

Introduction to the advantages of Jinpei LIC

Do you encounter the following questions and confusion?

1. Discharging too slow?
2. Life too short?
3. Temperature too high?
4. Volume too big?

This Lithium Ion Capacitor(LIC) is not a super capacitor & LIB(lithium ion battery), which is the efficient solution for your above problems.

Product positioning

The positioning or performance of our product (Jinpei LIC) is between lithium batteries and super capacitors, which can effectively replace LIB.

Material and parameters comparison

| cell | classify | typical characteristic | energy density | power density | cycle life | cryogenic property |
|---------------------|--|---|----------------|------------------------|------------------|--|
| Lithium-ion battery | Lithium iron phosphate battery (LFP battery) | The positive electrode energy storage material is lithium iron phosphate, and the negative electrode is carbon material | 120-160Wh/kg | $\leq 1\text{kW/kg}$ | 2000-3000 times | The $<0^{\circ}\text{C}$ cannot be used, and the low-temperature performance is poor |
| | Three yuan lithium battery | Positive and extremely ternary material NCM or NCA), the negative electrode for the carbon material | 180-250Wh/kg | $\leq 1\text{kW/kg}$ | 1000-2000 times | Poor, but better than the LFP cells |
| | Lithium cobalt oxide battery | Positive and extremely lithium cobalt oxide, negative electrode for carbon | 160-200Wh/kg | $\leq 0.5\text{kW/kg}$ | ≤ 500 times | Poor, but better than the LFP cells |

| | | material | | | | |
|------------|--|---|--------------|------------------------|---------------------|---|
| | Lithium manganese oxide battery | Positive extreme lithium manganate, negative electrode for carbon material | 120-200Wh/kg | $\leq 0.5\text{kW/kg}$ | ≤ 500 times | Poor, but better than the LFP cells |
| | Lithium titanate battery (LTO battery) | One or two of the positive extreme lithium manganate or lithium iron phosphate or ternary materials, the negative electrode is lithium titanate (LTO) | 60-80Wh/kg | $\leq 2\text{kW/kg}$ | 5000-20000 times | Better, -20°C can be used |
| Jinpei LIC | | The positive electrode adopts activated carbon + metal oxide, and the negative electrode adopts composite carbon material | 100-150Wh/kg | 7-12kW/kg | $\geq 30,000$ times | Better, -40°C can be used |

Product advantage

In contrast, JINPEI LIC has the advantages of these four aspects:

- 1.High safety
- 2.Wide temperature range
- 3.Fast charging
- 4.Long service life





| Performance |  |  |  |  |
|---|--|--|---|---|
| A new energy storage device, which integrates supercapacitor and lithium ion battery technology, stores energy through shallow embedding and shallow stripping of lithium ion, and has intermediate characteristics between supercapacitor and lithium ion battery. | Safety ✓Storage reliable ✓Overvoltage protection ✓Material safety, no explosion, no fire | Temperature ✓Available charge at -40°C ✓Available discharge at 85°C | Ratio ✓Continuous charge 20°C ✓Continuous discharge 30°C ✓Monmentary discharge 50°C | Life ✓Physical storage ✓Life $> 30,000$ times 1C ✓100% DOD |

Hidden flaws of lithium battery and the core advantages of Jinpei LIC

Lithium batteries have the potential safety hazard to explode and catch fire, as shown in the following figure (Battery explosion caused the fire accident).



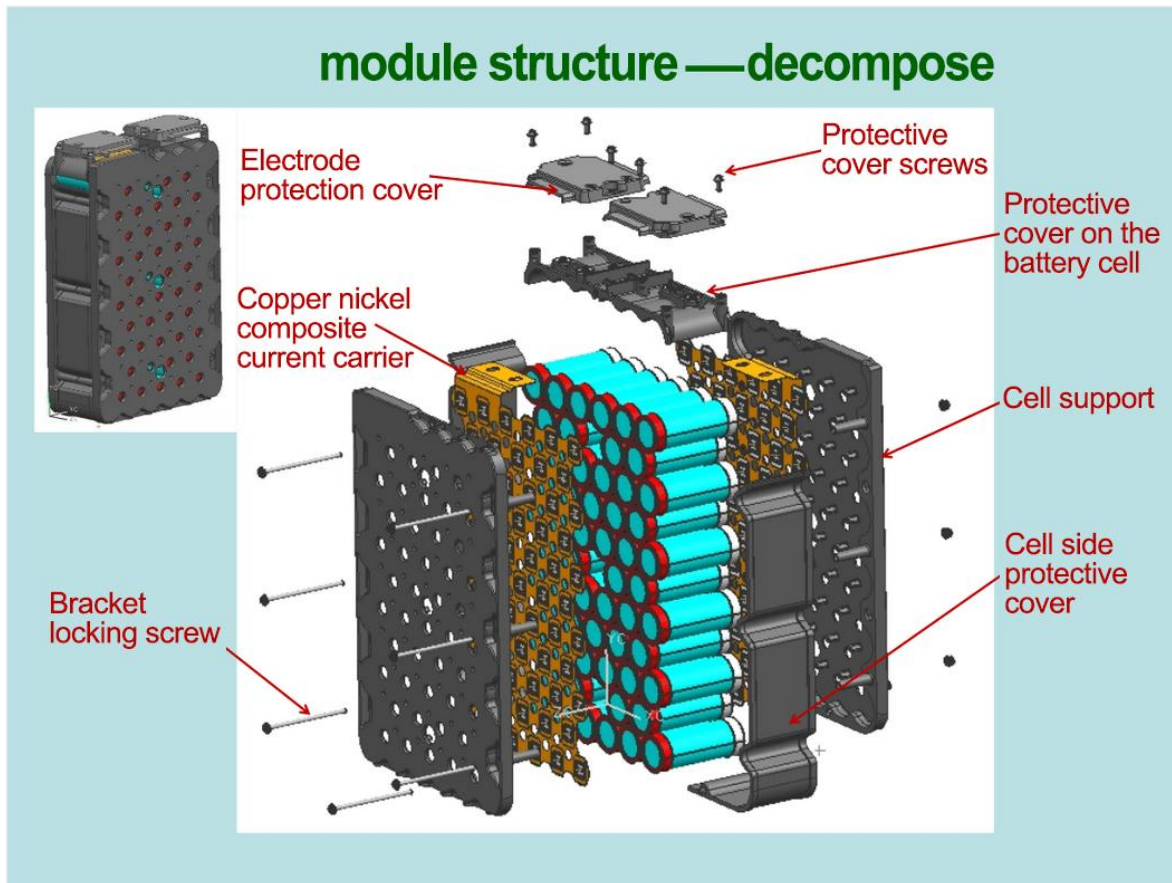
However, our LIC will not have such risks and hidden dangers, as described in the following figure of our product advantages:

| Performance |  |  |  |  |
|---|--|---|---|---|
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Product use

If you use our modules, we can provide remote use services.

Product assembly



1. Self-assembly by customers. We can provide free assembly advice if you have any questions in the assembly process.

2. We also have module design and assembly service, this service only charges the cost. If you are interested, we can quote the price of the module for your reference.

※ Assembly

- ◆ Automatic laser spot welding machine spot-welds battery.
- ◆ AutoFilter battery.
- ◆ Intelligent aging battery charging and discharging.

※ BMS:

- The BMS system has been successfully mass-produced in commercial vehicles, logistics vehicles, port autonomous driving IGV, port rail cranes, straddle carriers and so on. The control chip is NXP specification level control chip.
- The BMS system adopts a level 1, level 2 and level 3 architecture. At present, most of them adopt a level 2 architecture, which is a topology architecture of one master board and multiple slave boards.
- The BMS system collects the voltage, temperature and current of monomer with high accuracy and stable data. It can meet the national test requirements and has passed the GB/T_38661 test. The national standard charging system has passed the GB/T 34658-2017 test.
- BMS system has high insulation precision acquisition, in line with national standards.
- BMS system can modify the operating parameters through the upper computer, the collected parameters can be displayed through the upper computer, with its own touch screen, good man-machine interface, more user-friendly.
- The BMS system also has remote monitoring function, which can remote monitor faults, current, voltage, insulation, temperature and anticipate the safety accident of the vehicle to be nipped in the bud.
- BMS system has high precision SOC estimate, and uses a variety of SOC algorithms and SOC compensation methods.
- BMS system adopts multi-level fault judgment, and provides reliable information for the safety of the whole equipment system through CAN communication and vehicle controller communication.

After-sales service

The monomer warranty is 1 year. The warranty of BMS is 5 year.
The quality of the product itself can be replaced, including freight.

Patent certificate

证书号 第18528148号



实用新型专利证书

实用新型名称：一种锂离子电容器

A kind of Lithium capacitor

发 明 人：曾新仁

专 利 号：ZL 2022 2 1279740.X

专 利 申 请 日：2022年05月26日

专 利 权 人：上海金沛电子有限公司

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