



# LITHIUM BATTERY GUIDE

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# 2400W LFP Battery

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**Description:**

Lithium Iron Phosphate battery, 200AH, 2400W with proprietary internal controls and battery management system. Internal heating capacity – operating range - 20C /+5F to + 55C /+67F

Separate charge and discharge connections to improve cell life.

**Advantages:**

Compact, high power, deep draw capacity. Lighter and 60% less space than power equivalent AGM products

# Battery Description

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KS2 2400WLFP, ( Lithium Iron, Phosphate ) deep cycle 200A battery contains our proprietary BMS design and controls. It has built in safety protections and is designed for large demand applications.

Each battery contains a BMS ( battery management system), relays to manage charge and discharge requirements, temperature and current sensors and voltage sensors for the cells. Heaters have been installed to warm up the cells in cold climates. There is also an internal fuse to protect the battery. There are additional control devices in the battery to monitor voltages inside and outside the battery.

A KS 2400LFP battery contains about 2400 watts of power. The Lithium energy bank is a lot more generous than the AGM bank and it lets you take use approximately 80% of the power available. This means that the battery has about 2000 watt hours of usable power which is a more than the AGMs.

With 4 batteries you have a usable bank of about 8000 watt hours, so you can run your air conditioner for about 8000W/1500W which equals approximately 5 hours. If you have other appliances running it will be less.

# Specification

2400W LFP	12V
DC V Nominal	12.8
DC Voltage Range	12 to 13.6
Amp Hours	200
Rated kWh Capacity	2400
Max Discharge Current	200 Amps
Max Charge Current	200 Amps
Operating Temp	-20C to 55C / -4F to 131F
Charging Temp	0C to 45C / 32F to 113F
Life Cycles	2000
Weight	36.3 Kgs/ 79.9 Lbs.
Dimensions	495x230x320/19.5x9.1x12.6

# The Battery System

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Each KS2400LFP battery has its own control switch. A single battery will have one rocker switch at the bottom and one pushbutton switch at the top of the panel. A 2 battery set up will have two sets of switches etc.

The lower rocker switch turns on the battery. Under normal operation this switch should always be on. This powers the battery management system, which manages all functions of the battery, including charging, voltage protection, and the battery heaters when it gets cold.

The battery management system will turn off the batteries when they are run down to near empty. The system will still accept charge, but will no longer provide power.

In order for a charge to enter the battery, it must be turned ON. This applies regardless of the source of the charge.



# Turning on Batteries

## **Turning on the batteries**

Press the lower rocker switch to turn it on. Press the reset button for about 3 seconds to power up the Battery Management System. ( Do not hold the reset button for longer than 3 seconds)

When the vehicle is not in use, turn the batteries off. If you are storing the batteries for extended periods, charge them to between 12.8 and 13.0 V. They should be checked every 20 -30 days.

In cold weather (<2 C/ 36F),the battery management system will start the battery heaters first to warm up the batteries. Depending on the temperature, it could be a while until the batteries are at a temperature where they can be charged. The batteries can be discharged when cold.

If you have more than one battery turn both on at the same time. This will allow the charging devices to charge and maintain both batteries and to split the current between them. It is best to operate your batteries in pairs.

# Charging

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Charging is better if you charge a few batteries at a time. Under-hood generators can charge the batteries in a reasonable amount of time. Settings for the generator can be adjusted to maximize the systems life. (see table 1)

Solar charging also extends the time a user can be away from shore power. Settings for your solar charger should be adjusted to match the entire system. (see table 2 )

Your inverter / charger is designed to charge your batteries at a rate specified by the installer. It is important that your inverter be set to charge program 1. For adjustable charge current inverters the following charge currents are recommended:

1 battery = 45% / 30A,  
2 batteries = 70% /50A,  
4 or more batteries = 90%/70A

# Discharging/Use

*In order to extend the life of your batteries, it is best to operate them in pairs. This allows the batteries to share both the charge ( incoming current), and the load. If your vehicle has 4 batteries , turn off the first pair before turning on the second pair.*

*If you are going to run your appliances for an extended period of time without charging ( ie – sleeping with the air conditioner on), you can turn on 4 batteries. It is best to have your battery banks full for this situation. If both banks are within 0.2-0.3 Volts there will be little current rush between the banks when turning them on together. A large difference in V between the battery banks can lead to a rush of current from the “full set” to the “empty set”.*

*Should 1 set be empty, you should charge it before you require power from it.*

*There is a lower cut off of 12.2V for the battery. When it reaches this level you will need to supply charge power to the batteries from either the inverter ( shore power ) or the generator. ( see table 3 for all operating conditions)*



Table 1 – GU settings  
( modified for average users)

Display	Description	MC-614 NA3 parameters
dLc	Start Delay	1
AHL	High Voltage Limit	13.8
CL	Temp. CO Limit	13.8
bv	Bulk Voltage	13.8
b1c	Fixed Bulk Time	0.6
Av	Absorption Voltage	13.6
A1c	Fixed Abs. Time	0.6
Fv	Float Voltage	13.6
F1c	Fixed Float Time	0.7
ALL	Low Volt Limit	12.7
FbA	B to A Field Limit	27
FFL	F to A Field Limit	65
AL1	Alt Temp Limit	120
B1L	Battery Temp Limit	52
SLP	Temp CO Curve	0
Profile	Default Profile	LFP

Advanced	Settings
Boost Duration (min)	1 20
Equalize Duration (min)	120
Temp Compensation ©	-3
Over Volt Disconnect (V)	14.4
Over Volt Reconnect (V)	13.8
Equalize Charging (V)	13.6
Boost Charging (V)	13.8
Float Charging (V)	13.6
Boost Recon Charge (V)	13.25
Charging Limit (V)	14.1
Discharging Limit (V)	12.2
Low V Disconnect (V)	12.0
Low Volt Reconnect	12.9
Under voltage Warning (V)	12.2
Under Voltage Warning reconnect (V)	12.9

## Table 2 – Solar Charger Settings

# Table 3 – Operating conditions

PARAMETER	CONDITION	LIMIT	ACTION	RESET CONDITION
AMPERAGE	Greater than	200	Open Both relays	Reduce demand ( shutdown inverter etc )
TOTAL VOLTAGE BMS	Less than	12.4	Open Discharge relay	Apply charge
TOTAL VOLTAGE BMS	Greater than	14.4	Open Charge relay	Allow time to balance or apply demand
CELL VOLTAGE BMS	Less than	2.85	Open Discharge relay	Reduce demand ( shutdown inverter etc )
CELL VOLTAGE BMS	Greater than	3.6	Open Charge relay	Allow time to balance or apply demand
OUTSIDE VOLTAGE OVUV	Greater than	15.2	Open Discharge relay	Reduce V supplying Battery Disconnect ( GU/Inverter )
OUTSIDE VOLTAGE OVUV	Less than	11.5	Open Charge relay	Supply Charge V > 12.2VDC
TEMPERATURE	Greater than	55	Open Both relays	Reduce demand ( shutdown inverter etc )
TEMPERATURE	Less than	0	Open Charge relay	Supply power to heaters ( GU / Inverter )
TOTAL VOLTAGE APC	Less than	12.2	System shut down	Supply V > 12.9 and press reset

# Frequently Asked Questions

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***Batteries wont turn on:***

***Start the engine or plug inverter into shore power and turn it on. Turn the battery switch to on. Press the reset button for 3 seconds. This procedure may need to be repeated if the batteries are extremely low in power ( check V display )***

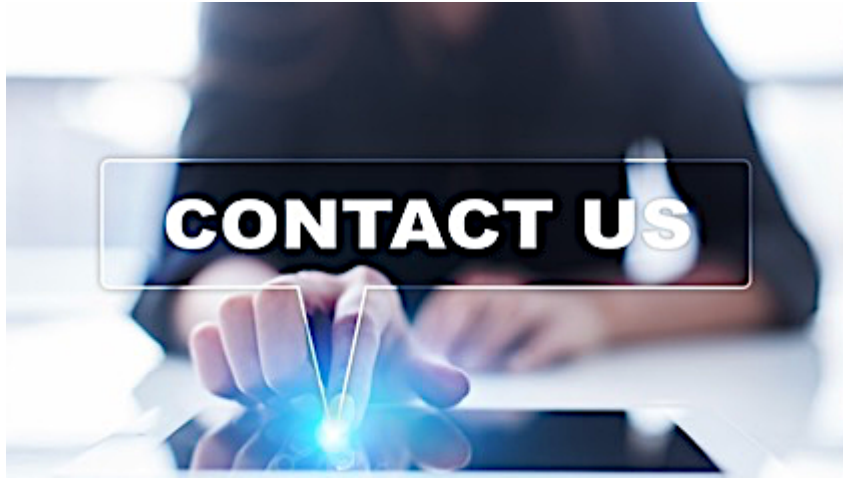
***Relays are clicking:***

***Normally this means the battery is at a state of shutdown due to over charge or undercharge. Check the V and refer to table 3 for details.***

***Blue LED light is flickering / dimming:***

***The battery V is too low – apply charge and press reset button. You may need to press the reset every 3 seconds for up to 1 min.***

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