



Lithium-ion Battery

DATA SHEET

Battery Model: [LIR17500](#)

| Prepared | Authorized | Approved |
|----------|------------|----------|
| | | |

Manufacturer: EEMB Co., Ltd.

Website: <http://eemb.com>

This Specification describes the requirements of the lithium ion battery with Lithium nickel manganese cobalt material supplied by EEMB Co., Ltd.

1. BASIC CHARACTERISTICS

| | | | |
|-------------------------------------|----------|-----------------------------|---------------|
| Capacity | | 1100mAh | |
| Material | | Nickel-plated steel | |
| Nominal Voltage | | 3.7V | |
| Max. Charge Voltage | | 4.2V | |
| Discharge Cut-off Voltage | | 3.0V | |
| Max. Charge Current | | 1C5 A | |
| Max. Discharge Current | | 2C5 A | |
| Internal Resistance(Max, at 1000HZ) | | ≤ 70 mΩ | |
| Weight | | 29g | |
| Charge(C C/CV) | Standard | 0.5 C ₅ A×7.5hrs | |
| | Fast | 1 C ₅ A×2.5hrs. | |
| Dimension(max)(Including PVC) | | φ | : 17.5mm max |
| | | H | : 50.5 mm max |
| Operational Temperature | | charge | 0°C ~ 45°C |
| | | | 32°F ~ 113°F |
| | | discharge | -20°C ~ 60°C |
| | | | -4°F ~ 140°F |
| | | storage | -20°C ~ 45°C |
| | | | -4°F ~ 113°F |

2. APPEARANCE

It shall be free from any defects such as remarkable scratches, breaks, cracks, discoloration, leakage, or middle deformation

3. TECHNICAL REQUIREMENTS

3.1 Testing Conditions (unless otherwise specified)

Temperature: 20±5°C

Relative Humidity: 65±20%RH

Accuracy of voltmeters and ammeters used in the test is equal to or better than the grade 0.5

3.2 Electrical Characteristics

| No. | Item | Criteria | Test Instructions |
|-------|---|---|--|
| 3.2.1 | Normal discharge performance | Discharge capacity/nominal capacity by 100% A) 0.2 C5A 100% or higher B) 0.5 C5A 98% or higher C) 1 c5a 95% or higher D) 2 c5a 90% or higher | In 1 standard atmospheric pressure, ambient temperature of 25 °C + 2 °C, relative humidity of 45% ~ 80%, 0.5 C standard battery charge (if the following No special instructions, all under the condition of the place, according to the charge hold for 10 min, respectively at 0.2C5A, 0.5C5A, 1 C5A, 2 C5A discharge to the threshold voltage of 2.75 V, cycle three times, when one Up to standards, which meet the standard requirements (hereinafter the same) |
| 3.2.2 | Maintain normal temperature charged Ability | The remaining capacity \geq nominal capacity*85% Recovery capacity \geq Nominal capacity* 90% The open circuit voltage decreases the rate \leq 3% Internal resistance increase rate \leq 20% | Measure the initial state and initial capacity of the battery, battery charging standards, Open place for 30 days, measuring battery final state; In 0.5 C5A discharge to 2.75 V, measuring the residual capacity of battery; 0.5 C/0.5 C electrical measurement Pool recovery capacity. Recycled three times, when once reach standard, namelyto meet the standard requirements. |
| 3.2.3 | Cycle Life | Capacity \geq nominal capacity*80% | Measuring battery's initial state and initial capacity, After 150 times at 1c / 1 c cycle measuring the final state after 500 times at 1C/1C |
| 3.2.4 | Storage | 0.2 C5A discharge time 3 months of storage battery \geq 4.5 h; 6 months storage battery \geq 4.25 h; 12 months of storage battery \geq 4 h. | Measure initial capacity of battery, charge the battery to 3.8+ / - 0.02 V, after test battery storage amount of the initial state, before the room temperature storage for 3 months, 6 months respectively, after 12 months, measuring the final state of the battery, and then Loop 3 times at 0.5 C / 0.2C record the discharge time of battery. |

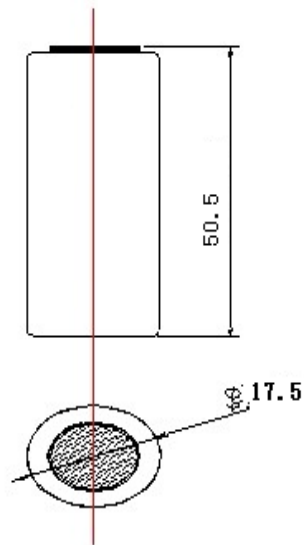
3.3 Acclimatization Characteristics

| No. | Item | Criteria | Test Instructions |
|-------|---|--|---|
| 3.3.1 | Thermal cycling performance | Batteries don't smoke, no fire, no explosion | Battery charge standard, rest for 48 h at 75 + 2 °C under the condition of open circuit, rest for 6 h at - 20 °C condition under the condition of open circuit, after at room temperature open 24 h, watch battery appearance change. |
| 3.3.2 | A constant humid performance | Put on hold after discharge capacity/nominal capacity X 100% > 60% Battery appearance no obvious deformation, no rust no smoke, vent is not open, no bang | Battery charging standard, placed in a temperature of 40 + / - 5 °C, RH 95% of the constant temperature and humidity box, shelved after 168 h, take out the battery aside 2 h, discharge at 1c5a to 2.75 V. |
| 3.3.3 | Under different temperature Discharge performance | Discharge capacity/nominal capacity by 100% A) 60 °C ≥ 95%; B) 0 °C ≥ 85%; C) - 10 °C ≥ 70%; D) -15 °C ≥ 60%. Battery don't smoke, explosions, fires | Measuring cell initial capacity and initial state, battery charging standard, in 60± 2 °C under the condition of constant temperature for 3 h, 0.5C5A discharge to 2.75 V, Then standard charge at room temperature, in accordance with this according to 0 ±2 °C , - 10 ±2, -10±2 °C. The order of the 15 °C / - plus or minus 2 °C under the condition of the corresponding temperature on 20 h, to 0.5 C5A measure corresponding to terminate your battery capacity, and finally put aside at room temperature 2 h measuring the final state of the battery and observe the battery appearance change. |
| 3.3.4 | Vibration performance adaptation | The remaining capacity ≥ nominal capacity * 95% The voltage decay ≤0.5% The battery internal resistance increase rate ≤20% Battery appearance has no obvious damage, don't take Smoke, no explosion | Batteries are vibrated 30 min in three mutually perpendicular directions with amplitude of 0.38mm (10~30Hz) or 0.19mm (30~55Hz) and the scanning rate of 1oct per min |
| 3.3.5 | Drop | No leakage, no fire or explosion; Discharge Time ≥ 51 min | After full charge, measuring the initial state of battery, the battery samples drop onto the wood in six direction from 1.0 m, test the final state of the battery after the drop, and then discharge at 1C ₅ A to 2.75 V, test discharge time of the battery |

3.4 Safety characteristics

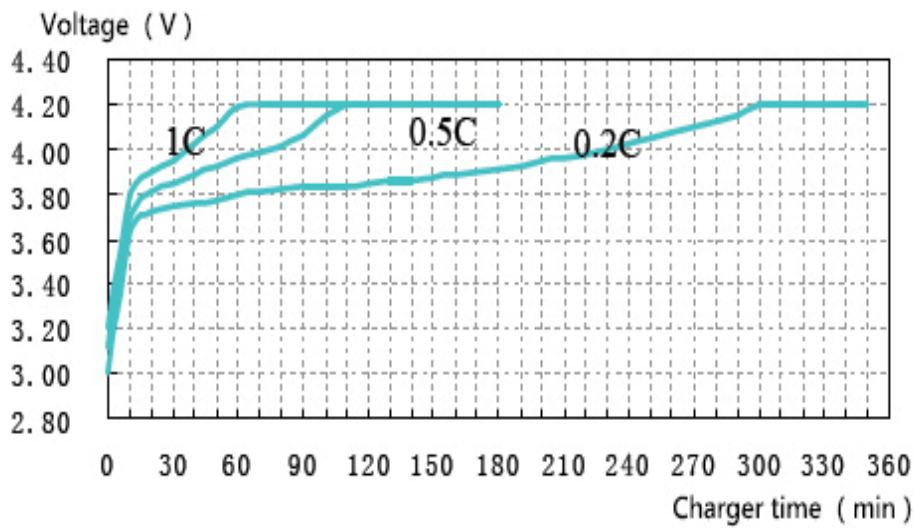
| No. | Item | Criteria | Test Instructions |
|-------|--|---|---|
| 3.4.1 | The overcharge performance | No explosion, fire, The highest temperature < 130 °C | Battery charging standards, measuring the battery's initial state, ensure the battery status Normal (the same below), 1 C5A current charging to 4.8 V, then turned to constant pressure filling Electricity to the current 0.01 C5A terminated, observe the temperature and the appearance of the battery Change. |
| 3.4.2 | Overdischarge performance | No fire or explosion; | After the battery charging standards, measuring the battery capacity, measuring the original battery State, with 1 c5a discharge to 2.75 V, and then use 10 Ω resistance will be The battery is connected to the cathode, for 14 days. Measuring the final state of the battery. |
| 3.4.3 | High temperature short circuit performance | No explosion, fire, The highest temperature < 130°C | Battery charging standards, measuring the battery's initial state, explosion-proof glass Direct short circuit in the bubble is the cathode (line resistance is not more than 50 m Ω), when Battery temperature dropped to 10 °C lower than the peak around end of the test. Observing electricity The temperature of the pool and appearance changes. |
| 3.4.3 | The normal temperature short circuit performance | No explosion, fire, The highest temperature < 130°C | Battery charging standards, measuring the battery's initial state, rest for 3h at explosion-proof case Direct short circuit in the bubble is the cathode (line resistance is not more than 50 m Ω), when Battery temperature dropped to 10 °C lower than the peak around end of the test. Observing electricity The temperature of the pool and appearance changes. |
| 3.4.4 | Heavy impact performance | No fire or explosion; | After full charge, test the initial state of battery, place it on the flat and connect to the thermocouple, put a bar with 15.8 mm diameter to the middle of the cell, a 9.1 kg weight drop from 610 mm height to the table, watch battery appearance and temperature changes |
| 3.4.5 | Compression safety performance | No explosion, fire, The highest temperature < 130°C | After full charge, test the initial state of battery, place it on the flat and connect to the thermocouple, placed it between two iron flat mould, quickly compress the battery with 13 KN. Observe the temperature of the battery and appearance change |
| 3.4.6 | Heating | No fire or explosion; | After full charge, test the initial state of battery, Placed it into hot box and connected to the thermocouple, Store for 10 min at 5 °C + 2 °C per min up to 130 °C + 2 °C. Observe the change of battery appearance |

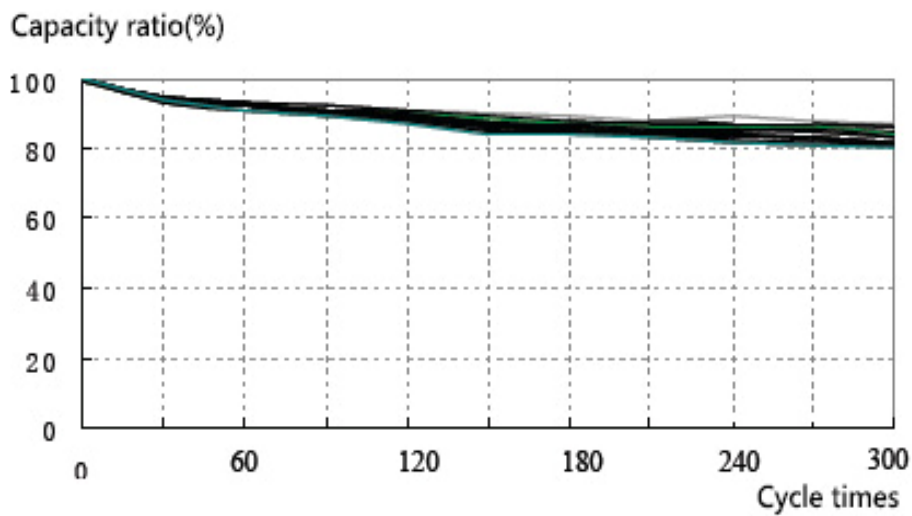
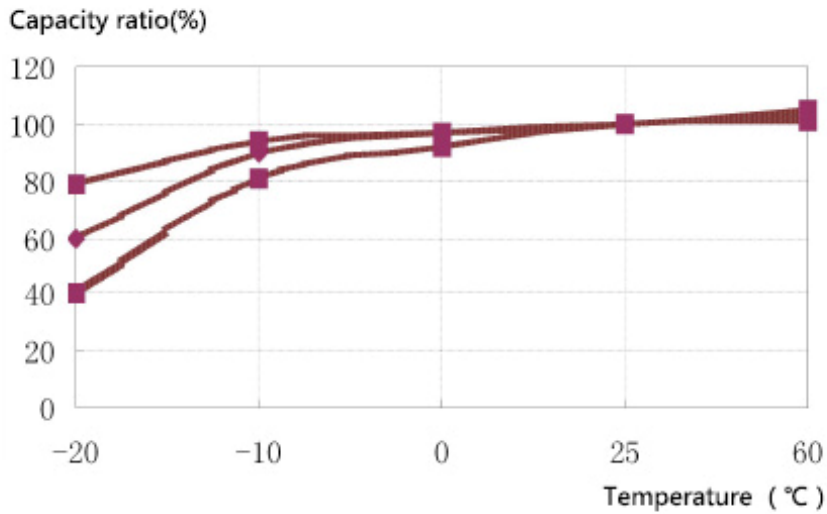
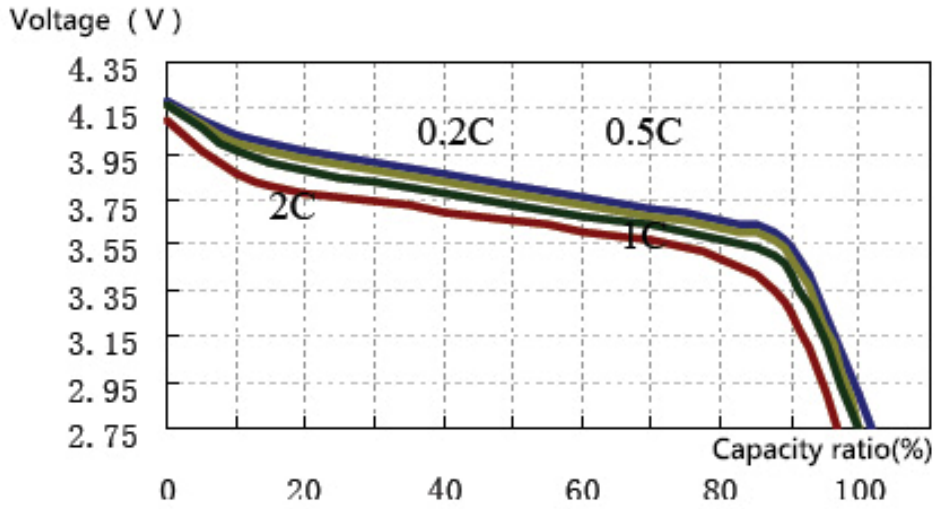
4. BATTERY DIMENSION



| | | |
|----------------|------|------------|
| Diameter (max) | 17.5 | Unit: (mm) |
| Height(max) | 50.5 | |

5. DISCHARGE CHARACTERITICS.





6. PROTECTION

When Li-ion rechargeable battery is used over the permitted voltage or current, electrolyte may disassemble, and this case will affect safety performance of Li-ion rechargeable battery. So protection circuit module were used in order to prevent overcharge, over discharge and over current.

WARNINGS!

- 1) Do not immerse the battery in water or seawater, and keep the battery in a cool dry surrounding if it stands by.
- 2) Do not use or leave the battery near a heat source as fire or heater
- 3) When recharging, use the battery charger specifically for that purpose
- 4) Do not reverse the position (+) and negative (-) terminals
- 5) Do not connect the battery to an electrical outlet
- 6) Do not discard the battery in fire or heat it
- 7) Do not short-circuit the battery by directly connecting the positive (+) and negative (-) terminal with metal objects such as wire.
- 8) Do not transport or store the battery together with metal objects such as necklaces, hairpins etc.
- 9) Do not strike or throw the battery
- 10) Do not directly solder the battery and pierce the battery with a nail or other sharp object.

CAUTIONS!

- 1) Do not use or leave the battery at very high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.
- 2) Do not use it in a location where static electricity is great, otherwise, the safety devices may be damaged, causing hidden trouble of safety.
- 3) If the battery leaks, and the electrolyte get into the eyes. Do not rub eyes, instead, rinse the eyes with clean running water, and immediately seek medical attention. Otherwise, it may injure eyes or cause a loss of sight.
- 4) If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charger and stop using it.
- 5) In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.
- 6) Be aware discarded batteries may cause fire, tape the battery terminals to insulate them.

Special notice!

Keep the cells in **50% charged state** during long period storage. We recommend to charge the battery up to 50% of the total capacity every 3 months after receipt of the battery and maintain the voltage 3.6~4.0V. And store the battery in cool and dry place.

Note: Any representations in this brochure concerning performance, are for informational purposes only and are not construed as warranties either expressed or implied, of future performance.