a restoration charge. To perform the restoration charge: charge the Oasis to 14.4V and continue to charge until the current drops to 0.6 A. Fully discharge the battery to 10.5V, and then repeat the same charge cycle. At this point, the Oasis should have regained it's full capacity.

Safety

EMERGENCY AND FIRST AID PROCEDURES

Battery Electrolyte Eye Contact: Immediately remove any contact lenses if present. Flush eyes with water for at least 15 minutes. Seek medical attention immediately.

Skin Contact: Remove contaminated clothing. Flush with water for at least 15 minutes. Seek medical attention immediately.

Inhalation: Remove to fresh air. If not breathing give artificial respiration. If breathing is difficult give oxygen. Seek medical attention immediately.

Ingestion: Do not induce vomiting. If conscious dilute by drinking water or milk. Do not give anything by mouth to an unconscious person. Seek medical attention immediately.

PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in case of a broken battery case or electrolyte leakage: neutralize spilled electrolyte and exposed battery parts with soda ash, sodium bicarbonate, lime, etc. Do not use organic or combustible material. Wear acid resistant clothing, boots, gloves, face shield, and proper respiratory protection.

Waste Disposal Information: Please observe all federal, local, and state regulations regarding the disposal of lead/acid batteries.

Precautions to be taken in Handling, Storing, and Transportation: Store in cool, dry area away from combustible materials; store in well ventilated areas. Other Precautions: Do not charge in unventilated areas.

Shipping, storage and disposal

VIBRATION RESISTANCE
The carbon foam batteries have been used under conditions of extreme vibration and impact in applications such as transit buses - carbon foam plates have higher yield strength than lead plates and have high compressive strength.

D.O.T. REGULATIONS-NONSPILLABLE
Firefly's Group 31 battery meets the non-spillable criteria. It is excepted from CFR 49, Subchapter C requirements, which translates to no proper shipping name, no hazardous class, no UN number, no packaging group and no hazardous labels when transporting, provided that the following criteria are met: 1. The batteries must be protected against short circuits and securely packaged. 2. The batteries and their outer packaging must be plainly and durable marked "NON- SPILLABLE" or "NON-SPILLABLE BATTERY".

TWO YEAR SHELF LIFE
Unlike other lead acid batteries that require a recharge as frequently as every six weeks, the Oasis battery can be stored for up to two years at 25°C (77°F) from a fully charged state.

FULLY-CHARGED WHEN SHIPPED
The Oasis will be shipped from the factory fully charged. Some venting around the terminals is possible when it arrives.

RECYCLING
There is an existing infrastructure to recycle lead acid batteries. Because Firefly's technology uses carbon, it actually decreases the amount of lead in the battery. Firefly's microcell technology can be recycled through the existing lead acid infrastructure.