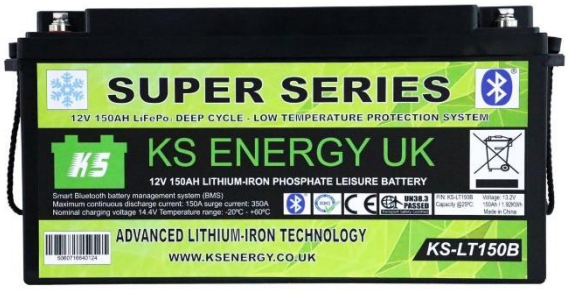
KS ENERGY **SUPER SERIES** Bluetooth

Model KS-LT150B Lithium-iron Phosphate Battery with High Current BMS Featuring Integral Bluetooth Monitor and Low Temperature Charge Protection



Guidance

Only ever use within the parameters of the specification detailed herein. Terminals are M8 threads and 13mm heads. Torque to 90lb/10Nm. It is vital to zero terminal connection resistance since this can cause termination heating which may lead to damage and even pose fire risk. Use only appropriately rated, crimped, and secured ring terminations. Positive should be correctly fused. Batteries may be oriented and secured in any position of orientation. If in doubt seek qualified assistance.

Continuous current rating

Pay attention to the maximum current rating of the battery and parallel additional batteries accordingly for high demands such large mains inverters or twin axle motor movers. (150A max continuous discharge per battery).

Parallel / Serial battery arrangements

Where batteries are installed in parallel or serial multiples, always ensure batteries are fully charged before attempting to make the parallel (or serial) electrical connection. Providing each battery is identical, there is no limitations to the number of individual batteries that can be paralleled. The limit for serial is limited to 4 batteries maximum, making a 48V bank (52V nominal).

Overload

In case of overload or accidental short circuit, the battery may enter a self-protect mode. Ensure all loads are removed before resetting the battery. A reset is accomplished by applying a normal charge voltage to the terminals and the battery terminal voltage is restored. Note, some self-sensing duel voltage chargers may be unsuitable since they rely on sensing the terminal voltage before the charging process can begin.

Low Temperature Protection

To prevent fatal internal cell damage during use, this battery features an integral temperature monitor that detects if the cells fall below freezing (0^{o}C). Safe temperature charging parameters inherent to all lithium batteries are above 0^{o} C. When this event is triggered the battery will not accept a charge. Normal charging is only resumed when the battery cell temperature rises over zero. This feature is purely automatic and will not affect the normal battery discharge operation which continues to operate safely (to -20^{o}C).

Under Voltage Protection

Should the battery be allowed to become completely discharge to an extent where the terminal voltage falls to around 10V, the battery will enter low voltage protection and shut down. The terminals will automatically disconnect and fall to zero. To reset the battery, a normal charge voltage must be applied to the terminals. A recharge should be performed as soon as practical, certainly within a few

weeks to maintain cell integrity avoiding the possibility of longer term total discharge and irreversible cell damage.

Bluetooth Integral Monitor

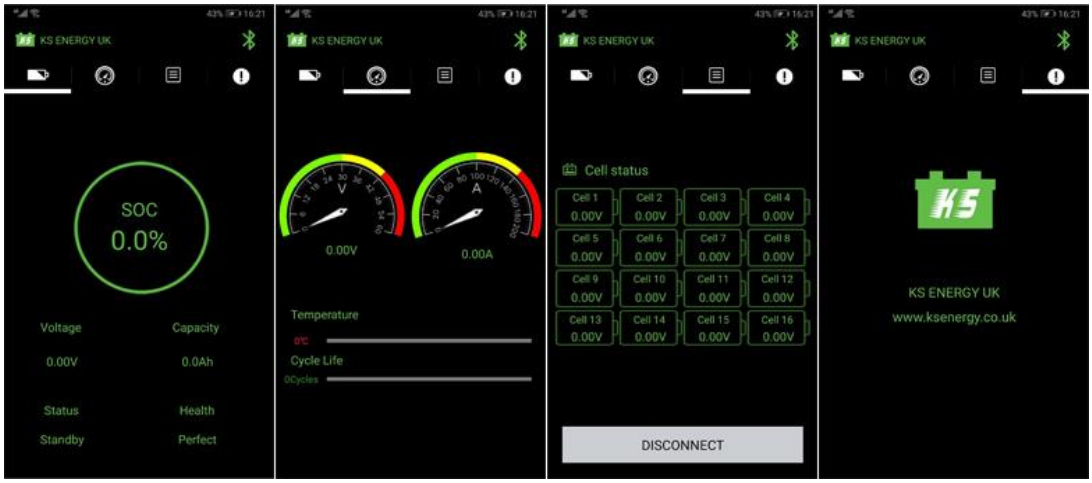
Overview: The feature is available using any Android® or Apple® device with Bluetooth® 4.0. Download the free KS Energy UK app to a compatible device from the Android® or Apple® store. Search for the app “KS ENERGY 1.0” The monitor is a state of charge gauge (coulomb counting) with real time voltage, current and temperature display. State of charge self-calibrates over normal cyclic use by noting the low voltage cut-off activation level and then gauging the total accumulated charge to a factor where the nominal charge voltage is reached and its tail current falls to a few percent of capacity, it can then generally maintain accuracy of a few percent. When the Bluetooth signal is unpaired it goes into hibernation (drawing near zero power).

Connecting Bluetooth: Turn on Bluetooth on your device. Open the app and accept the privacy requests. Each battery has a unique Bluetooth identification code (as labelled on the battery case). Ensure you are within a few meters of proximity to the battery. To connect, touch the top right-hand Bluetooth symbol, select connect and the batteries code number. Note only one single battery can be connected to a single device at once. You must disconnect from the battery to connect to another battery, or to connect another device to the same battery.

The battery information within the application is essentially self-explanatory and an overview follows: Page 1 displays State of Charge (SOC) as a percentage, the Voltage, total Capacity, and the present Status (Charging, Standby or Discharging), also battery Health. Swipe left for Page 2 which displays Voltage and Current on an analogue dial display, cell temperature and total number of charge cycles. Swipe left for Page 3 which displays the cell bank voltages. There are four banks in each battery, the voltage levels are maintained closely by the BMS during normal operation. It is thus possible to qualify the correct operation of the BMS and cell bank. Use this page to also disconnect the Bluetooth from the battery. Page 4 is not used.

When two or more batteries are paralleled together as a bank, multiplying total capacity, simply log in to a single battery. The total battery bank state of charge remains valid as will voltage. Do be aware that the current indication will indicate a factor division according to the number of batteries in paralleled. For example, two 150AH batteries connected to make a 300AH bank under a load of 20A would produce a live reading of half (10A), however the SOC and voltage reflects entire bank.

PAGE 1 **PAGE 2** **PAGE 3** **PAGE 4**



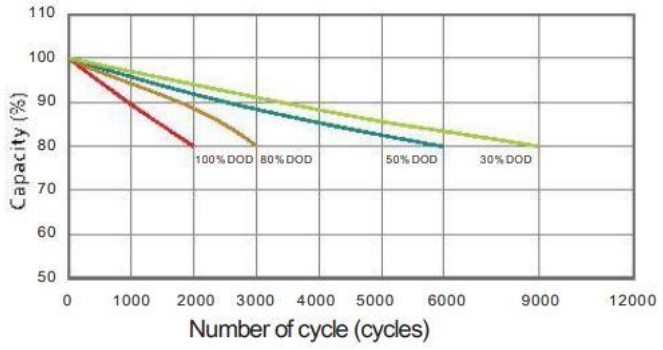
Constant Current Discharge Table (Amperes @ 25ºC)

	1hr	2hr	3hr	5hr	10hr
Cut of voltage 10.8V	150A	75A	50A	30A	15A

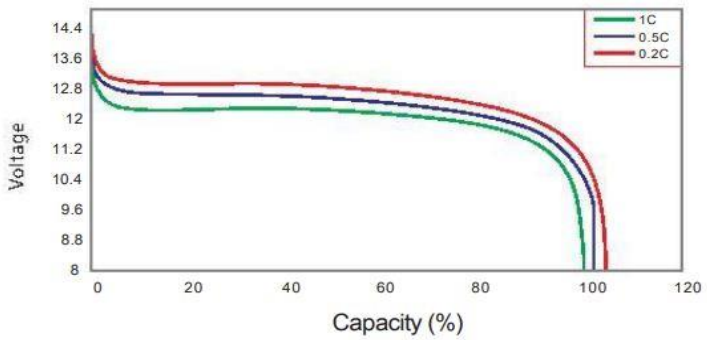
Specifications- KS-LT150B

Product code: 5060716640124, Type: Lithium-Iron Phosphate ($LiFePo^4$), Cells: 3270 cylindrical 3.2V 6000mAh, Arrangement: 4S *25P, Management: Internal BMS actively balanced
BMS protection: Low temperature charge protection (charge current disconnects at zero <0ºC); Short Circuit electronic trip: (>320A <250µS); Over voltage: detect 15.2V <2S, release 14.4V; Over discharge voltage: 9.8V <2S, release 11.8V; Over temperature shut down: 65ºC, release <55ºC
Battery voltage nominal: 12.8V, charged and rested: 13.2V-13.3V typical
Capacity: 150AH nominal, 1.92KWh @ 25ºC
Size: (mm ±2) L*W*H 485*170*240 (inch 19*6.7*9.4) Weight: 19.5Kg (43lbs)
Depth Discharge: 100% Efficiency: 99%
Internal resistance (±3%) : 25mΩ @ 50% SOC 25ºC, Self-discharge: 2.5% per month
Maximum recommended dry storage duration: (@55% capacity): 12 months
Max continuous discharge current: 150A Peak surge discharge current: 250A for 15 seconds
Max continuous charge current: 150A, Max charge voltage: 14.6V
Recommended charge current <75A Recommended discharge current <120A
Recommended Charge voltage 14.4V, charge type: CC/CV
Recommended low voltage disconnect 11V, Float voltage (when applicable) 13.2V - 13.3V
Operating temperature range: -20ºC to +50ºC, storage temperature: -20ºC to +50ºC
Maximum recommended dry storage duration: (@55% capacity): 12 months
Terminals: F12 (M8), Terminal torque 90lb – 10Nm. Case material: ABS, Ingress Rating: IP64
Parallel configuration: unlimited, Series: 4 batteries maximum
Life Span: >5000 cycles @80% - 30% DOD @ 0.5C, >2500 cycles DOD 95% @ 1C
Wireless protocol: Low energy - Bluetooth® 4.0
Compliance: Certification CE (battery) UL1642/IEC62133 (cells), UN3480 Class 9 (shipping)
Designed by KS Energy Holdings (UK) Limited, assembled in China.

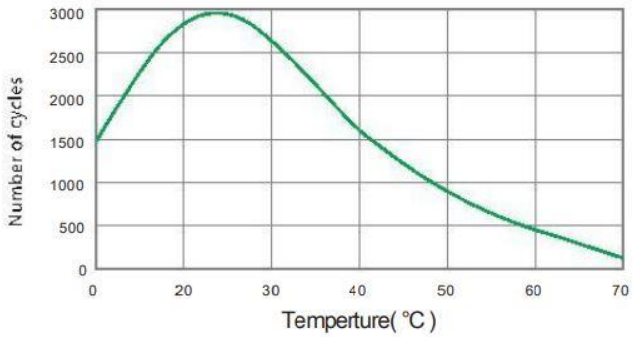
Number Cycles Vs. DOD



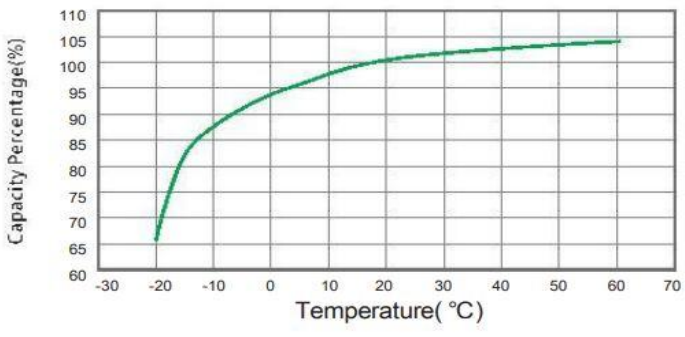
Discharge Performance at 25ºC



Cycle life (1C 100% DOD) Vs. Temperature



Temperature effects on capacity



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