

SFK-260 & SFK-260HP

User Manual



Revision 1.2

www.sunfunkits.com

General Usage Instructions

Thank you for purchasing your Sun Fun Kits battery kit system, your battery has been hand built by Sun Fun Kits technicians in our Baton Rouge (Louisiana, USA) facility using components from China, United States, and India. We have tested your battery by performing a complete balance, capacity, and load test to ensure it is built to industry standards. Your battery comes ready to use and we recommend you review this brief guide on how to get the optimum performance and longevity of your unit.

We have built the SFK-260 battery to be serviceable and upgradeable, this allows for efficient service and repairs and ensures product longevity. The nature of kit built products comes with some considerations; they are not as rugged as non serviceable products so care needs to be given when handling battery kits. However non serviceable products generally have to be disposed of in case of issues (regardless of how insignificant) this contributes to e-waste and is against many right to repair laws; because of this we feel our kit approach offers the best in reliability and longevity for our customers.

Please review this usage manual before using your battery/kit to ensure many years of reliable use. **NOTE:** The battery will arrive at approximately 35% SOC (state of charge) and should be charged to 80-100% before use. This is necessary to comply with shipping regulations, for more information please see the charging section. You may need to charge/discharge your battery a few times to calibrate the SOC meter, please read the charging section of this user guide for more information.

Battery Safety:

Sun Fun Kits recommends an experienced electrician setup your battery bank system, or you have extensive knowledge and experience in setting up high power DC systems. Setting up batteries improperly can result in severe injury and even death. Please take caution when working with our batteries and ensure you have proper safety equipment and tools, please follow these safety tips:

- Wear safety equipment and tools including eye protection, insulating gloves, and use electrically safe tools.
- The use of proper circuit breakers, fuses and DC disconnects is recommended. Please ensure installs and setups are done by certified electricians, or licensed installers/dealers.
- Sun Fun Kits SFK-260 battery contains a battery management system (BMS) that protects the battery from overcharging, discharging and temperature extremes. Users must ensure their electrical setup works within these parameters and assume that the BMS protection is secondary protection ONLY.

- Reverse Polarity can cause damage to your battery, ENSURE you have properly set up your electrical wiring.
- Battery short-circuits can damage your bms and battery, ensure you are using insulated tools when installing the battery and that you have planned your install carefully before beginning.
- Ensure bolts are tightened and installed correctly on all cables and power disconnections/bridges, loose terminals can cause permanent damage as well as electrical fires as it increases resistance in an electrical circuit.
- **ALWAYS** ensure the battery is oriented properly and has the terminals facing up. **DO NOT** place the battery upside down or on its sides. This will cause permanent damage to your battery.
- Keep away from direct sunlight and water, these battery units are not water sealed in order to make them serviceable. If you are using them in a situation where they are exposed to the elements, you must take appropriate measures to ensure they are isolated from these environmental factors.

General Use:

LifePo4 or Lithium Iron Phosphate is one of the safest lithium based chemistries in the market. Unlike other chemistries such as Li-Ion or Li-polymer these batteries do not have thermal run-away, and will not ignite or burst into flames (in rare circumstances, if the cell is punctured; the electrolyte is flammable) if overcharged / over discharged. It is the only chemistry recommended for recreational use and has been confirmed to be the safest lithium option by independent labs and government agencies (FAA transportation study: <https://www.fire.tc.faa.gov/pdf/TC-16-17.pdf>).

Sun Fun Kits LifePo4 batteries may be used anywhere typical deep cycle lead acid/agm/flooded batteries are used and do not require special charging equipment as they have built in circuitry that ensures proper charging and discharging. It is recommended that you use lithium LifePo4 chargers whenever possible, or set your charging apparatus to the AGM charging profile to ensure that your batteries can get fully charged. Sun Fun Kits offers the SFK-PS-330 charger that can be used to fully charge your LifePo4 batteries for customers looking for a stand-alone wall outlet charger.

Acceptable uses are:

- Use in RVs as a 12-48 volt power source, or as part of an inverter bank to provide standby power
- Use in solar panel installs as a power source for storing power
- Use in troller motor applications for boats (requires ensuring that the battery is isolated and protected from water intrusion)
- Use in Golf Carts or other small electric vehicles that have amperage governors (care must be taken to ensure that the batters are protected from water intrusion)
- As a DC power source for power supplies and other items needing DC power
- Use in DC to AC inverters where standby / backup power is needed such as data centers, or residential power sources.

Restrictions And Safe Mode:

Lithium Iron Phosphate batteries are not recommended for applications that require high amperage bursts such as starting engines or use in DC arc welding. This will trigger the maximum amp cut-off in the batteries built in BMS (battery management system) to stop sending current and the system will engage in a 30 second shut down.

If you exceed the amp limit of your battery or have gone to below 0% SOC and find that the battery is not outputting power, it may be because the battery has gone into safe mode. Safe mode protects the battery from damage and requires a cool down period of up to 5 minutes before it can be available for use again. In order to take out the battery of safe mode, you will need to apply an external power source of 13 volts or higher to “wake up” the battery, this can be done using any standard 12v charger.

Max amps and voltage:

Sun Fun Kits SFK-260 batteries can be connected in parallel or in series. You can connect up to 4 batteries in series to achieve a maximum voltage of 58 volts (this is generally shown as 48v, the nominal reading) and you can parallel these batteries up to 4 units. Regardless of how you configure your batteries, we recommend you keep your combined power output to under 3500 watts for sustained use with a max peak of 5 kw (30 seconds) and a maximum amp discharge of 125 amps. You will also need to ensure that you have selected the proper wire gauge and wire materials to ensure you can safely deliver your desired power output. A brief chart lists power usage and wire / gauge requirements below:

Gauge	Volts	Amps	Total Power
4 Awg	13.2	75	0.99 kw
4 Awg	26.4	75	1.98 kw
4 Awg	52.8	65	3.42 kw
2 Awg	13.2	125	1.65 kw
2 Awg	26.4	125	3.3 kw
2 Awg	52.8	65	3.42 kw

*For power requirements greater than 3.5 kw continuous, you will need to have multiple banks of batteries connected to different inverters / dc banks.

Sun Fun kits recommends using the highest possible voltage available on your power system, and limiting the total output to below 125 amps, we also recommend using 2 Awg or lower pure copper wire.

Charging & Discharging:

Lithium Iron Phosphate batteries do not require special charging equipment as they have built in circuitry that ensures proper charging and discharging. This means you can use “any standard 12v based battery charger”. We do recommend you use lithium LifePo4 chargers whenever possible, or set your charging apparatus to the AGM charging profile to ensure a full charge. Sun Fun Kits offers LifePo4 based chargers to ensure full charging if you need a purpose built charger.

The charging and discharging parameters for the SFK-260 are listed below:

Parameter	Value	Notes
Low voltage cut-off	10.8 volts / 2.7 volts (cell)	Battery will go into Safe Mode at this voltage.

Full Charge	14.4 volts / 3.6 volts (cell)	Maximum charge voltage should not exceed 14.6 volts
Nominal Voltage	13.6 Volts / 3.4 volts (cell)	This is the voltage that the battery will settle to after it is taken off charge.
BMS Self Discharge	0.52 amps / day	A fully charged battery will discharge to low state of charge in about 500 days
BMS Balance Amps	1.2 Amps 5 Amps (HP Models)	Balancing will happen between 2.9v-3.65v ONLY.
Recommended Discharge	550 watts (40 amps)	Discharges of 550 and below will yield the longest battery life.
Max Continuous Discharge	750 watts (60-85 amps) 1,000 watts (For HP Models)	This is the highest suggested discharge for an extended period of use.
Peak Discharge (30 seconds)	1.7 kw (125 amps)	Limited to less than 30 secs.
Recommended Charge Rate	330 watts (23 amps at 14.4v)	
Max Charge Rate	800 watts (60 amps at 14.4v)	
Surcharge Disconnect	83 amps	The battery will stop charging if it detects a surge of more than 83 amps.
Recommended Usage Temp.	70° Fahrenheit	Batteries are happiest in the same temperature range we are.
Maximum Discharge Temp.	120° Fahrenheit	
Minimum Discharge Temp.	34° Fahrenheit	
Maximum Charge Temp.	120° Fahrenheit	
Minimum Charge Temp.	34° Fahrenheit	
Short Circuit Protection	155 amps	The BMS will turn the battery off if more than 155 amps are drawn from the battery.
Usable Battery Capacity	260 ah	This is regulated by the BMS to ensure battery integrity

Total Cell Capacity	275-285 ah	This is the actual cell capacity of the individual cells
---------------------	------------	--

Maintaining Battery:

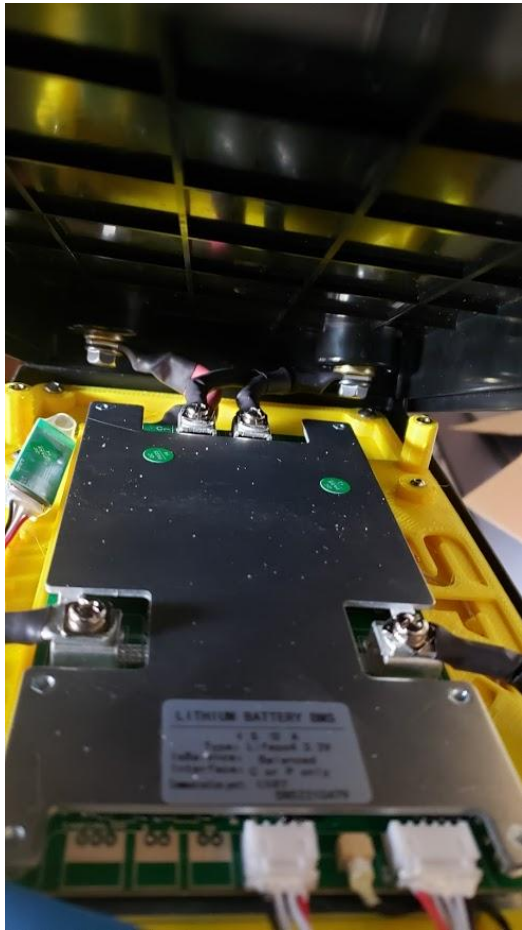
Sun Fun Kits Lithium Iron Phosphate batteries require minimal maintenance and do not need to have any liquid added to them such as water (in the case of flooded lead acid) in order to keep charge. The only maintenance required is to ensure that the state of charge of the battery is in a reasonable state depending on how it is being used. Please see the chart below:

State of Charge	Recommended use	Notes
80-100%	Normal Use	For normal everyday use, keep your battery in this range if you are using it at least once a month.
50%	For long term storage	Keep your battery in this state when you will not be using it (for more than a month).
25-35%	For use in transport / maintenance	When your battery is shipped to you, or if you need to return it, it should be in this SOC
15% or lower	Low Charge, Battery should be brought up to 40% or higher	This is a low SOC, do not keep your battery in this state for a long period of time or it will cause permanent damage to it.

Wiring and Setup:

It is recommended to periodically inspect your wiring schematic and ensure all bolts and terminals are properly installed and tight. Depending on the discharge/charge rate you may experience loosening of terminals due to thermal expansion. If this occurs you will need to re-tighten your bolts.

The main terminal bolts on the SFK-260 are under the battery case, to access this you will need to remove the 4 top M4 countersunk screws. Once the case is removed you can use a M8 ball-end hex driver or L-wrench to check that they are snug and are making proper contact with the copper conductor ring. **If they are loose**, you will need to tighten them, note loose bolts will cause the battery terminals to heat up as they become a source of resistance, this must be addressed or it will cause permanent damage to your battery and can lead to a fire hazard.

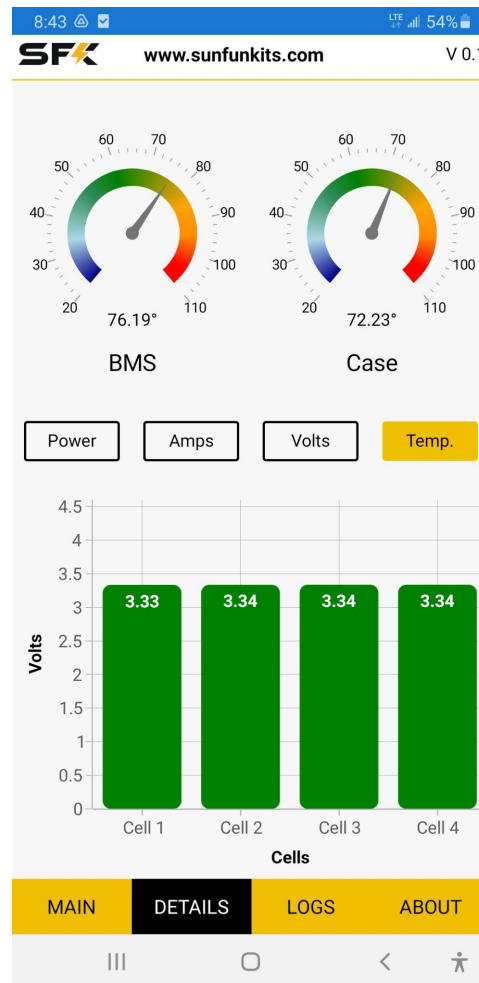
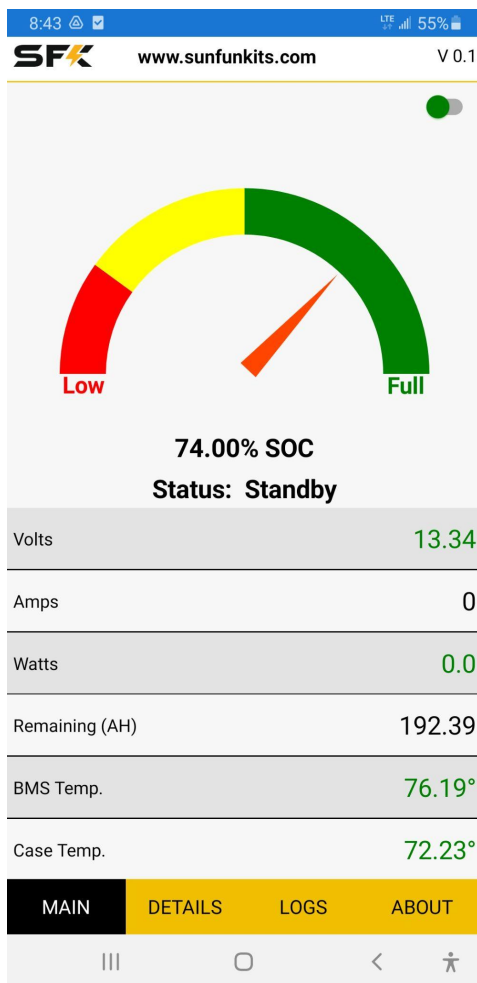


You should also check that the battery is kept away from water & moisture and that there is proper ventilation to maintain temperature & humidity. These issues can lead to battery performance and degradation if not resolved; they may not be apparent immediately, but will have a cumulative effect in the long term.

Mobile Apps (Android & IOS):

Sun Fun Kits has released a battery monitoring app that you can use to monitor your battery status and usage information. You may download this app from either the Google Play store or Apple App store, simply search for Sun Fun Kis.

Please note, we only recommend using the official Sun Fun Kits apps on your battery, using third party apps may void your warranty or cause compatibility problems that can lead to battery failure.



WARRANTY

Limited Warranty:

Sun Fun Kits guarantees purchases made from its website or authorized retailers are free from manufacturer defects and will repair or replace battery and kits that fail to meet specifications at our discretion within the warranty period. Warranty is only offered to the original purchaser and will require a warranty transfer to any user that the battery has been sold to thereafter by the end user (limited to a maximum of 1 transfer). Warranty details are explained below:

DOA Warranty

The D.O.A. (dead on arrival) warranty ensures any item sold by Sun Fun Kits arrives in working order, customers have 30 days to inspect and ensure items are in working order. If the item does not work upon delivery, it can be returned to Sun Fun Kits. All D.O.A. claims require the item in question is in the original and non modified condition, furthermore D.O.A. claims require the customer to ship the item back to Sun Fun Kits to receive a refund.

Basic 12/24 Warranty

The basic 12/24 warranty provides free repair/replacement of items for the first 12 months and a prorated repair/replacement for the remaining 12 months.

Standard 36/60 Warranty

The standard 36/60 warranty provides free repair/replacement of items for the first 36 months, and a prorated repair/replacement for the remaining 24 months. This warranty also guarantees a full 100% cycle life for the first 500 cycles, 100-90% capacity for the next 500 cycles, and 90-80% life for the next 500 cycles. After approximately 1500-2000 cycles, customers can expect between 80-70% of the original rated capacity.

Extended 60/96 Warranty

The extended 60/96 warranty provides free repair/replacement of items for the first 60 months, and a prorated repair/replacement for the remaining 36 months. This warranty also guarantees a full 100% cycle life for the first 500 cycles, between 100-90% for the next 500 cycles, and between 90-80% life for the next 500 cycles. After approximately 1500-2000 cycles, customers can expect between 80-70% of the original rated capacity.

Warranty Exclusions:

Improper Installs

Damage resulting from improper installs are not covered under warranty, this includes (but is not limited to) short circuits, reversed polarity damage, not placing the battery upright, excessive moisture, temperatures that exceed OEM thresholds, improperly installed terminal cables, poor ventilation, and excessive vibration.

Modifications to electronic components

Customer agrees not to perform modifications to battery cells, bms components, case mounting, or any other change that alters the OEM specifications. Doing so will void the warranty.

Changing BMS parameters with unauthorized tools

Customer agrees to only use official Sun Fun Kits software tools made for IOS / Android / Windows to manage battery systems, the use of unauthorized software tools will void the warranty.

Using battery in non-approved applications

Customer agrees not to use battery & components in automotive operations such as using it as an engine starting power source (CCA applications), high power applications that exceed 5000 watts total output, subjecting battery & components to unreasonable tests that do not represent real-world scenarios (e.g. putting battery in a cold freezer or oven), using the battery as a power source for DC arc welding. These and other non approved scenarios will void the warranty.

Physical damage and neglect

Customer agrees any physical damage to the battery systems and components (such as dropping the battery, impaling the battery, submerging the battery in liquid) will result in voiding the warranty. Customer furthermore agrees subjecting the battery systems and components to environmental factors that exceed OEM thresholds (exceeding rated temperature limits, charge/discharge watt limits) will result in voiding the warranty.

Failure to maintain battery

Customer agrees to perform proper maintenance on the battery. This includes ensuring cycling the battery at least once every 4 months when not in use and ensuring the battery has a 50% or greater charge when kept in storage. Keeping the battery at less than 15% charge for an extended period of time will damage the battery and will void the warranty. Battery and kits must not be exposed to temperatures greater than 110° fahrenheit or lower than 20° for an extended period (greater than 4 hours) NOTE: Sun Fun Kits BMS system keeps an internal log and Sun Fun Kits technicians can determine if proper maintenance was not done.

Normal Battery Aging / Cycle Life

Customer agrees that normal cell aging and degradation is not covered under warranty. Sun Fun Kits provides battery estimates in technical specifications for cycle information, however, as is the nature of all lithium based batteries, normal use will degrade the battery over time resulting in reduced capacity and output power.

Terms, Liabilities & Disputes

Sun Fun Kits LLC DBA Sun Fun Kits offers its products with the terms, conditions and notices as follows: The following terms and conditions apply to all sales and uses. Please review carefully. These terms and conditions include limited warranties and disclaimers of liabilities. Keeping, using or allowing use of Sun Fun Kits products indicates your agreement to these terms. By checking "Agree" on our website at checkout also constitutes your agreement to these terms.

Terms of use

This product is offered to you conditioned upon your acceptance without modification of the terms, conditions, and notices contained herein.

Use limitation

You may not modify, copy, distribute, transmit, display, perform, reproduce, publish, license, create derivative works from, transfer, or sell, any information, software, products or services obtained, from Sun Fun Kits' website or its products.

Level of Risk

Lithium batteries, Inverters, high powered DC/AC devices, and apparatus sold by Sun Fun Kits can be associated with a high level of risk and may pose risk of serious physical injury, burns, disability and/or death. Users of our products choose to do so at their own risk.

Assumption of Risk

By buying, using, or allowing the use of Sun Fun Kits' products, you understand and agree that the nature of higher powered devices can be associated with a high level of risk and, to the extent permitted by law, YOU EXPRESSLY AND VOLUNTARILY ASSUME THE RISK OF DEATH OR OTHER PERSONAL INJURY SUSTAINED WHILE USING OUR PRODUCTS, WHETHER OR NOT CAUSED BY THE NEGLIGENCE OR OTHER FAULT OF Sun Fun Kits, including but not limited to equipment malfunction from whatever cause, or any other fault of Sun Fun Kits. Additionally, you agree to indemnify, defend, and hold Sun Fun Kits harmless from any third party claims arising from such High Risk Uses, or any use or misuse of our products.

Limitation Of Liability

As set forth above under the limited warranty provisions, Sun Fun Kits' liability is limited to repair or replacement of its products which are returned to it in the specified period of time. In no event shall Sun Fun Kits; liability exceed the value of the product(s) sold. In no event shall Sun Fun Kits' be liable for any direct, indirect, punitive, incidental, special or consequential damages whatsoever arising out of or connected with the use or misuse of any of its products.

Warning

Use and misuse of products sold by Sun Fun Kits involves serious risks including injury, disability and death. Purchasers assume all risks.

Inspect Before Each Use

This product must be inspected for use to ensure it has not been damaged in shipment. If damaged, do not use and immediately return the product to Sun Fun Kits for a replacement.

Entire Obligation

The PRODUCT LIABILITY DISCLAIMER document states the entire obligation of Sun Fun Kits with respect to the products. If any part of this disclaimer is determined to be void, invalid, unenforceable or illegal, including, but not limited to the warranty disclaimers and liability disclaimers and liability limitations set forth above, then the invalid or unenforceable provision will be deemed superseded by a valid, enforceable provision that most closely matches the intent of the original provision and the remainder of the agreement shall remain in full force and effect.

Applicable Law

Any and all disputes or claims relating in any way while using your Sun Fun Kits products or services will be resolved by arbitration rather than in court by the American Arbitration Association (AAA). Either party Sun Fun Kits or the customer may initiate the claim. Claims may also be asserted in East Baton Rouge Parish Small Claims court if the claim is within small claims court limits.

Arbitration awards are limited, however, an arbitrator can award on an individual basis the same damages and relief as court (including injunctive and declaratory relief or statutory damages).

To request arbitration you will need to submit in writing via certified mail to:

Arbitration Request - Sun Fun Kits 11636 Industriplex Blvd, Baton Rouge, LA 70809. You will need to accompany your request with a demand letter detailing your complaint. You will then need to contact the AAA by visiting www.adr.org and file the initiation fee. Sun Fun Kits will reimburse these fees to you if the arbitrator(s) finds in your favor, however, if the arbitrator(s) finds in Sun Fun Kits favor then no fees will be reimbursed. Both parties agree that they will be responsible for their own attorney fees regardless of the decision by the arbitration process. All ongoing arbitration fees will be split between the customer and Sun Fun Kits evenly (50% by each party) after the initial filing fee to start arbitration.

The venue of arbitration proceedings shall be within East Baton Rouge Parish; you may also request to have arbitration done via phone conferences or via web/video meeting online.

East Baton Rouge Parish Small Claims court awards are limited to \$5,000.00 and do not require an attorney, however, you will be required to file your claim as well as present your case in person for a resolution. If you wish to proceed with a small claims court claim you may contact

the East Baton Rouge Parish Small Claims Court by visiting:
<https://www.brla.gov/319/Civil-Suit-Interactive-Forms>

Modification of Terms and Conditions

Sun Fun Kits reserves the right to change the terms, conditions, and notices under which it's products are offered at any time.