


**REAL POWER
UNREAL PERFORMANCE**

CAUTION! PLEASE READ!



Proper Charging is Crucial! Charge before initial use!

Be sure to read the Instruction Sheet for full instructions.

Proper Charging is crucial to the life of your XS Power TITAN8 battery. It is very important that the temperature of the battery remains cool with respect to the charge voltage.



Do Not Over-tighten Battery Terminals!

Introduction

Congratulations on your purchase of an XS Power Batteries lithium TITAN8 battery. You have in your hand the cutting edge lithium battery made for extreme power or extreme reserve applications.

Lithium cells hold, in general terms, three times the energy density of lead acid batteries. However they need careful management to be safe and provide a long service life. Fundamentally, they have serious risks associated with them and these must be understood to avoid danger, loss of property, and personal injury.

Lithium batteries are not lead acid batteries. That seems to be stating the obvious but for the majority of the people reading this instruction sheet, it is a significant one. You are probably replacing a lead acid (flooded, maintenance free, or AGM) battery with this new lithium battery. To get the most out of your new battery, specific care and procedures are required. Read this sheet carefully so that you fully understand what your new lithium battery can and cannot do.

! The Quick List

- READ the battery label and do not exceed any of the ratings.
- Do not over discharge this battery. Terminal voltage should at all times remain above 9V(12V models), 10.8V(14V models) or 12.5V(16V models).
- Disconnect when not in use.
- Make sure you have the correct charger. Lithium batteries are voltage sensitive so pay close attention to the max voltage rating.
- Do not use an undersized battery for the job esp. in applications under -20°C(-40°F).
- If the terminal voltage under-load drops below 9V(12V Models), 10.8V(14V Models) or 12.6V(16V Models) the battery is too small for the job. Stop and resolve the issue before continuing.

Pulse loads by their very nature are a pseudo short circuit of the battery. This is fundamentally destructive to the battery so each battery's State of Health should be regularly checked.

- See the separate SDS sheets for additional information at, <https://www.4xspower.com/support/material-safety-data>

Technical Assistance

Our Customer Service Department is eager to help you with any questions or issues you may have and are available from 8:30AM to 5:30PM, Monday thru Friday at 865-688-5953. In addition, technical support is available via FAX at 865-281-9844 or by email at tech@4xspowerbatteries.com. Be sure to check out our website for additional technical and product information.

TEMPERATURE SPECIFICATIONS

| | |
|-----------------------------|-----------------------------|
| Nominal Operating Temp. | -4°F - 131°F (-20°C - 55°C) |
| Recommended Operating Temp. | 14°F - 95°F (-10°C - 35°C) |
| Storage Temp. Range | 5°F - 122°F (-15°C - 50°C) |



PROP 65 WARNING: This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer or birth defects or other reproductive harm. Wash hands after handling.

For more information, visit www.P65Warnings.ca.gov

Installation

You may mount the Lithium battery in any direction as long as it is secured from short circuits and/or movement. One word of caution though. This battery is very light and therefore it does not require a great deal of force to hold it. Do not crush the battery with battery retention systems. The threads are M6-1.0. Optional mounting kits and terminals are available. Observe the maximum torque ratings on the battery label.

- Be extremely careful when making connections. Remember there is no low voltage disconnect, reverse polarity, or short circuit protection on the main terminals of this battery. Further the power output of a lithium battery is four times that of typical lead acid batteries. Short circuits will flow huge amounts of current instantly with the ability to melt metal.
- Do not expose to temperatures above 60°C (140°F). Elevated temperatures accelerate the aging process of most battery types and lithium batteries are especially sensitive to high temperatures. If it must be in the engine compartment, use a heat shield and duct cool air around the battery.
- Parallel connection of this lithium battery is not recommended. By its very nature this connection method cannot be considered 100% safe. If parallel connection is unavoidable, fuses, switches, or fusible links must be used to control excessive cross current (current flowing from one battery to the adjacent battery.)
- Open circuit voltage should be 12.8V for 12V, 15.4V for 14V, and 17.8V for 16V when fully charged after resting for 8 hours. If it is less than this after resting for 8 hours, the battery should be taken out of service and must be checked for capacity, cell balance, and State of Health before resuming operation.

Charging

Typically the battery will ship at less than 100% State of Charge (SOC.) Please charge your new battery immediately upon receipt. It is important that you use a lithium capable charger your battery, and one that is rated for the correct voltage.

Lithium batteries are by their very nature voltage sensitive. Further, the lithium battery is the most vulnerable to damage while charging. It is important that the charging process of the battery be fully understood and carefully controlled.

- DO NOT use a battery charger designed for "Flooded" or "Maintenance Free" batteries.
- DO NOT use a battery charger with a "de-sulfation mode" or "float mode".
- Remove the battery charger once the battery is full meaning 100% State of Charge. Unlike lead acid batteries, over charging lithium batteries DOES NOT help them nor cause them to store more power. Instead it harms them and should be strictly avoided.

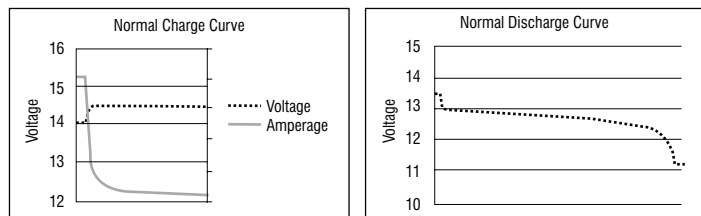
REAL POWER UNREAL PERFORMANCE

Charging(con'd)

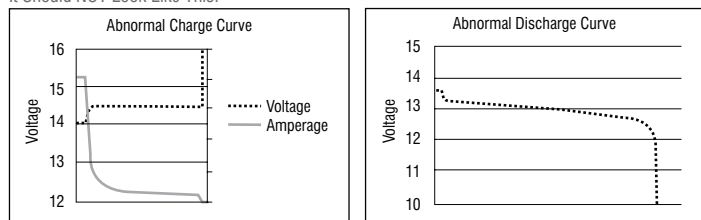
- Lithium cells are in a state of stress when at 100% SoC and beyond. Continuous charging must be avoided.
- Unlike most lithium batteries, TITAN8 batteries have a very high recharge rate and can, if a large enough charger is used, be charged to 100% SOC in approximately 5 minutes. Speed of charge will be determined by the output of the charger you are using.
- If you discharge the battery beyond its recommended minimum voltage, it is not recommended to fast charge the battery. In this situation the best method to charge the battery to keep it from being damaged is to charge it at 1 amp or less for an extended period of time until 100% state of charge is reached.
- Lithium batteries do not have a "memory effect" therefore they do not have to be empty to benefit from re-charging. Simply recharge them when convenient and avoid overcharging. In general, float charging or battery maintaining should be avoided. However, since the chemistry is LTO, they can be used in a system that does constantly charge the battery to maintain a ~90% SOC without damaging the battery.

The charging and discharging behavior of a lithium battery should be very predictable and repeatable. Changes in behavior should be understood and not ignored. For spot checking the batteries, use an accurate digital multimeter to measure the voltage to at least two decimal places. (Analog type meters are not recommended.)

During charging and discharging the voltage should follow this pattern in general:



It Should NOT Look Like This:



State of Charge

| S5 | | S6 | | S7 | |
|-------|---------|-------|---------|-------|---------|
| 13.60 | 100.00% | 16.40 | 100.00% | 19.13 | 100.00% |
| 13.20 | 96.00% | 16.00 | 98.00% | 18.67 | 98.00% |
| 12.80 | 77.00% | 15.60 | 92.00% | 18.20 | 92.00% |
| 12.40 | 54.00% | 15.20 | 74.00% | 17.73 | 74.00% |
| 12.00 | 25.00% | 14.80 | 50.00% | 17.27 | 50.00% |
| 11.60 | 10.00% | 14.40 | 25.00% | 16.80 | 25.00% |
| 11.20 | 8.00% | 14.00 | 10.00% | 16.33 | 10.00% |
| 10.80 | 5.00% | 13.60 | 7.00% | 15.87 | 7.00% |
| 10.40 | 1.00% | 13.20 | 6.00% | 15.40 | 6.00% |
| 10.00 | 0.00% | 12.80 | 4.00% | 14.93 | 4.00% |
| | | 12.40 | 1.00% | 14.47 | 1.00% |
| | | 12.00 | 0.00% | 14.00 | 0.00% |

Charging(cont'd)

Charge Voltage

| S5 | S6 | S7 |
|--------------|--------------|--------------|
| 13.6 - 14.5V | 15.5 - 17.4V | 18.2 - 20.3V |

Power Wattage

| PWR-S5 | | PWR-S6 | | PWR-S7 | |
|------------|--------|------------|--------|------------|--------|
| Standalone | 4,000W | Standalone | 5,000W | Standalone | 6,000W |
| 100A Alt. | 5,000W | 100A Alt. | 6,000W | 100A Alt. | 7,000W |
| 200A Alt. | 6,000W | 200A Alt. | 7,000W | 200A Alt. | 8,000W |
| 300A Alt. | 7,000W | 300A Alt. | 8,000W | 300A Alt. | 9,000W |

| RSV-S5 | | RSV-S6 | | RSV-S7 | |
|------------|--------|------------|--------|------------|--------|
| Standalone | 2,500W | Standalone | 3,000W | Standalone | 3,500W |
| 100A Alt. | 3,500W | 100A Alt. | 4,000W | 100A Alt. | 4,500W |
| 200A Alt. | 4,500W | 200A Alt. | 5,000W | 200A Alt. | 5,500W |
| 300A Alt. | 5,500W | 300A Alt. | 6,000W | 300A Alt. | 6,500W |

Standalone Burst Discharge(5 sec)

| | |
|--------|-----------------------------------|
| PWR-S5 | 1000A pulse capability (10,000W+) |
| PWR-S6 | 1100A pulse capability (11,000W+) |
| PWR-S7 | 1200A pulse capability (12,000W+) |
| RSV-S5 | 500A pulse capability (5,000W+) |
| RSV-S6 | 600A pulse capability (12,000W+) |
| RSV-S7 | 700A pulse capability (14,000W+) |

Usage

In general, the lithium battery will greatly outperform the lead acid battery it is replacing. If it does not, chances are you have a battery that is too small for the job. It may be necessary to use a larger capacity battery, or a second battery in parallel. Pulling the battery's terminal voltage below 9V(12V models), 10.8V(14V models), or 12.6V(16V models) for even the shortest amount of time is prone for a premature failure.

Lithium batteries have a relatively flat discharge curve when compared to a lead acid battery. The average terminal voltage throughout discharge will be 12.0V for 12V models, 14.4V for 14V models or 16.8V for 16V models. Unfortunately, this can make judging the state of charge difficult when the battery is nearly empty. Lithium batteries at a low state of charge will show a relatively high voltage. It is important to get familiar with the limits of your battery because over discharge (discharge below 9V for 12V models, 10.8V for 14V models, or 12.6V for 16V models) must be strictly avoided.

Warnings

To reduce the risk of fire or personal injury including burns

- Do not over charge the battery (meaning exceed the maximum voltage OR amperage and remove the charger once the battery is at 100% SOC).
- Do not short circuit the terminals.
- Use with alternators requires that the charging voltage be limited to 14.5V or less. 13.0~14.0 is preferred for 12V models, 15.5-17.4 for 14V models and 18.2-20.3 for 16V models.
- Avoid high temperature. Never operate the battery in environments above 140°F or if the battery itself exceeds 140°F at any point.
- Disconnect the battery in total before welding anywhere on the vehicle.
- Do not submerge in water. This battery is not waterproof.
- Do not crush, puncture, or dispose in fire or water.
- Do not attempt to open, disassemble, or service the battery pack.