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Version No.: V1.0

Inductive Active Balancer

(EK-L21S1A)

Product Datasheet

Shenzhen Enerkey BMS Power Technology Co., LTD

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Product Name	Inductive Active Balancer
Product Model	EK-L21S1A
Version	V1.0
Adapt Battery String	21S
Adapt Battery Type	NCM/ LFP
Effective date	15th.Nov.2023

Product change history			
Version	Date	Change point description	Approve
V1.0	2023-12-15	Initial version	

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Enerkey

1. Overview

- ①. This series of inductor-adjacent balancing boards is a balancing management system tailor-made for small-capacity series-connected battery packs.
- ②. This series of inductors are adjacent to the balancing board, and the voltage difference generated by charging and discharging triggers the balancing board to work, achieving balanced energy transfer.
- ③. This module fully automatically detects adjacent pressure differences around the clock to achieve active energy transfer balance.
- ④. When the voltage difference between adjacent batteries is $>0.1V$, the balancing operation is automatically triggered until the voltage difference between adjacent batteries is $\leq 0.03V$, and the balancing is completed.
- ⑤. When the adjacent voltage difference is $0.1V$, the balancing current reaches a maximum of $1A$. The balancing current is positively related to the adjacent voltage difference.
- ⑥. This series of inductor-adjacent balancing boards is suitable for mainstream ternary lithium batteries and lithium iron phosphate batteries on the market. Supports 2 to 24 battery strings. The inductance balancing board is not recommended for use with low strings. The indicator light will flash and an error message will appear. It cannot be used as a maintenance tool and the balancing efficiency is relatively low.
- ⑦. It is mostly used in battery packs of electric toys, electric balance vehicles, outdoor energy storage, small household appliances and other products. It can also be used for battery balancing maintenance and repair, etc. It mainly plays the role of repairing the battery pack voltage, restoring the battery pack capacity, and extending the battery pack life.

2. Technical Parameters

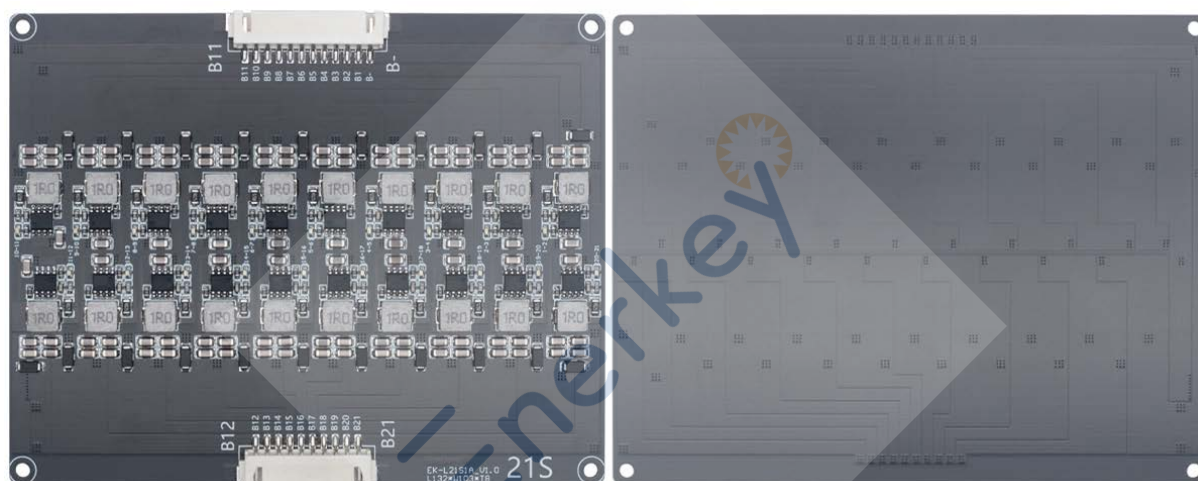
Product Name	EK-L21S1A
Adapt String	21s
Adapt Battery Type	NCM/LFP
Cell Voltage Working Range	3.0-4.5V
Cascading	Support (Not recommended)
Voltage Balancing Accuracy	Adjacent voltage difference 30mV (typical value)
balanced Approach	Detecting that the voltage difference between adjacent batteries is greater than 100mV triggers equalization; Stop working when the adjacent voltage difference is less than 30mV
Balanced Current	0.05V voltage difference balancing current 0.5A 0.1V voltage difference reaches the maximum balancing current of 1A
Undervoltage Protection Sleep Voltage	When the adjacent voltage difference is less than 30mV, it enters sleep state.
Quiescent Operating Current	10uA

Working Temperature	-20℃ - +60℃
Whether need an external power supply	No external power supply required; Relying on internal energy transfer of the battery to achieve adjacent equilibrium
Product Size	L132*W103*T8mm
Product Gross Weight	125g

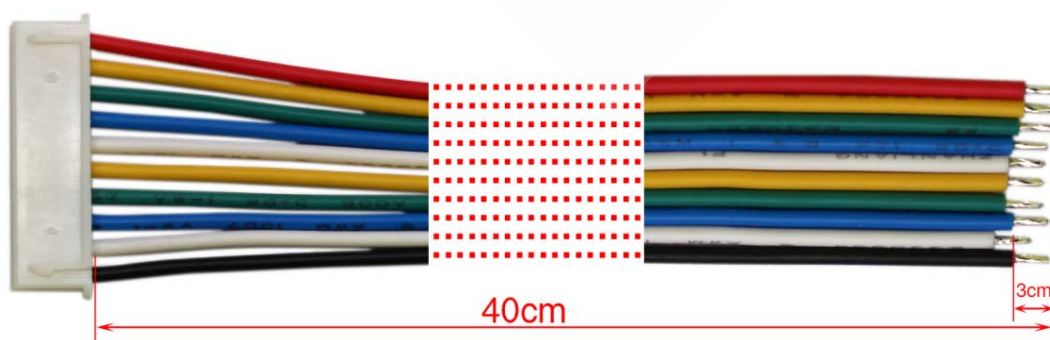
3. Product Photo

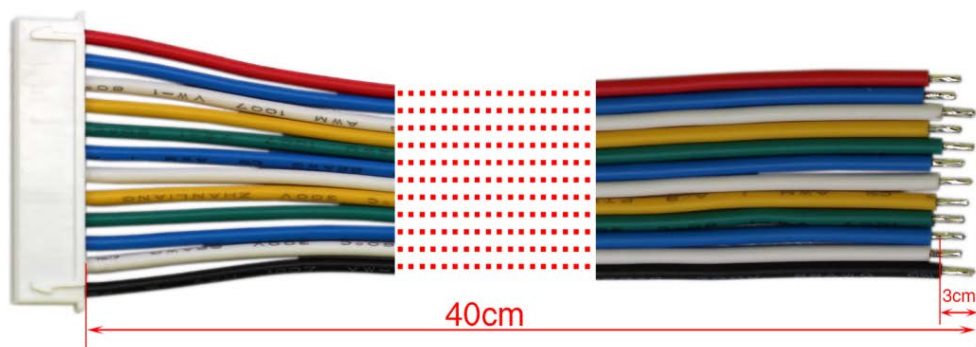
1) Product Appearance

Special note: The shipped products are all coated with conformal anti-paint.



2) Accessories

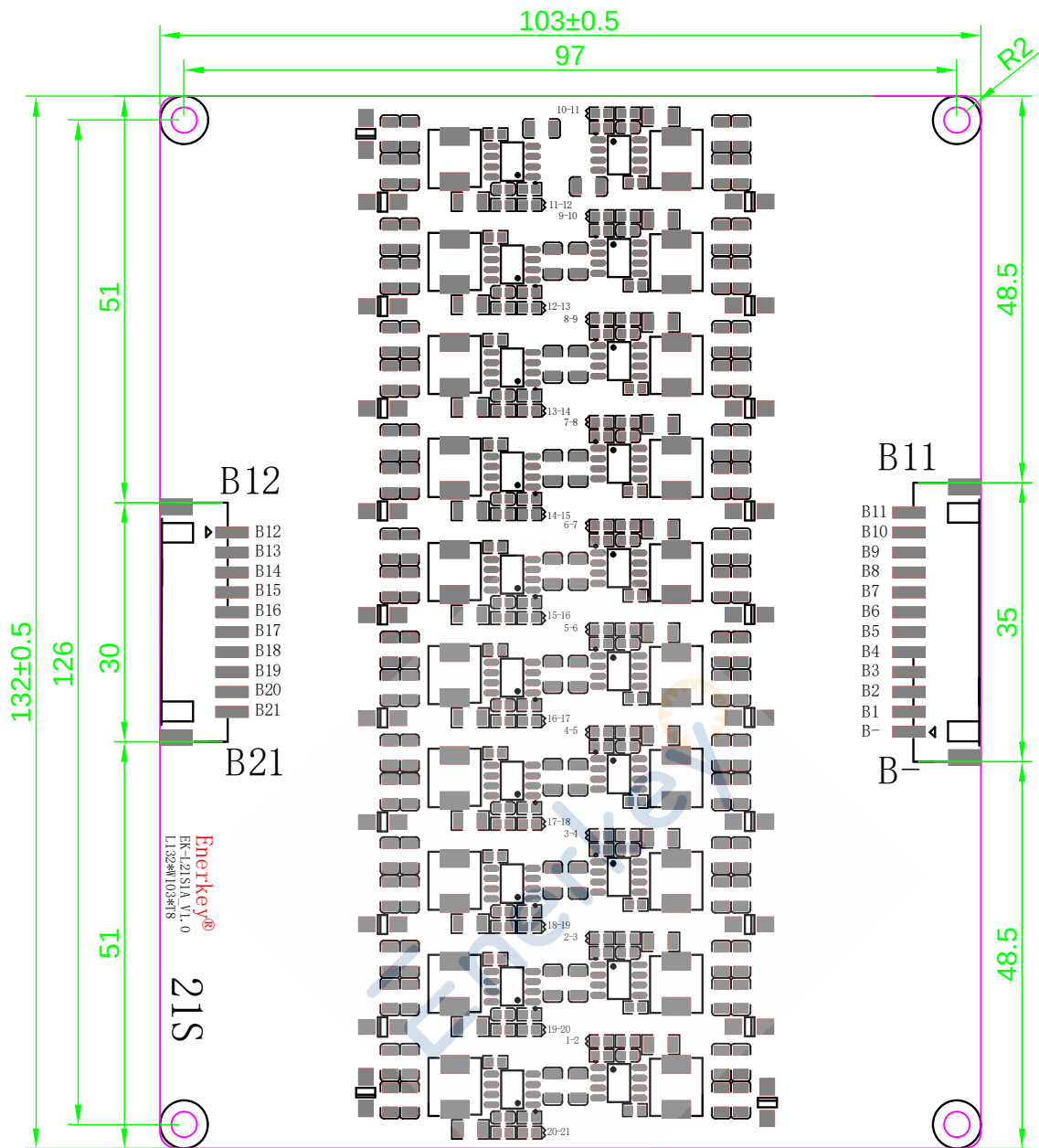




Accessories specifications					
Terminal specifications	Material	Line number	Line length	Stripping length	Quantity
XH2.54mm_11Pin	Cu	22AWG	40cm	3cm	1
XH2.54mm_12Pin	Cu	22AWG	40cm	3cm	1

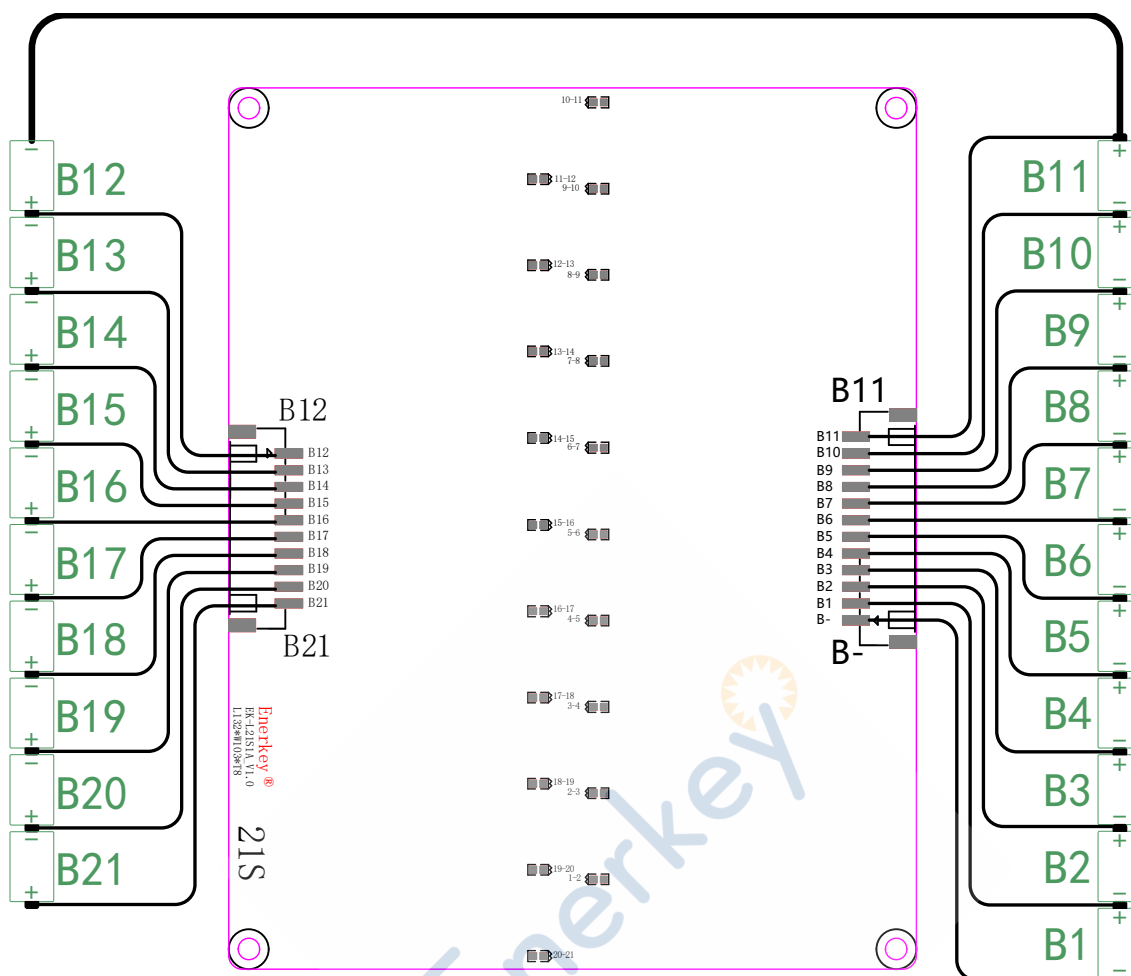
4. Product Drawing

(No tolerance noted: ± 0.15 , Unit: mm)



PCB Specifications			
Material	FR-4	Layer	2 layer
PCB thickness	0.6±0.10	Copper(CU) thickness	1.0 oz
Pads plating	Lead-free spray tin	Plate thickness	
Solder	Black	Silkscreen	White

5. Product wiring diagram



Wiring precautions

- ①. The assembly of this product requires welding operations; please strictly follow the wiring diagram! If you have any questions during the assembly process, please contact after-sales personnel.
- ②. When assembling, please solder the terminal wire to the battery pack first, and then insert the terminal wire into the product.
- ③. After connecting the battery, please pay attention to the insulation protection of the product to avoid short circuit when the power is on.

Special note: This balancing board is not recommended for cascade use as the balancing effect is not obvious.

6. Product indicator light description

Each battery corresponds to an LED indicator, and you can clearly observe whether each cell is balanced.

Indicator status	Product operation status
Always on	in equilibrium
Flashing	Bad battery contact
Go out	Equalization completed/no equalization required

7. Environmental substance requirements

Each battery corresponds to an LED indicator, and you can clearly observe whether each cell is balanced.

Harmful Substance	Limit standard (mg/kg)
Lead (Pb)	1000
Cadmium (Cd)	100
Mercury (Hg)	1000
Hexavalent chromium (Cr6+)	1000
Polybrominated biphenyls (PBB)	1000
Polybrominated diphenyl ethers (PBDE)	1000

8. Safety protection measures, transportation and storage

1) Safety protection measures

①. There is no high voltage in the balancing board itself, and it will not cause electric shock damage to the body.

②. Do not repair the balancing board while the power is on. All repairs should be performed by qualified service personnel.

If the working voltage set by the factory is changed, the safety certificate no longer applies.

③. When using, please pay attention to the insulation treatment of the product to avoid short circuit.

④. Pay attention to ESD protection when using this product.

⑤. This product complies with the company's thrust standards: 0402 components $\geq 1.0\text{KgF}$; 0603 components $\geq 1.5\text{KgF}$; IC and MOS tubes $\geq 2.0\text{KgF}$.

2) Packaging and shipping

①. Separate and package PCBA with anti-static bubble bags.

②. The packed products can be transported by ordinary means of transportation when they are not directly affected by rain, snow or violent collisions and bumps.

It is not allowed to be placed together with corrosive substances such as acids and alkalis during transportation.

3) Storage

Packaged products should be stored in a permanent warehouse with a temperature of $0^{\circ}\text{C}\sim 35^{\circ}\text{C}$ and a relative humidity of no more than 80%.

The warehouse should be free of acid, alkali and corrosive gases, strong mechanical vibration and impact, and no strong magnetic field.