Transformer Balancer

For Lithium Battery

(BT04S05A/BT04S10A/BT08S05A/BT08S10A)

Operation and Maintenance Manual

Heltec Energy

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1. Introduction

The lithium battery transformer balancer is tailor-made for the charging and discharging of large-capacity series-parallel battery packs. It has the whole set of full-scale non-differential equalization, automatic low-voltage sleep, and temperature protection. The circuit board is sprayed with conformal paint, which has excellent performances such as insulation, moisture resistance, leakage prevention, shock resistance, dust resistance, corrosion resistance, aging resistance, and corona resistance, which can effectively protect the circuit and improve the safety and reliability of the product.

The circuit board is equipped with an aluminum heat sink, which has the characteristics of fast heat dissipation and low temperature rise when working with high current. This product is suitable for ternary lithium, lithium iron phosphate, and lithium titanate batteries. The maximum balancing voltage difference is 0.005V, and the maximum balancing current is 10A. When the voltage difference is 0.1V, the current is about 1A (its actually related to the capacity and internal resistance of the battery). When the battery is lower than 2.7V (ternary lithium/lithium iron phosphate), it stops working and enters dormancy, with over-discharge protection function.



Figure 1. Transformer Balancer

2. Technical Parameters

The main technical indicators of the transformer balancer are shown in Table 1.

Table 1. Main Technical Indicators of Smart Version

Parameter	SKU			
	BT04S05A	BT04S10A	BT08S05A	BT08S10A
Applicable battery strings	3S-4S		5S-8S	
Maximum balancing current	5A	10A	5A	10A
Applicable battery type	NCM/LFP			
Working voltage range	2.7V-4.5V		1.8-4.5V	
Voltage balance accuracy	5mV (Typical value)			
Sleep protection voltage	NCM/LFP：2.7V；LTO：1.8V，Other voltages can be customized			
Standby operating current	5.5mA	6mA	6.5mA	7mA
Sleep current	0.1mA			
Operating temperature	-10°C-60°C			
Overall dimensions (mm)	94*64*17		111*79*17	

3. Installation and Assembly

3.1 Connection Description

The connection position of the balance board is shown in Figure 2, and its

definition is shown in Table 2.

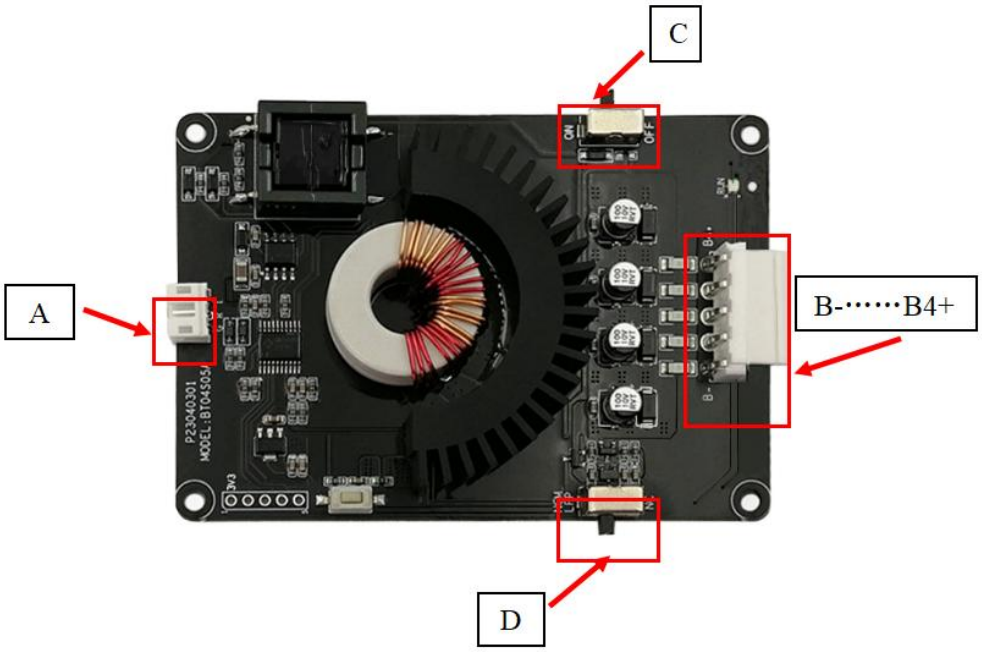


Figure 2. BT04S05A - Schematic Diagram

Table 2- Connection definition

	BT04S05A	
	Name	Definition
A	Serial Interface	Send commands through the control serial port to turn on and off the balance board
B- ～B4+	B-	The negative pole of the 1st string
	B1+	The positive pole of the 1st string
	B2+	The positive pole of the 2nd string
	B3+	The positive pole of the 3rd string
	B4+	The positive pole of the 4th string
C	DIP switch	ON： Balance function is on / OFF： Balance function off
D	DIP switch	NCMLFP: Ternary lithium/lithium iron phosphate / CN: no function

3.2 Wiring Diagram

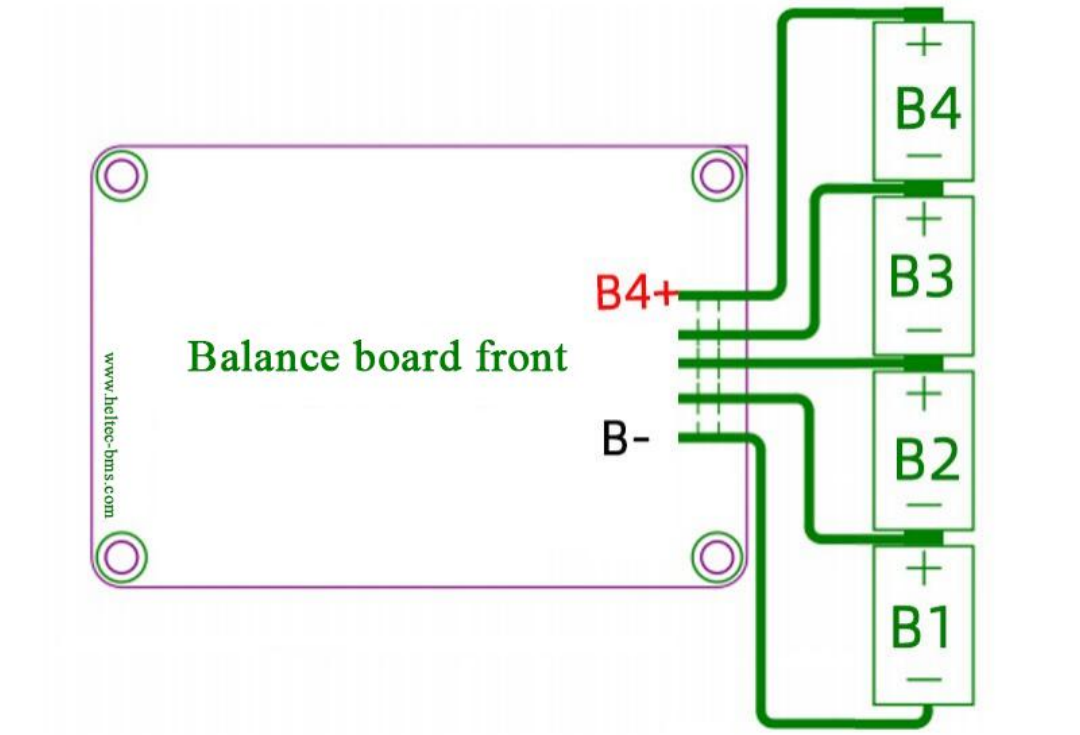


Figure 3. 4S Wiring Diagram

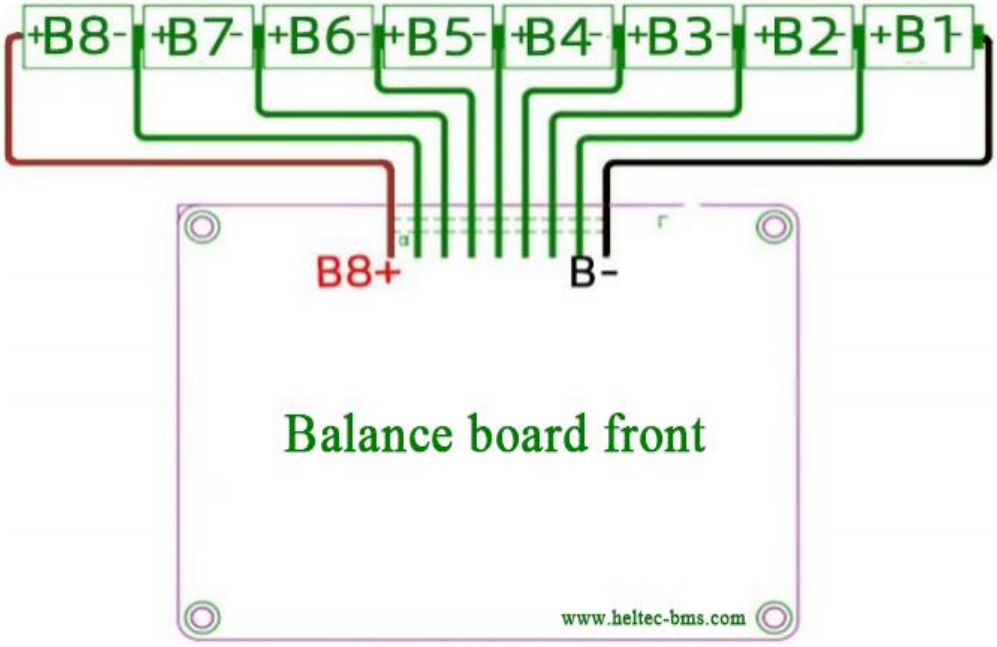


Figure 4. 8S Wiring Diagram

4. Precaution for Use

1. This board works on the principle of adjacent balancing and cannot be used as a maintenance tool. To connect to the battery, it must be used with lithium battery protection. The voltage difference generated by charging and discharging triggers the balancing board to achieve energy transfer balancing.

2. Be sure to follow the design parameters and usage conditions during use, and do not use it in violation of the parameters in this specification, otherwise it will easily damage the protective plate and then damage the battery pack.

3. It is necessary to prevent static electricity during use. When testing, installing, and touching the protective board, corresponding static discharge measures must be taken.

4. Be careful not to touch the components on the circuit board with the lead wire, electric soldering iron, tin slag, etc. during use, otherwise the balance board may be damaged.

5. If there is any abnormality during use, please stop using it immediately, send it back to the original factory or ask professional maintenance personnel to repair it.

6. This balancing board has undergone a large number of reliability tests. The reliability is much higher than the general balancing boards on the market. The process of the battery core must also be guaranteed at the same time to reduce the occurrence of combustion as much as possible.

* Safety Precautions：

The company is committed to the improvement of quality and reliability, but generally speaking, electrical products will have a certain probability of failure. The durability will be different due to the different environmental conditions of use; the lengthy design is adopted during use to avoid abnormal heat, smoke, and even personal accidents, fire accidents, and social damages caused by overloading.