



Battery Active-Balancer **(NEEY-24S4EB)**

Specification and operation manual

Henan Nengyi Electronic Technology Co., Ltd

Product warranty clause

Name: Battery Active-Balancer

Warranty period: One Year

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1 Overview

Battery Active-Balancer (NEEY-24S4EB) is a balanced management system tailored for large-capacity series battery packs. The Balancer USES ultracapacitors as the medium to balance the active energy transfer.

The Balancer is suitable for 2 ~ 24 series battery packs, with the functions of voltage collection and balance. The balancer operates with a constant balance-current of 4A (NEEY-24S4EB) for energy transfer. The balance-current does not depend on the delta-voltage of the battery cells in series. Cell voltage acquisition range 1 V ~ 5V, accuracy $\pm 1\text{mV}$. Applicable to Li-ion, Lipo, Lifepo4, LTO and other battery on the market.

The balancer is equipped with bluetooth communication function and supports mobile APP software. The balancer can be connected to the phone via bluetooth to check the individual battery voltage, balance state, modify parameters and other operations. The balancer is small in size and easy to carry. It can be widely used in the battery PACK of small sightseeing car, scooter, sharing car, high-power energy storage, base station backup power supply, solar power station and other products. It can also be used in battery balance maintenance, repair and other occasions.

2 Main technical parameters

2.1 Features

- ◆ Support 2 ~ 24 cells battery packs.
- ◆ Active, balanced energy transfer, the delta-voltage between cells of battery $\leq 5\text{mV}$.
- ◆ Cell voltage acquisition range 1V ~ 5V, accuracy $\pm 1\text{mV}$.
- ◆ Support all battery on the market.
- ◆ The balance-current is set independently within the range of 0.3 ~ 4A.
- ◆ Bluetooth function, equipped with mobile APP, support Android and IOS.
- ◆ Balance-Wire resistance detection to find wiring errors in advance.
- ◆ Operating power supply: 25V~100V.

2.2 Operating conditions

- a) Temperature range: $-20^{\circ}\text{C}\sim 70^{\circ}\text{C}$.
- b) Operating power supply: 25~100V, Battery power or external power supply can be used.
- c) Total current consumption: Work mode 10mA@100V, Idle mode 6mA@100V.

3 Connector and interface

3.1 connectors and LED

The positions of connectors and LED are shown in figure 1.



3.2 definition of connector and LED

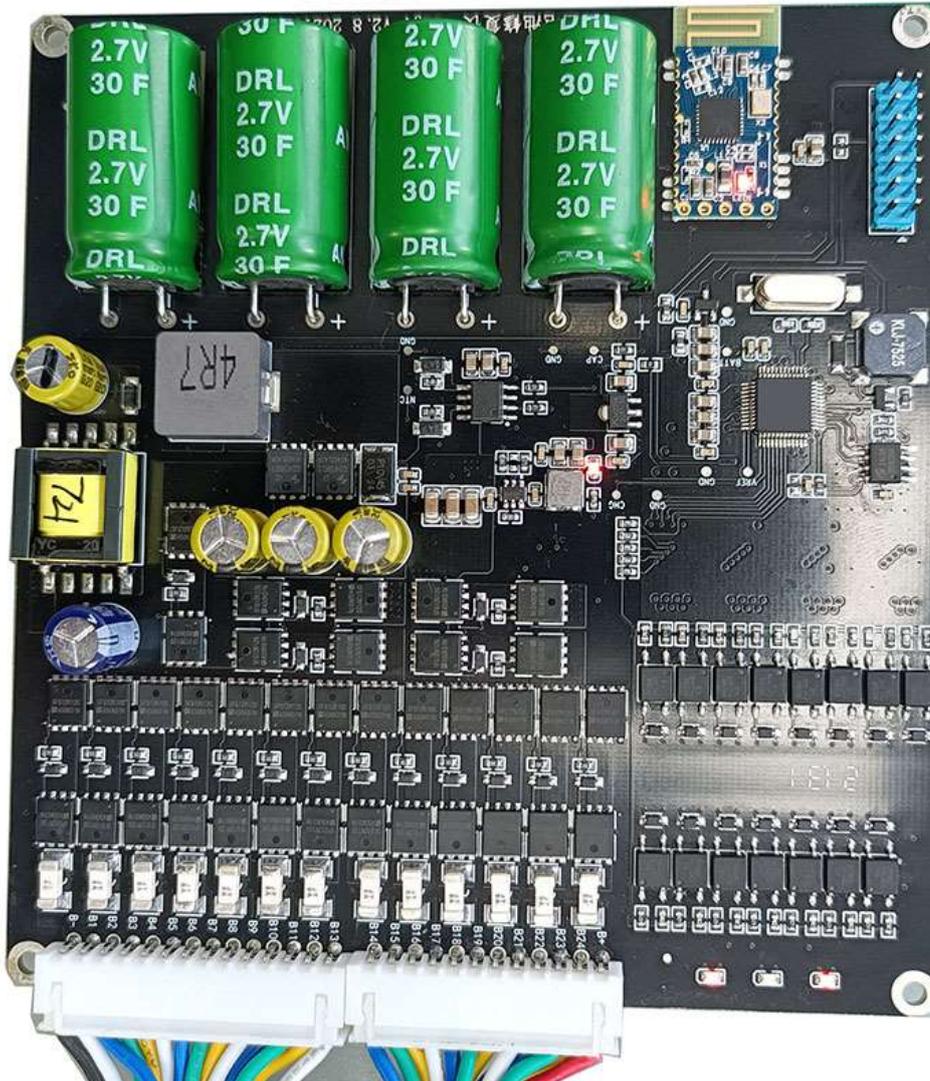
Connector definition and LED definition are shown in table 1.

Table 1 connector definitions

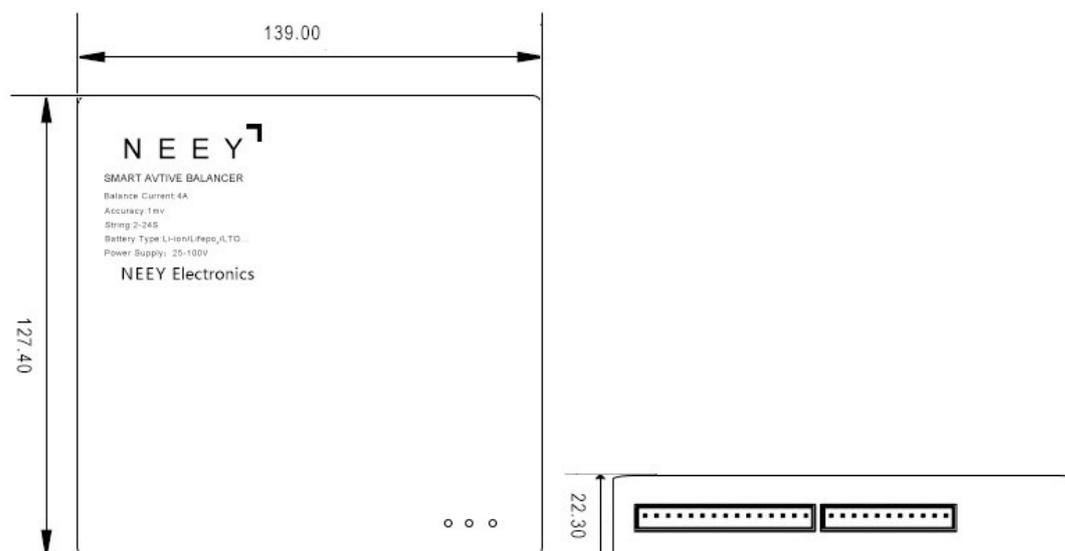
connect	Pin	Name	Descriptio
P2	1	B-	battery negative
	2	B1	
	3	B2	
	4	B3	
	5	B4	
	6	B5	
	7	B6	
	8	B7	
	9	B8	
	10	B9	
	11	B10	
	12	B11	
	13	B12	
	14	B13	
	15	B14	
	1	B15	
	2	B16	
	3	B17	
	4	B18	
	5	B19	
P1	6	B20	
	7	B21	
	8	B22	
	9	B23	
	10	B24	
	11	B+	Power supply of

3.3 Product appearance

The product appearance is shown in Below



3.4 Size



The size of NEEY-24S4EB balancer is 162mm×100mm×20mm

3.5 Weight

The balancer weighs about 470g。

4 Installation method and precautions

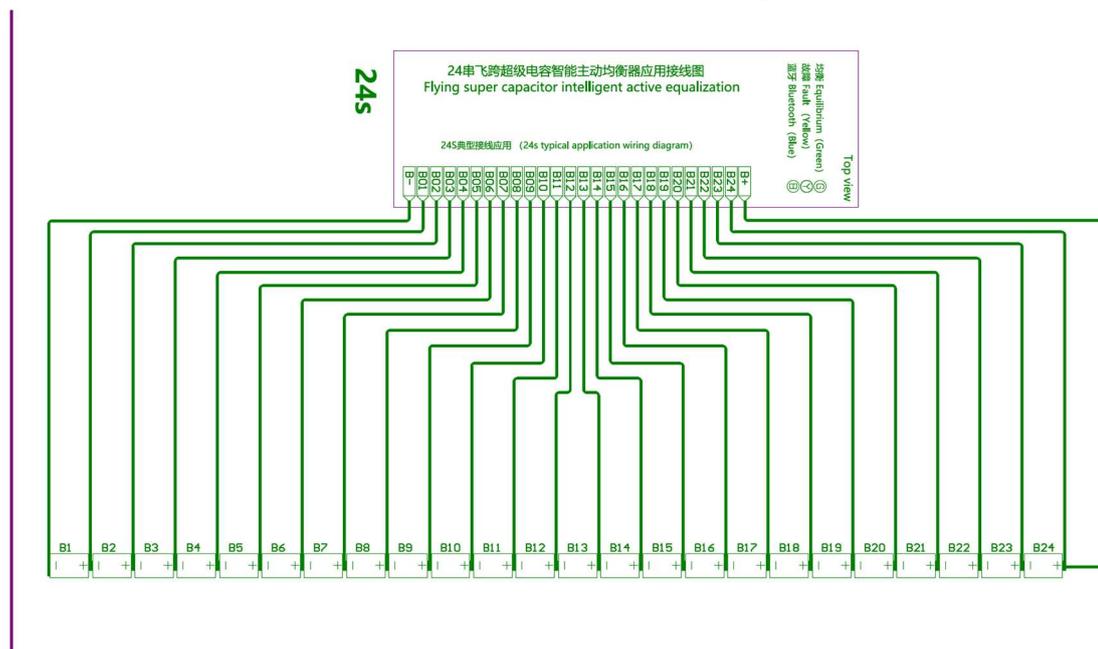
4.1 Unpacking inspection

Unpacking inspection and precautions are as follows:

- handle the packing boxes and balancer gently and try not to turn them upside down.
- pay attention to whether the package is in good condition before unpacking, such as whether there is any impact mark, whether there is any damage, etc.

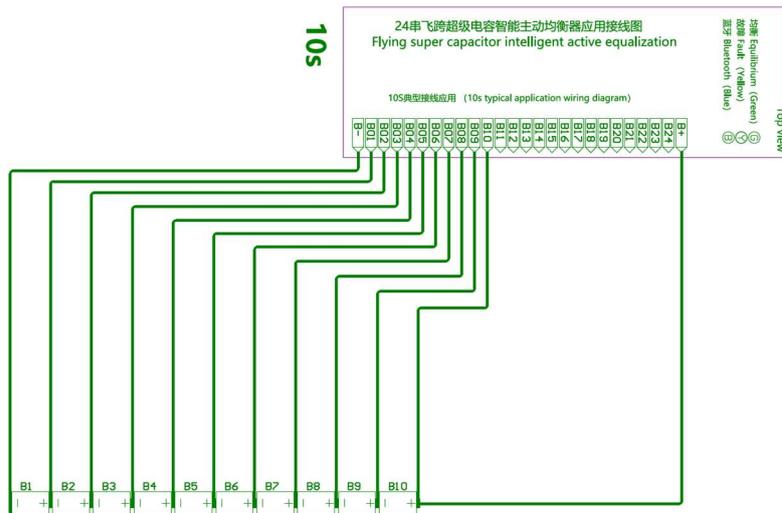
4.2 Installation of a single balancer

Single NEEY-24S4EB balancer is suitable for 2-24 batteries in series. **However, when the battery voltage is lower than 25V, the balancer shall provide an external dc power supply of 25V~100V.**

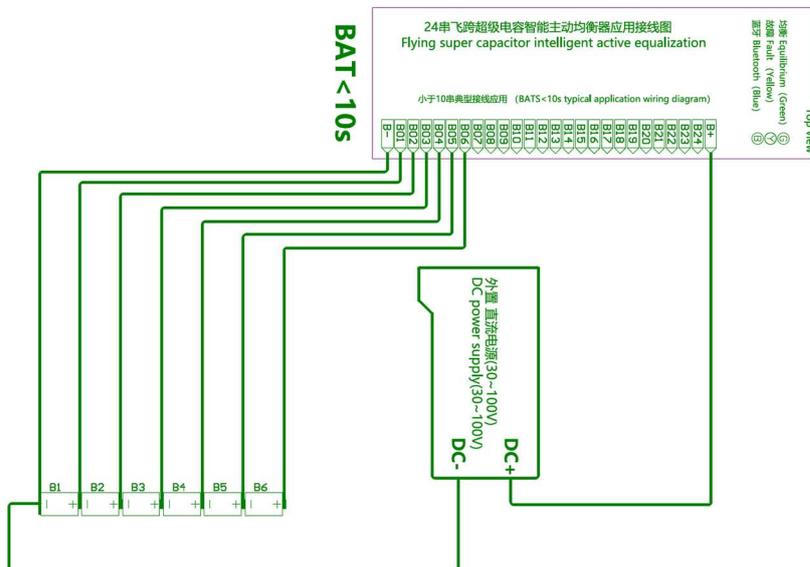


For the battery pack with 24 cells ,

For the battery pack less than 24 cells , the installation wiring method is shown in Below (The diagram shows 17 cells cases)。



The balancer is applied to the battery pack with a voltage less than 25V, and the wiring method is shown in Below (The diagram shows 6 cells with booster module case).



4.3 The APP install

By scanning the QR code shown in Below , you can get the mobile APP matching the product.



<https://github.com/NEEY-ELEC/NEEY-BALANCER>

5 Operation guide

5.1 Preparation and inspection before use

Before turning on the power supply, please confirm again whether the balan-wire connection is normal, whether the power supply provided to the balancer is within the power supply range, check whether the ebalancer has been placed securely, only after the confirmation can be connected to the balancer power supply, otherwise it may cause abnormal work, even burning and other serious consequences.

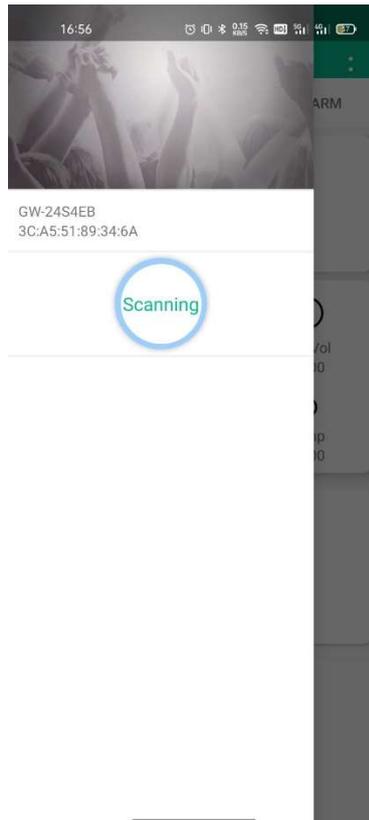
5.2 Balancer start to work

Once the above operation is confirmed, the balancer can be powerd. NEEY-24S4EB balancer does not have power-on button, it only needs to connect the 'B+' of balancer to the power, and the balancer starts to work automatically.

5.3 APP operation guide

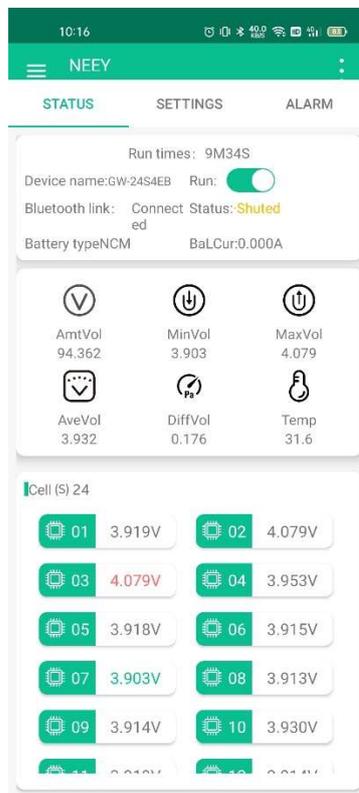
5.3.1 Device operation in APP

First of all turn on the bluetooth function of the phone, then open the APP, as shown in Below, Click the icon in the upper left corner to scan the device, After scan, click the name of the device to be connected(eg "24S4EB").



5.3.2 Real-time status

The real-time state is shown in Below



In the real-time status page, you can check the Cells voltage, battery voltage, maximum delta- voltage, Cells voltage average, balance state, balance-current, cells wire resistance and other information.

The definitions of each parameter are as follows:

a) **Cells voltage**

The "cells voltage" area displays all the cell voltage of the current battery, in which BLUE is the current highest voltage of cells and RED is the current lowest voltage of cells.

In balancing, the BLUE cell battery discharge to the balancer to stored, then balancer use the energy which store in it to charge the RED cell battery, This is called energy transfer.

b) **Balance-current**

Balance current displays the current balance in real time.

In balancing, BLUE represents the discharged cell battery and red represents the charged cell battery. The negative current indicates that the BLUE cell battery is discharging, when blue blink, the positive current indicates that the RED cell battery is charging, when red blink.

c) **Battery voltage**

The battery voltage represents the total voltage of the current battery and the sum of all the cells voltages.

d) **Maximum delta-voltage**

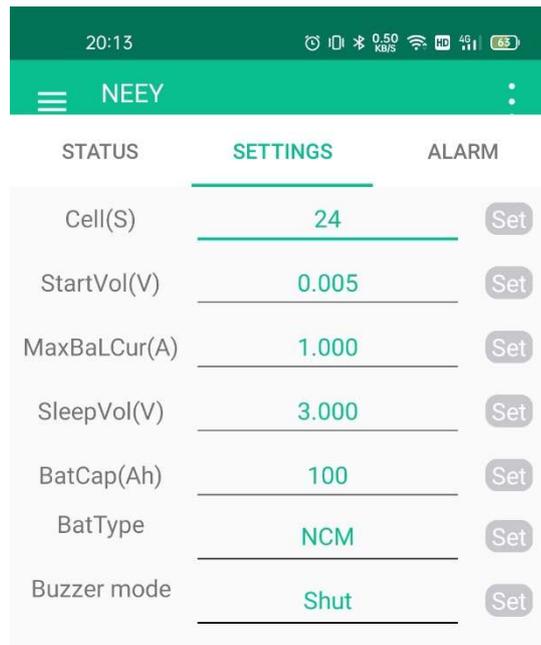
The maximum delta-voltage represents the difference between the highest cell voltage and the lowest cell voltage for the current battery pack.

e) **Cells wire resistance**

The cells wire resistance represents the resistance that connects the balancer to the cells. This value is just a preliminary calculation, the purpose is to prevent the wrong wiring, or poor contact, when the "wire resistance is too large" alarm, please check the wiring.

5.3.3 Setting

The Settings page is shown in Below



On the setting page, you can set the cells count、trigger balance delta-voltage、maximum balance current、voltage calibration and so on.

The definitions of each parameter are as follows:

a) **Cells count**

The "cells count" represents the number of cells in the current battery pack. Please set this value accurately before using, otherwise the balancer will not work properly (maybe note " Cell count is not equal to settings " in STATUS page with blink).

b) **trigger balance delta-voltage**

The trigger balance delta-voltage is the only parameter that controls the balance. With the balance switch on, when the maximum delta-voltage of the battery exceeds this value, the balancer starts to balance until the balance completed when the "Maximum delta-voltage" falls below this value. For example, set the trigger balance delta-voltage to 0.01v, start balance when Maximum delta-voltage of the battery is greater than 0.01v, and finish balance when it is lower than 0.01v.(it is recommended to set the trigger balance delta-voltage for batteries above 50AH as 0.005v, and for batteries below 50AH as 0.01v).

c) **Maximum balance current**

balance current represents the continuous current of high voltage cell battery discharge and low voltage cell battery charge during energy transfer.The maximum balance current represents the maximum current in the energy transfer process, and the maximum balance current should not exceed 0.1C.For example: 20AH battery not exceeding $20 \times 0.1 = 2A$.

The maximum balance current can be set for NEEY-24S4EB is 4A.

d) **Voltage calibration**

The voltage calibration function can be used to calibrate the voltage

acquisition accuracy of the balancer.

When the battery voltage display on the balancer is found to be in error with the voltage of the battery, the voltage calibration function can be used to calibrate the balancer. The calibration method is to fill in the current battery voltage measured by the multimeter, and then click on the "small plane" ico behind the voltage calibration box to complete the calibration.

Note: after any parameter is modified, click the "small airplane" ico beside the parameter box. when the balancer successfully receives the parameter, it will emit a "di" soun.

5.3.4 Control

This function is for use on the Protection board, NEEY-24S4EB Balancer does not have this function, and the page is vacant.

6 General failure analysis and troubleshooting

Fault causes and treatment are shown in table 2.

Table 2 Fault causes and treatment

NO.	phenomenon	causes	Elimination method
1	The power indicator is off	Not powering properly	Check the power supply
2	Cell count is not equal to settings	"cells count" set wrong	set a right value to "cells count"
3	wire resistance is too large	Wrong wiring or	check the wiring
4	Voltage collection error	Wiring error or parameter setting error	Check the wires one by one to eliminate wiring errors. Calibrate through the voltage

As listed above, common faults, possible causes and solutions, if not, please contact Henan Nengyi Electronic Technology Co., Ltd.

7 Transportation and storage

7.1 Transportation

The products after packing are not directly affected by rain and snow and

can be transported by normal means of transportation. It is not allowed to be put together with corrosive substances such as acid and base during transportation.

7.2 Storage

The packaged products should be placed in a permanent warehouse for storage, the temperature of the warehouse is 0°C ~ 35°C, the relative humidity is not more than 80%, the warehouse should be free of acid and alkali and corrosive gas, no strong vibration and impact mechanism, no strong magnetic field.