



energIQ
POWER WITH INTELLIGENCE

12.8V - 360V (100-400Ah)

LITHIUM-ION BATTERY

— USER MANUAL —



- Bluetooth Connectivity*
- Low Self Discharge
- Extended Lifespan
- Long Life Cycle
- Active Balancing*
- Eco Friendly

*Selected models only

We appreciated that you have chosen the Smarten make Lithium-ion battery. In order to make sure the correct usage of lithium-ion batteries, please read this service manual carefully and also keep it saved for future reference because the handling of the Li-ion batteries requires strict safety protocols as follows:

For Customers (Usage & Storage)

- **Safe Storage:** Store at 5-40°C (41-104°F), 50% charge (if long-term), in dry, cool places away from heat/sunlight, avoid stacking or leaving in vehicles.
- **Handling:** Avoid dropping, crushing, puncturing, or shorting terminals, do not disassemble.
- **Charging:** Use correct, manufacturer-approved chargers, avoid overcharging/overheating.
- **Damaged Batteries:** Do not touch leaking fluids; store in a fire-resistant container and contact a specialist immediately.

For Service Providers (Returns & Support)

- **Secure Handling:** Immediately remove damaged/faulty batteries to a secure, isolated area (at least 10m from combustibles).
- **Containment:** Place damaged batteries in fire-resistant containers with inert cushioning (e.g., vermiculite, sand) to manage potential thermal runaway.
- **Spill Management:** Wear PPE (gloves, goggles) and use inert absorbents (not cellulose) for any spilled electrolyte, seal and dispose of properly.
- **Technical Support:** Offer live support, advanced diagnostics, and clear repair/replacement options.
- **Repair & Refurbishment:** For those with expertise, safely check connections (solder joints), test cells with a multimeters, and replace bad components.
- **Disposal & Recycling:** Partner with reputable recyclers for end-of-life batteries, never put them in regular trash.

Key After-Sales Focus Areas

- **Safety First:** Prioritize preventing fire/explosion risks through strict handling and storage protocols.
- **Education:** Clearly communicate storage, usage, and disposal guidelines to end-users.
- **Transparency:** Offer clear processes for returns, repairs, and end-of-life management (repurpose/recycle).
- **Longevity:** Advise users on optimal charge levels for storage (around 50% SOC for Li-ion) to prevent capacity loss

Smart usage and storage

Avoid heat, cold, and deep discharges (keep above 20%), use correct chargers, and store at 40-60% charge, not full or empty. For deeper issues like a fully drained battery, a slow, gentle charge with a proper charger might revive it, but always inspect for swelling or leaks, and never disassemble or puncture them due to fire risks, seeking professional service for serious problems.

Daily Maintenance & Usage

- **Temperature Control:** Keep batteries cool (68-77°F / 20-25°C); avoid direct sun, heat, or freezing.
- **Charge Smart:** Don't fully drain (keep above 20%); 80/20 rule (charge to 80% daily, 100% only when needed) extends life.
- **Avoid Fast Charging:** Use sparingly, as it generates heat and accelerates aging.
- **Use Correct Gear:** Always use manufacturer-approved chargers and check for firmware updates.

Long-Term Storage (Months/Years)

- **Charge to 40-60%:** For storage, charge to around 50%, not full or empty, for best longevity.
- **Cycle Occasionally:** If unused for over 6 months, cycle it (full charge/discharge) then return to 50%.

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Troubleshooting & Safety

- Inspect: Look for swelling, leaks, or unusual smells; if found, stop use and dispose of safely.
- Deep Discharge: If completely dead, try a slow charge with a compatible charger to gently wake it, but be cautious.
- Never Disassemble: Do not puncture, crush, or short-circuit batteries; it's extremely dangerous.
- When in Doubt: If a battery is old, damaged, or won't hold a charge after basic steps, recycle it properly.

1. Attentions before Battery Using

- 1.1 The battery user shall carefully read the battery using guide and other explanatory materials, familiar with the charging and discharging characteristics, understand the usage of BMS and charging generator before using our products.
- 1.2 Dynamic monitor is necessary for OCV of individual cell at any time or condition, charging & discharging test without BMS or PCB is forbidden under any situation in case of any kind of over charge or discharge.
- 1.3 Battery safety valve is explosion-free designed for avoiding long-time overcharging, damageable extrusion and accidental short circuit. Screw action is not allowed under any circumstance, as illustrated in picture 1.3



Picture 1.3



Picture 1.4

- 1.4 The action of twisting the pole bolts is also not allowed under any circumstance, as illustrated in picture 1.4.
- 1.5 New ex-factory cell usually has 60% of SOC, do not long time using the battery before the adjustment of BMS and charger completed in case of over discharge the battery.
- 1.6 BMS shall have cell using data storage and fault code record function, the historical data for last week or permanent data is necessary for analysis the reason of failure.
- 1.7 How to recognize the laser encoding of the battery? Bar codes of the battery are 16 digits, including, area code, capacity code, production date and serial number.

2. Technical Requirements for Battery Charging & Discharging

Charging & discharging characteristics are the following except specially description.

- 2.1 Individual cell charging constant voltage: 3.6V (CCCV charging mode, charging voltage for the period which from CC model to CV model.).
- 2.2 Charging voltage for N cells connected into series: $N \times 3.60V$ (CCCV charging model, charger shall automatic convert to CCCV when individual cell voltage raises up to 3.60V.).
- 2.3 Trickle charge current for CCCV model: 0.05C (During CV charging period, charging process shall be regarded as over when charging current fall down to 0.05C.).
- 2.4 Cut-off charging voltage for individual cell: 3.90V (Charging maximum charging voltage for individual cell, charging current shall be cut-off immediately when individual cell voltage raises up to 3.9V.).
- 2.5 Individual cell charging float voltage: 3.40V (Charging voltage for the applications in storage power of photovoltaic energy conversion system, UPS power and automobile auxiliary power.).
- 2.6 Float charging voltage for N cells connected into series $N \times 3.40V$.
- 2.7 Individual cell discharging alert voltage: 3.0V (dynamic value @ 0.3C) (When OCV of individual cell falls down to 3.1V, the depth of discharge has been over 85%; when OCV of individual cell fall down to 3.0V, the depth of discharge has been over 90%. Strongly recommend shallow charge and discharge the cell, if the BMS find individual cell voltage fall down to 3.0V, cell shall be charged on time.).
- 2.8 Individual cell discharging cut-off voltage: 2.50V (dynamic value @ 0.3C) (Minimum discharge voltage is 2.0V @ -20°C, when individual cell voltage fall down to 2.0V, output current shall be cut-off immediately, if cell been over discharge seriously, the damage which cause by that is unrecoverable.).
- 2.9 Cell temperature parameters (measure the terminal temperature): BMS shall able to boot the cooling fan when cell temperature raise up to 40°C; BMS shall able to decrease the motor power when cell temperature raise up to 50°C; BMS shall able to shut down the motor when cell temperature raise up to 55°C.
- 2.10 Standard requirement of charging & discharging is 0.3C.
- 2.11 Directly charging under 0°C is not allowed. Temperature range for charging from 5°C—45°C is recommended.

3. Installation and Maintenance

3.1 Basic Requirements for Battery Installation

- 3.1.1 Each group of battery must be properly fixed to the battery box which shall be placed on battery pole up mode after clamping. Changing the direction of installation is not recommended, pictures are as follows.
- 3.1.2 When using the battery modular group fixture provided by our company, make sure to tighten flat mattress and spring mattress on the rod, assemble and tighten the nut completely to ensure the battery pack maintain clamping state during the bumping driving process. The battery users should also obey the above principles if they connect up the cells themselves.
- 3.1.3 The Battery Module in the compartment should keep 30mm-50mm space at the top to facilitate the connection of a battery management system, wiring harness and repair lines also for better heat elimination.

3.2 Basic Requirements for Battery Connection

- 3.2.1 It is necessary to put on insulating gloves in the process of battery connection.
- 3.2.2 Socket wrench, fixed wrench, screwdriver and other tools have to be make strict insulated treatments. Pay attention for the metal items carrying-on, such as keychains, watches, necklaces etc. Never contact those metal items to the pole, in case of short circuit.

- 3.2.3 Make sure to avoid short-circuit phenomenon, reverse connection and other possible Condition.
- 3.2.4 Before connecting the battery and management systems, battery aluminium pole on the surface need sanding to remove the oxide layer to reduce contact resistance.
- 3.2.5 Bolts on battery poles must be tightened so as to avoid osculate resistance increase.
- 3.2.6 Battery pole metal is aluminium material, do not use excessive force when tighten the bolts, so as not to strip the screw thread.
- 3.2.7 Please using the torque spanner of 5—30NM during tightening bolts. The specific types of torque spanners match to the specific type of batteries.
- 3.3 Basic Requirements for Battery's Storage and Maintenance
- 3.3.1 If not for temporarily use, the battery should be stored at temperature of 5-40 °C , dry, clean and well-ventilated warehouse.
- 3.3.2 Batteries, which in use or inventory, should be excluded from direct sunlight, also should be away from heat sources at a distance of no less than 2m.
- 3.3.3 Batteries shall be storage within the warehouse, flat laid with insulated material and marked by obviously.
- 3.3.4 Battery inventory shall not be placed upside down or lying. Mechanical shock or stress, cells exposing to heat and rain is strictly prohibited.
- 3.3.5 Formulate the tracking table of stock battery voltage tracking table, check inventory battery voltage every two weeks.
- 3.3.6 Fully charge and discharge the cells per month @0.3C, and record the result.

4. Troubleshooting Method

- 4.1 The security of repair maintenance operations and construction of high-voltage battery pack need to paid great attention.
- 4.2 The battery pole is made from aluminium material; please use the screw tap if you accidentally damage the bolts because of excessive force using.
- 4.3 During the charge and discharge process, in particular, high-current charge and discharge the battery, if the BMS detected any certain individual battery voltage fluctuated widely, and markedly different from other batteries, please carefully check.
- 4.3.1 Whether you have tightened the bolt on the terminals, if not, please tighten it.
- 4.3.2 Whether the oxide layer on the surface of the battery's two polarity pole has been wiped off; if not, use sand paper to clean it.
- 4.3.3 Whether the BMS voltage acquisition line is reliable, please correct the fact connection.
- 4.3.4 Whether there are problems of connection across compartment or over length of wire. Large tolerance will be caused by high voltage depreciation.
- 4.3.5 If there is oxide layer between bus-bar sheets, please replace the bus-bar.
- 4.4 Once the battery is accidentally over-discharge, first charge the battery with 0.1C current and discharge the battery with normal situation after the voltage came up to 3.20V or higher. If the voltage cannot be restored, please replace it with the backup battery.
- 4.5 Once you reverse charging the cells, please replace the cells with substitutions. Make sure the new cell gains the same SOC with other cells.
- 4.6 If you have any other technical problem, welcome to call our Customer Service Department---9319699755.

5. Quality Assurance

- 5.1 The ways and conditions of quality assurance: battery sales are identified based on its laser barcode. our company will not be responsible for after sales service if there is no laser barcode. According to the area code, the representative office which is in charge of this area will solve the problem. Head office of company will not be responsible for after sales service directly.
- 5.2 Before setting up the overseas representative office, head office will in charge of the after sales service.
- 5.3 Battery warranty period is 36 months (from the date of production). If there are warranty terms in the contract, please follow the contract.
- 5.4 In the first 18 months, if batteries cannot be used because of the quality, and accords with the exchanging requirement of our company, we will exchange them for free (including the round-trip freight).
- 5.5 In the last 18 months, if batteries cannot be used because of the quality, and accords with the exchanging requirement of our company, we will exchange them timely and afford 50% cost.
- 5.6 Identification method: the identification should be proceeded by company's Customer Service Department and the third party authority admitted by company. The fare will be paid by customers in advance. The result of the identification shows that if batteries do have quality problems, company will pay the fare and send money back to customers in cash or some other ways, if not, customers will pay instead.
- 5.7 Methods for quality assurance.
 - 5.7.1 In the quality assurance period, if the batteries cannot be used because of its quality problem, please first contact the technician in the nearest representative office for consultancy.
 - 5.7.2 After the confirmation from the technicians, please send the problematic battery to the representative office. At the same time, the technicians there would give relevant feedback to the company's Customer Service Department.
 - 5.7.3 After the representative office receives the abnormal battery, it will have them tested, and if it does have a problem, an email with an application for exchanging battery will be sent to Customer Service Department, and then report to the manager in Marketing Department. The problematic battery will be exchanged after the confirmation by the manager.
 - 5.7.4 The representative office will mark, record and store these problematic batteries in certain places for future recollection.
 - 5.7.5 The quality assurance period for newly exchanged battery is based on the date of previous ones.
- 5.8 Customers must fill in the Battery Quality Issue Feedback Sheet first, and also offer the photos or data of unqualified batteries.

6. Disclaimer

Company shall not undertake any loss, cost which caused by users' inappropriate use of the products as follows:

- 6.1 Using and testing batteries without reliable BMS or PCB which because part short-circuit or over discharge.
- 6.2 Reverse charge the cells which destroy the cells.
- 6.3 Not effectively control the charging process which over charge the cells.
- 6.4 Not effectively control the discharging process which over discharge the cells.
- 6.5 Not select appropriate cable, connector, lug and other electrical components which cause safety issues by over heat.
- 6.6 Not install high voltage protection component within main loop. Damage the device by damaged and aging of the wire.
- 6.7 Adopt the connection method which affect the SOC balance of battery modules (exp. Support devices with the power from some of the cells), which cause over discharge of some cells.
- 6.8 Bad connection between cable lug and bus bar, decrease the life span by over heat which caused by loosen of the bolt.
- 6.9 Not check and maintain the batteries periodically, not remove the accident potential on time.
- 6.10 Any other loss because of not following this manual.

The final explanation rights of the manual are reserved by Company.

Company will edit this document occasionally, and a modified document is provided to customers only with the package, the company does not undertake the responsibility of notifying the original customer. All of the user could search for solutions on our website or through technical service email address: care@smartenpowersystems.com

TECHNICAL SPECIFICATION

LI-ION BATTERY - 12.8V / 100Ah

Battery Capacity	100Ah
Battery Nominal Voltage	12.8V $\pm$ 0.2V
Battery High Cut Voltage	14.4V $\pm$ 0.2V
Battery Low Cut Voltage	10.4V $\pm$ 0.2V
Standard Charging Current	50Amp. $\pm$ 0.5Amp.
Allowed Maximum Charging Current	70Amp. $\pm$ 1.0Amp.
Allowed Maximum Discharging Current	80Amp. $\pm$ 1.0Amp.
Standard Charge	CV-CC
Over Current Protection	150Amp-60Sec
Battery Cell	4S
Over Voltage Protection (OVP)	3.65V $\pm$ 25mV
Over Voltage Protection Release (OVPR)	3.55V $\pm$ 50mV
Under Voltage Protection (UVP)	2.60V $\pm$ 80mV
Under Voltage Protection Release (UVPR)	2.90V $\pm$ 100mV
Short Circuit Current Protection	660A
Operating Temperature	0 to 60

TERMS & CONDITIONS

- This Limited Warranty is provided by Smarten Power Systems Ltd and covers defects in workmanship and materials for your product. The warranty period lasts for 60 months* from the date of purchase at the point of sale. Proof of purchase is required to make warranty claims. This warranty is transferable to subsequent owners but only for the unexpired portion of the warranty period. Subsequent owners will also need proof of purchase.
- Smarten will, at its option, repair or replace the defective product free of charge, if you notify Smarten of the product defect within the Warranty Period, and if Smarten through inspection establishes the existence of such a defect and that is covered by this Limited Warranty.
- Smarten will, at its option, use new and/or reconditioned parts in performing warranty repair and building replacement products. Smarten reserves the right to use parts or products of original or improved design in the repair or replacement. If Smarten repairs or replaces a product, its warranty continues for the remaining portion of the original warranty period. All replaced products and all parts removed from repaired products become the property of Smarten.
- In any warranty claim, dated proof of purchase must accompany the product and the product must not have been disassembled or modified without prior written authorization by Smarten.
- Proof of purchase may be in any one of the following forms:
 - The dated purchase receipt from the original purchase of the product at point of sales.
 - The dated invoice or purchase receipt showing the product exchanged under warranty.
- This Limited Warranty does not cover normal wear and tear of the product or costs related to the removal, installation, or troubleshooting of the customer's electrical systems. Additionally, this warranty does not apply to, and Smarten will not be responsible for, any defects in or damage to the product.
- The either product if it has been misused, neglected, improperly installed, physically damaged or altered, internally or externally, or damaged from improper use or use in an unsuitable environment;
- The product if it has been subjected to fire, water, generalized corrosion, biological infestations, or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Smarten product specifications including high input voltage from generators and lightning strikes;
- The product if repairs have been done to it other than by Smarten;
- The product if it is used as a component part of a product expressly warranted by another manufacturer;
- The product if its original identification (trade-mark, serial number) markings have been defaced, altered, or removed.

Out of Warranty Service:

- If the warranty period for your product has expired.
- If the unit was damaged by misuse or incorrect installation.
- If other conditions of the warranty have not been met or if no dated proof of purchase is available, your product will be considered out of warranty and will be serviced only at the actual repair cost.

*Conditions apply

WARRANTY CARD

Product Barcode / Serial No. _____ Model _____ Date of purchase _____

Customer name _____ Contact No. _____

Address _____

State _____ Pin _____ City _____

Manufactured by:

Smarten Power Systems Ltd.

Plot No. 374, Pace City-II, Sector-37, Gurugram, Haryana - 122001, India

✉ care@smartenpowersystems.com | www.smartenpowersystems.in

PKG-UM-044-01

Dealer Signature
with stamp