



The World's Lightest, Strongest
Powersports Batteries
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Lite Motorcycle Accessories

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SHORAI FAQ

Q. LFM vs LFX - What's the difference?

The LFM and LFX batteries share the same case and Lithium Iron Phosphate (LiFePO₄) cells.

The dimensions and electrical specifications are identical. Shorai began including a BMS (battery management system) in our batteries to provide over discharge protection. At the time, there was no part number or name change to designate the addition of the BMS to differentiate from the previous generation batteries other than a red dot on the label of the battery. The only way to determine if a battery was equipped with a BMS was by the red dot or by looking up the LOT number from the bottom of the battery. In some cases the dot or LOT code sticker would wear off and it would no longer be possible to identify if it was equipped with a BMS. From a customer service standpoint, this became very difficult. The decision was made to create a new part number and label for Shorai batteries, the new part number changing from LFX to LFM.

It is noteworthy to mention that the label on the front of the battery was changed slightly at the time the BMS was introduced into the product line. This change was due to the need to comply with IATA regulations. The original label used a PB/EQ rating ([scroll down](#) to read more about PB/EQ) to provide customers a way of comparison for Shorai lithium batteries relative to lead-acid batteries — a way to compare "apples to apples." However, to adhere to international shipping standards, the labels were changed to show an actual lithium capacity (Ah) rating.

Please rest assured, the capacity and amp hour ratings of the Shorai LFM batteries remain the same as the LFX-labeled batteries. The cells used in both models are identical. As a side note, all batteries before the BMS change also include the actual Ah and Wh rating on the bottom of the battery on a small sticker.

Q. Do Shorai Batteries have a BMS (Battery Management System)?

The new generation of Shorai batteries feature an advanced internal Battery Management System (BMS) designed to protect against over-discharge. If the battery's voltage drops too low (e.g., when a vehicle key is left on, or high parasitic draw), the BMS disconnects (locks) the main terminals to prevent damage. This is a protective measure, not a fault in the battery.

In the locked state:

The battery may read zero volts (or near) at the main terminals.

Charging with a "smart" battery charger may not work, as the charger will see zero volts and refuse to start.

The BMS can be unlocked (reset) in several ways:

- Use the Shorai BMS01 Charger in CHARGE MODE (not store mode). The BMS01 LEDs will alternate between yellow and green for a period while the charger re-conditions the battery. The charger will automatically switch to full 2a charge mode and only the green LED will flash. When the charge is completed, the charger will turn off OR both green and yellow LEDs will go solid ON to indicate the charger is now in READY mode.
- Using a DC power source, apply a low current "jump" of less than 1 amp of 12V~15V to the main terminals for no more than 5 minutes. Disconnect the power supply and test the voltage at the terminals. If it is reading a steady voltage greater than 12.2v you may connect your lithium appropriate battery charger and recharge the battery fully.
- A "jump" from one 12V battery to the Shorai battery for no more than 30 seconds (best to use another motorcycle battery rather than a car battery). Disconnect the jump battery and test the voltage at the terminals, if it is reading a steady voltage greater than 12.2v you may connect your lithium appropriate battery charger and recharge the battery fully.
- Use an old 12v "dumb" charger. If charger output is more than 2A only, use it to unlock the BMS, (until measured voltage is above 12.2v) then shift to an appropriate charger for LiFePO4 Lithium.
- Use a charger with a BMS recovery function such as the Optimate Lithium 4s 0.8a TM-471 (Please use the TM-391 Optimate Lithium 4s 6a for Shorai batteries larger than the LFM19 series).

Please Note! Whenever possible after unlocking the BMS, allow 24hrs for the battery to rest.

Do not use Shorai BMS01 Charger STORE MODE for these new Shorai batteries with internal BMS. The battery fully protects against overdischarge itself, and the Shorai internal BMS may conflict with the charger store mode.

Q. Can I use Lead-Acid battery chargers or charger/tenders?

Yes, lead acid charger/tenders can be used for regular maintenance charging and then be disconnected after the battery is fully charged. **HOWEVER, you may NOT use a charger/tender if it has an automatic "desulfation mode", "repair", "recondition", or "recovery" mode, which cannot be turned off. (Nearly ALL Schumacher lead-acid chargers have these modes that cannot be turned off, therefore we do not recommend the use of ANY Schumacher chargers. If you are unsure about your charger, please contact us.)**

DO NOT leave the lead acid charger connected to store the battery, because most will NOT maintain the proper voltage for lithium batteries.

Just set a reminder on your phone to charge once every month if you aren't riding or using your vehicle. Recent Shorai batteries include a Battery Management Circuit that prevents over-discharge if the battery charge has not been properly maintained. [CLICK HERE](#) for details on how to "unlock" the battery in that case, to allow normal charging again.

Q. How do I maintain my Shorai Battery?

Shorai™ batteries should be recharged whenever voltage drops to 13.1 volts, or sooner. When shipped lithium batteries have a very low 30% state of charge, so always fully charge your new Shorai battery before first use in the vehicle.

If you have a vintage or off-road vehicle which has NO draw on the battery when the key is OFF, then you should only need to charge your Shorai™ battery every few months.

However, most modern street bikes have a draw on the battery even when the key is off, to support the clock, computer, alarms, or other devices. This draw will eventually drain the battery, which is damaging and could void your warranty. So if you are not riding once a month or more, then you should charge the

battery every month (or more, for rare bikes with very high key-off draw). Alternatively, you may disconnect the negative cable from the battery for storage, and charge once or twice per year in that case.

“Smart” lead-acid chargers with automatic cutoff may be used for periodic charging, but will NOT work as a tender/maintainer and should be disconnected immediately after charge has finished. **Older lead-acid chargers without automatic shut-off should never be used.**

Q. Will a Shorai Battery Work In My Custom Vehicle?

Our Shorai batteries are a great fit when properly matched to the engine and starter of any custom vehicle. The ability to fit a battery horizontally really can come in handy, compared to lead-acid batteries which must always be topside up. Do not install the Shorai battery topside down. The Shorai Battery warranty is only maintained if the Shorai battery chosen for the custom vehicle is the one we recommend for the original vehicle's engine and starter system, and there have been no engine modifications (such as high compression) that would cause excessive starter system current (amps). If you have a stock motor pulled from another vehicle, then you can use our battery finder to select the battery that the motor came from as long as the compression ratio and starter gearing is the same.

Q. Will a Shorai battery work in my vehicle?

The short answer is yes! Shorai batteries are an easy drop-in replacement upgrade. Your vehicle charging system should be working within standard spec (generally that means charging at 13.6-14.4 volts when running), and please use our Battery Finder to select the correct battery for your vehicle. Call us for a recommendation if you don't see your vehicle listed or if you have a custom built motorcycle.

Q. What is the Difference between your Standard and Duration Recommendation?

Standard recommendation is meant to provide the same starting performance and capability as the OEM equivalent battery.

The Duration recommendation is more suited towards vehicles that are ridden less often, have more accessories, a modified engine and/or charging system. We always refer to the Duration battery for those who want the strongest possible cranking performance and lifespan from Shorai batteries.

Q. Can I use a Shorai battery in my mobility scooter or power chair?

The quick answer is NO. Shorai batteries are intended for use as replacement **powersports starter batteries** only. They are not intended for use in any EV type applications (e.g. E-bikes/E-scooters, motorized carts, "power chairs", "total-loss systems", deep-discharge applications, etc..). The use in any application beyond the intended purpose of a **powersports starter battery**, goes against the recommendation of Shorai Service LLC. and will void the warranty.

Q. What is the best way to facilitate long term storage?

If you need to store your vehicle for extended periods, it is best to "manually" store your battery. Because modern Shorai batteries include a BMS, there is no longer a need to leave the battery connected to a charger/tender indefinitely. If you have a vintage or off-road vehicle which has NO draw on the battery when the key is OFF, then you should only need to recharge your Shorai™ battery every few months. However, most modern street bikes have a drain on the battery even when the key is off to support the clock, computer, alarms, or other devices. This draw will eventually drain the battery, which is damaging to the battery and could void your warranty.

Cool storage is good for any type of battery. You may remove the battery from the vehicle for summer storage and place it in a cool, dry location – with terminals taped to avoid short circuit (ideal is about 34F/1C, so a refrigerator is great). Avoid long storage at temperatures below 0F/-18C or above 90F/32C whenever possible. Any charging during storage should be performed at temperatures above freezing.

To manually store your battery:

- Fully charge your battery at the beginning of the storage period.
- Every 3-6 weeks (depending upon the parasitic draw on the battery), measure the voltage at the terminals and compare to the chart above.
- If the measured voltage is getting down to around **13.1v (40%)** or less, recharge your battery and let it sit until it is time to measure again.
- You can expect longer storage if your battery is disconnected from the vehicle. You will still use the same process to manually store it, just a longer interim between charges.

Some key points to remember about Storing your battery:

- Different bikes will have different parasitic draw rates on the battery. If your bike has an alarm system, it may have a higher "key off" draw on the battery. Some older bikes may have very little parasitic draw on the battery while some newer bikes may have significant key off draw.
- We can measure this draw using a multimeter and know approximately what the parasitic draw is. Follow this link to learn how to check the key off draw on your battery -> [Testing Parasitic Draw](#)
- Storing in a cool, dry environment is always best. Temperatures between 34F/1C and 90F/32C are acceptable, preferring towards cooler if possible. If you remove the battery from your bike, storing it in a refrigerator is great!
- It is best to not leave the charger/tender connected to the battery indefinitely.
- If possible, disconnect the battery from the vehicle.

If by chance during the long term storage, your Shorai battery was allowed to discharge too deeply, you may read zero volts across the terminals. Shorai Batteries have included a BMS protection circuit since mid 2022. If battery voltage falls too low, the main terminals are disconnected to prevent a damaging "too deep" discharge. In this case charging with a "smart" battery charger may not work, as the charger will see zero volts and refuse to start. This is a protective measure, not a fault.

In this state:

- The battery may read zero volts (or near) at the main terminals, **this is normal behavior when the BMS is "locked".**
- Charging with a "smart" battery charger may not work, as the charger will see zero volts and refuse to start.

The BMS can be unlocked (reset) in several ways:

- Use the Shorai BMS01 Charger in CHARGE MODE (not store mode). The BMS01 LEDs will alternate between yellow and green for a period while the charger re-conditions the battery. The charger will automatically switch to full 2a charge mode and only the green LED will flash. When the charge is completed, the charger will turn off OR both green and yellow LEDs will go solid ON to indicate the charger is now in READY mode.
- Using a DC power source, apply a low current "jump" of less than 1 amp of 12V~15V to the main terminals for no more than 5 minutes. Disconnect the power supply and test the voltage at the

terminals. If it is reading a steady voltage greater than 12.2v you may connect your lithium appropriate battery charger and recharge the battery fully.

- A "jump" from one 12V battery to the Shorai battery for no more than 30 seconds (best to use another motorcycle battery rather than a car battery). Disconnect the jump battery and test the voltage at the terminals, if it is reading a steady voltage greater than 12.2v you may connect your lithium appropriate battery charger and recharge the battery fully.
- Use an old 12v "dumb" charger. If charger output is more than 2A only, use it to unlock the BMS, (until measured voltage is above 12.2v) then shift to an appropriate charger for LiFePO4 Lithium.
- Use a charger with a BMS recovery function such as the Optimate Lithium 4S 0.8a TM-471. (For larger Shorai batteries, please use the Optimate Lithium 4s 6a TM-391 charger.)

Please Note! Whenever possible after unlocking the BMS, allow 24hrs for the battery to rest. If at that time your battery is once again locked or you are reading very low voltage at the terminals, please contact us.

Do not use Shorai BMS01 Charger STORE MODE for these new Shorai batteries with internal BMS. The battery fully protects against overdischarge itself, and the Shorai internal BMS may conflict with the charger store mode.

If you ride at least twice a month or more, there is no need to ever charge for most motorcycles.

Q. How does the LFX "PBeq AHr" capacity rating compare to lead-acid Ah ratings?

First, we need to understand that the primary job of a starter battery is to flow a large current (amperage) for a short time in order to start a vehicle. In order to do that efficiently, the battery must have low internal resistance. Holding all other considerations equal, the more capacity a battery has the lower its resistance will be - thus it will be more able to crank a vehicle under high loads.

Lead-acid makers have therefore used AHr(capacity) ratings as shorthand to indicate cranking ability, rather than a real usable capacity. The lead-acid capacity rating itself is based on a complete discharge at a low discharge rate. Under actual cranking conditions they will deliver considerably less than spec capacity. And because lead-acid batteries begin sulfating when only a small percentage of the capacity has been used, and their internal resistance rises as they are discharged, the actual capacity which can be USED may be as little as 20% of the mfg. rating. Discharge in excess will not only damage the lead-acid battery, it may not allow proper starting as voltage sags.

Shorai batteries are based on a completely different chemistry. Not only do they have less than 1/3 the internal resistance per capacity than lead-acid, they are also the ultimate "deep-cycle" battery. The internal "completely discharged" capacity of a Shorai battery is 1/3 the rated "PBeq" capacity.

For example, the LFX18 12V series have 6Ah cells internally. But the cells are capable of 80% discharge without damage and while retaining more cranking ability. As such, the USABLE capacity(or "reserve capacity") of an LFX18 12V battery is on or very near par with 18AHr-rated lead acid batteries, while providing superior cranking performance and a vast reduction in weight. The Shorai PBeq AHr (lead-acid equivalent) rating system therefore allows users to compare a very different technology from lead-acid, but on a close apples-to-apples basis when making a choice.

Please note - Shorai's "PBeq" capacity rating IS NOT actual cell capacity, but is ONLY intended as a comparison method of vehicle cranking capability to lead-acid batteries.

Q. How does the Shorai "CCA" cold-cranking rating compare to lead-acid Ah ratings?

CCA ratings are another way that lead-acid makers have tried to convey starting power. Unfortunately, their typical spec is based on a "half-nominal-voltage" delivery. That is, at their CCA spec, you can expect 7.2V delivered, at best; and 7.2V isn't useful, as you won't start a vehicle with it...

In any case, CCA ratings aren't about actually drawing that much current from a battery.

The typical vehicle which uses a 200A CCA-rated battery, for example, will only draw 45A~80A from the battery. What the CCA rating really intends to convey is how much voltage will be delivered. Higher CCA rated batteries will deliver more voltage at the same actual cranking current. Our LFX are CCA rated to deliver 9V for a 5-second crank at the CCA rated current. (In fact, our average voltage delivered will be even higher during a 30-second crank. But our CCA ratings are intended to indicate not only a measure of voltage at true cranking currents, but also proper usage, which lead-acid do not) At actual cranking currents - which are always well below CCA, LFX deliver up to two volts more than an equivalent-CCA-rated lead acid battery. Current alone won't start anything. It is the current multiplied by voltage that does the work (watts). In reality, this means that you can multiply the Shorai CCA rating by 1.5x to compare to a Lead Acid battery CCA. For example, our 270A CCA LFX18 series provides about the same cranking voltage as a 405A-CCA-rated lead acid battery (from a quality lead-acid maker; some CCA specs we've tested on the cheapest lead acid seemed to be plucked from thin air).

Q. Addressing Water and Corrosion?

WATER/CORROSION: Avoid high pressure power washing around the battery case, or constant exposure to water. If the battery may be occasionally submerged, we highly suggest application of sealant to fill the horizontal seam between top and bottom of the battery case, and that the 5-pin port be fully packed with dielectric grease. (dielectric grease is a good idea in any case to insure no pin corrosion). Also, heavy grease should be liberally applied to terminals for wet environments.

Q. What about Safety Precautions?

Starter batteries of any type contain a large amount of energy. During a short circuit, ALL that energy is released in a matter of seconds, creating an extremely hot arc welder, possibly causing fire or explosion.

You MUST be very careful at all times to avoid short circuit of the positive and negative terminals by adhering to the following:

- Do NOT wear jewelry on the wrist or neck while handling batteries.
- INSURE that when installed the positive and negative terminals are properly covered and insulated from the vehicle.
- Do NOT use carbon fiber battery hold down units, as carbon is an electrical conductor.

When replacing a battery, it is important to verify that your charging system is working properly and the output voltage is within the recommended range of 13.6-14.4v. At no time should the charging system output be above 15.2v or it can damage the battery.

Be CAREFUL!

Q. Cold Weather Performance Expectations?

Most users can expect normal first-crank starting down to approximately 20°F (-7°C). In cold weather, allowing a small electrical load before cranking helps warm the battery and improve performance. If the headlight activates with the key ON, leave it on briefly before starting, adjusting the headlight ON time according to the outside temperature using the following as a guide: at 40°F (5°C), approximately 30 seconds; at 0°F (-17°C), 4–5 minutes. This typically results in a stronger first crank and improved battery longevity.

If the engine does not start on the first attempt, the initial crank will have warmed the battery; however, allow 30 seconds before attempting to crank again, as the second attempt will be significantly stronger. Other accessories (such as heated gear or a radio) may also be used for this purpose. Ensuring the battery is fully charged after storage further improves cold-weather starting performance.

Q. Will Shorai Batteries Work In My Electric Vehicle, total loss vehicle, or Non Vehicle-Starting Application?

Shorai starter batteries have been formulated to improve performance in every aspect of performance for their intended usage as **powersports drop-in, upgrade starter batteries**. Our batteries are made strictly as **powersports starter batteries only**.

Shorai batteries are not intended for use in EV type vehicles or electric mobility devices (e.g. E-bikes/E-scooters, motorized carts, "power chairs", etc..), "total loss", deep-discharge, or any similar type of use. The use of our batteries in these and similar applications are not recommended by Shorai Service LLC. and carry no warranty.

Please note - Shorai's "PBeq" capacity rating IS NOT actual cell capacity, but is ONLY intended as a comparison method of vehicle cranking capability to lead-acid batteries. Please see the FAQ Question: **"How does the Shorai "PBeq AHR" capacity rating compare to lead-acid Ahr ratings?"** for further information.

Q. Am I covered under warranty?

Please visit <http://shoraipower.com/> PRIOR TO INSTALLATION and use our year/make/model finder to verify that you have purchased the correct battery for your vehicle. **Use of an incorrect battery in your vehicle can be dangerous and will void any guarantee or warranty. Batteries are not covered under usage in electric vehicles. Use in aircraft, automobiles, and motive power applications are not recommended and will void any guarantee or warranty.** If your Shorai™ battery is not recommended for your vehicle, contact your seller to exchange it for the proper battery.

Q. What size is the hardware that comes with my Shorai battery?

Please find below a break down of hardware included with each Shorai battery

- Case 1 and 2 batteries come with M5 hardware. Foam backers are provided on the nuts to hold them in place to assist during installation.
- Case 3, 4, 5, 6, and 7 batteries include M6 hardware.
- Specific to case 3, you will find M2.5 screws to secure the "L" or "Z" brackets to the battery terminals.
- Specific to case 7, you will find "L" brackets in addition to the M6 hardware.