KS ENERGY **SUPER SERIES** Bluetooth

Model KS-C125B Compact series lithium-iron phosphate Battery with High Current BMS
Featuring Integral Bluetooth monitor and low temperature charge protection

Guidance

Only use within the parameters of the battery's specification. Terminals are M8 threads with 13mm heads. Torque to 90lb/ft-10Nm. It is vital to zero terminal connection resistance since this can cause termination heating which can cause damage or even pose fire risk. Use only appropriately rated, crimped, and secured lug terminations. Positive should be correctly fused. The batteries may be oriented and secured in any position of orientation. No ventilation is required. Avoid mounting near hot heat sources above ambient temperatures such as an engine bay. Note battery height is 205mm but allow additional height for the wiring and the terminals located on the top. Physically secure the battery using appropriate securing straps or battery tray and always ensure no metal parts can contact battery terminals at any time.

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

Note. With batteries installed in parallel or serial multiples, it is vital to individually charge each battery fully before making any parallel (or serial) connection. This is because small differences in state of charge that cannot be detected by the app, will result in very large current transfers between batteries. There are no limitations to individual batteries paralleled, but the limit is 4 batteries for series. 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 dual voltage chargers may be unsuitable since they rely on sensing a 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 (0ºC). Safe temperature charging parameters inherent to all lithium batteries are above 0º 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 -20ºC).

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 possible longer-term discharge and irreversible cell damage.

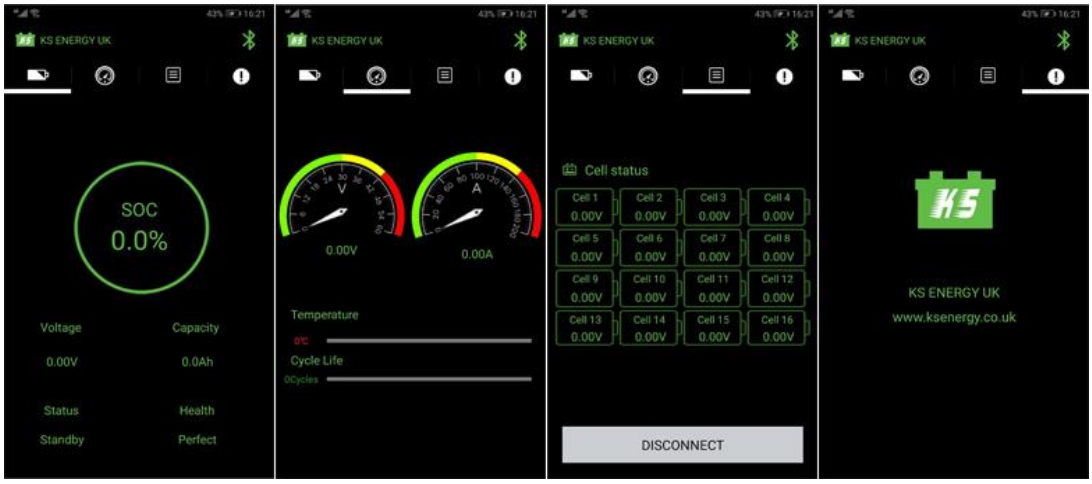
Bluetooth Integral Monitor

(For more information see: https://www.ksenergy.co.uk/bluetooth-lithium-battery-monitor-2.0)

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 2.0" The monitor is a state of charge (SOC) fuel gauge (coulomb counting). The SOC gauge self-calibrates during cyclic use over time by noting the changing impedance, the low voltage cut-off activation point 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 maintain good accuracy.

Connecting Bluetooth: Turn on Bluetooth on your device. Open the app and accept the privacy requests. Each battery has a unique serial number (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 serial number. Note only a single battery can be connected to a single device at a time. When the Bluetooth signal is unpaired it goes into hibernation (drawing near zero power). Be aware that Bluetooth is a very low power signal and can be highly directional and susceptible to interference, which can lead to data dropout or sporadic data display. Sealed metal areas, metal foils, other devices and electrical interference can impair such signals.

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



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 battery Voltage, total Capacity, and the present Status

(Charging, Overcharge, Standby or Discharging), and battery health. Swipe left for Page 2 which displays Voltage and Current and via a 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 12V battery, (eight in a 24V etc) therefore, four voltage levels are active in this model. It is possible to qualify the correct operation of the BMS's

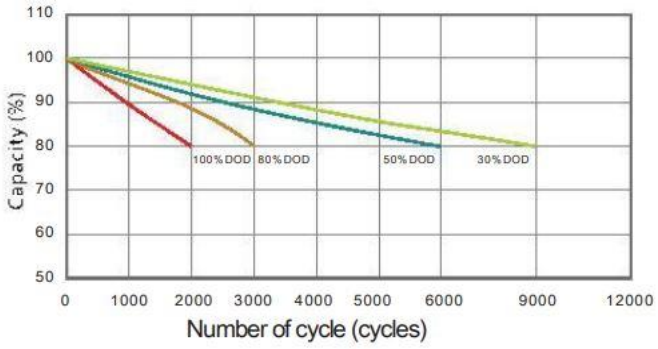
auto balancing. Cells generally drift more towards the end of charging and then rebalancing is performed overtime at rest. Use this page to disconnect the battery from the Bluetooth.

When two or more batteries are paralleled together as a bank, multiplying total capacity, SOC may be monitored by logging into a single battery. Once the batteries have equalised over a few cycles sharing similar impedances, the total battery bank SOC indication becomes valid from a single reading, as will the banks total voltage. Do be aware that the current indication will indicate a factor division according to the number of batteries in parallel. For example, two 125AH batteries connected to make a 250AH bank under a load of 10A would produce a live reading of half (5A), however the SOC and voltage reflects entire bank.

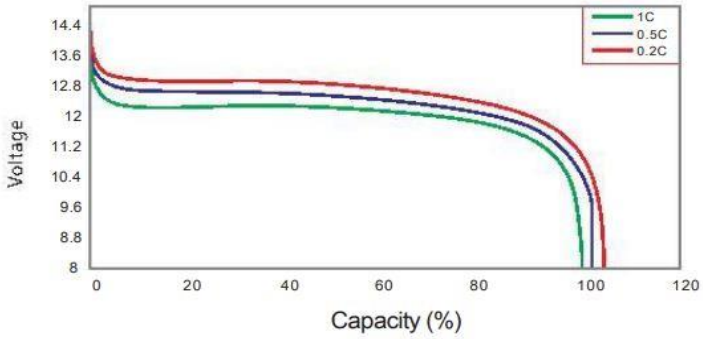
Constant Current Discharge Table (Amperes @ 25°C typical)

	1hr	2hr	3hr	5hr	20hr
Cut of voltage 10.8V	125A	63A	42A	25A	6.25A

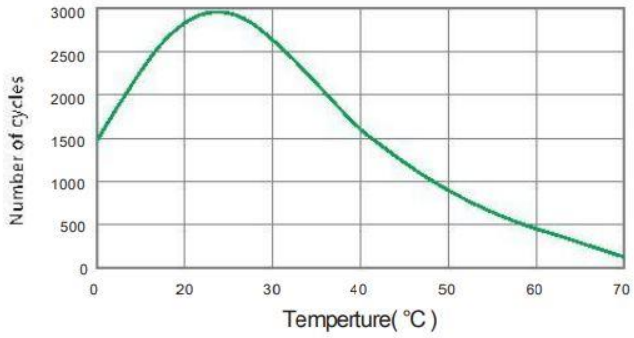
Number Cycles Vs. DOD



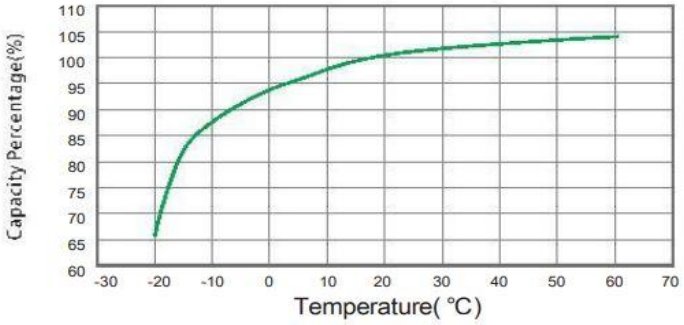
Discharge Performance at 25°C



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



Temperature effects on capacity



Specifications- KS-C125B

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Product code: 5060716640193
Type: Lithium-Iron Phosphate ($LiFePo^4$)
Battery voltage nominal: 12.8V, charged at rested: 13.2V
Capacity: 128Ah nominal, (1.63KWh @ 25°C)
Cells: cylindrical 3.2V 4000mAh, Arrangement: 4S *32P
Size: (mm ±2) L*W*H 305*170*205 (inch 12*6.7*8.1)
Weight: 14Kg (30lbs)
Max charge voltage: 14.6V, recommended charge voltage 14.2V-14.4V
Maximum continuous discharge current: 100A
Peak surge discharge current: 300A for 5 seconds
Max continuous charge current: 100A, charge type: CC/CV
Recommended charge current <65A
Recommended discharge current: <80A
Float voltage (when applicable) recommended 13.2V - 13.3V, max 13.6V
Recommended low voltage disconnect (when applicable) 11.2V
Operating temperature range: -20°C to +50°C
Storage temperature: -20°C to +30°C
Battery Management/Protection:
Internal BMS actively balanced cell banks x4
Battery low temperature Charge Protection (charge current disconnects at zero <0°C)
Battery over charge disconnect Protection 1) cell bank disconnect >3.75V resumes <3.55V
Battery over charge disconnect Protection 2) battery disconnect 15.0V, resumes <14.4V
Battery over discharge protection 1) cell bank disconnect <2.3V, resumes 2.4V
Battery over discharge protection 2) battery disconnect <10V, resumes >10.4V
Short circuit electronic trip: (>400A <250µS)
Over temperature protection: 65°C, release <55°C
Depth discharge: 100% Efficiency: 99%
Internal resistance (±3%) : 20mΩ @ 50% SOC 25°C
Self-discharge: 3% per month
Maximum recommended dry storage duration: (@60% capacity): 12 months
Terminals: F12 (M8), Terminal torque 90ft/lb – 10Nm
Case material: ABS, Ingress Rating: IP64
Parallel configuration: unlimited, Series: 4 batteries maximum
Life Span: >4500 cycles @80%-30% DOD @0.5C, >2250 cycles DOD 95% @1C
Wireless protocol: Low energy - Bluetooth® 4.0
Compliance: CE Certification for the entire battery (product)
ROHS Certification for the entire battery (product)
UN38.3 Certification for the entire battery (product)
Shipping designation: dangerous goods class 9
Designed in Great Britain by KS Energy Holdings (UK) Limited and assembled in China