BALANCER 12S

FS-B12S

OPERATING INSTRUCTIONS

Please keep for future reference

Thank you for purchasing this Fusion B12S Balancer. We are sure you will be pleased with its performance and features. In order to ensure that you obtain the maximum benefit from its operation, please read these instructions carefully.

SPECIFICATIONS

Input	Lithium Charger
Battery Type	Lithium-Polymer (Li-Po) or LiFePO4 (Li-Fe) cells
Cells	2 ~ 12 Cells
Charge Rate	0 ~ 10A
Discharge Rate	0 ~ 10A
Dimensions	105 x 80 x 25 mm
Balancing Ports	2 x 6 cell JST-EH type
Balancing Current	70mA
Current Drain (Normal Modes)	15mA
Current Drain (Standby Mode)	0.4mA

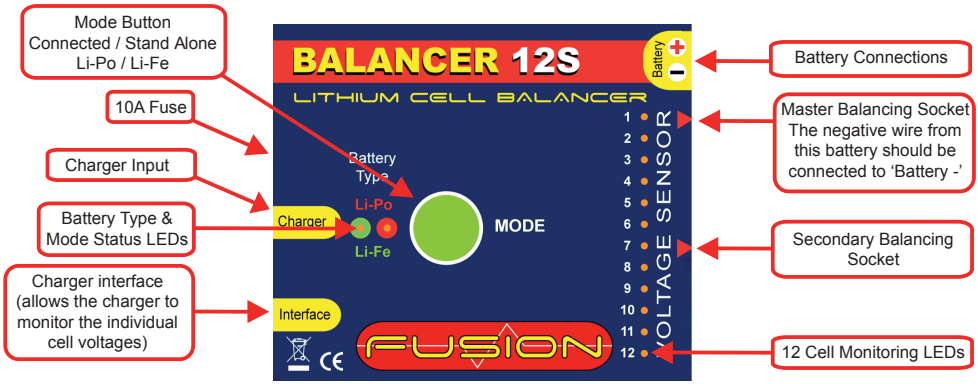
ABOUT BALANCING

Balancing of Lithium packs is necessary because the individual cells tend to decline to different charge states (voltage levels) when they are discharged. This imbalance varies according to the application, but permanent damage can be caused to Lithium packs when individual cells are over discharged. In addition, if a Lithium cell is over-charged, the cell can become unstable and in extreme cases can explode.

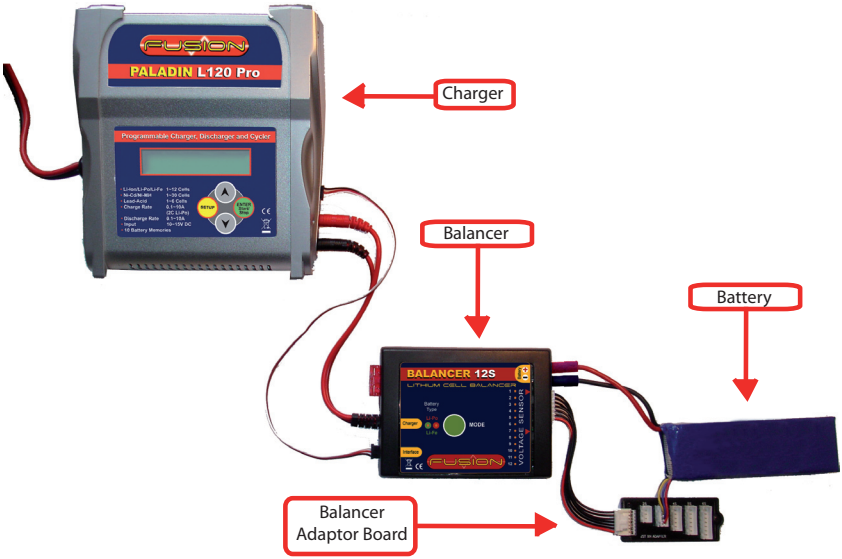
This Fusion 12 cell balancer is designed to balance lithium packs of up to 12 cells wired in series. By keeping the cells at equal voltages throughout the charge, the balancer will ensure that individual cell voltages are not exceeded, and an equal capacity is held in each cell.

When a balanced pack is discharged, the individual cells in the pack should dis-charge to similar levels meaning that none of the cells fall below their individual minimum voltages.

BALANCER LAYOUT

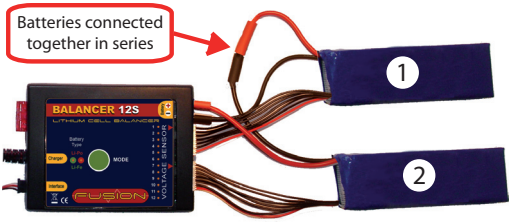


CONNECTING TO A CHARGER



1. With the charger turned off, connect the balancer to the charger.
2. If using a compatible Fusion charger, connect the interface cable between the charger and the balancer. This will enable the charger to record the individual cell voltages.
3. Connect the negative and positive battery connections to the balancer.

Note: Two packs of the same capacity and charge states can be charged in series. In this case the negative from first pack and the positive from the second pack should be connected to the balancer. Then, the positive from the first pack, and the negative from the second should then be connected together to wire the packs in series. DO NOT SHORT CIRCUIT the packs.



4. Connect the battery's balancing cable to the balancing port.

   If charging two packs in series, ensure that the first pack (connected to -ve) is connected to the master balancing port (cells 1~6). If your battery uses a different balancing connector, then balance board adaptors are available.

5. Ensure that the LED is lit for the correct battery type. If the wrong battery is shown, hold the Mode button down for 2 seconds until the battery type changes. N.B The battery type can only be changed within 10 seconds of connecting the battery to the balancing port.

BALANCER MODES

There are 3 modes that can be identified on on the status LEDs.

Status LED	Mode
On	Stand Alone Mode
1 Flash every 2 seconds	Connected Mode
Off	Standby Mode

CHARGING OR DISCHARGING WITH THE BALANCER

1. Connect the charger/discharger to the power source.
2. Select the correct charge/discharge parameters, double checking the cell count and charge/discharge rates.
3. Press the mode button on the balancer to select 'Connected Mode'. In connected mode the status LED should flash once every 2 seconds. In 'Stand Alone Mode' the status LED will remain on.
4. Press the 'Start' button on the charger/discharger.

CHARGE/DISCHARGE COMPLETION

- The charger/discharger will switch off when the battery pack reaches the preset final charge/discharge voltage.
- If the pack is balanced, you will see that the cell monitor LEDs only flash sporadically. In this case disconnect the battery pack(s) from the balancer.
- Normally the cells are balanced whilst charging. However, if the cell monitor LEDs flash continuously then the pack is not fully balanced and the mode button should be pressed to allow the balancer to continue in 'Stand Alone Mode'. When the balancing is complete all the LEDs will turn off and the unit will enter 'Standby Mode'.
- If a battery pack is left connected to the balancer in 'Connected Mode' then it will continue to balance the cells, causing the pack to slowly discharge.

BALANCING WITHOUT A CHARGER

The Fusion Balancer is also capable of balancing a battery pack without the charger connected.

1. Insulate the plugs on the charger input leads to avoid short-circuits.
2. Connect the negative and positive battery connections to the balancer.

   Note: Two packs can be balanced in series. In this case the negative from first pack and the positive from the second pack should be connected to the balancer. Then, the positive from the first pack, and the negative from the second should then be connected together in order to wire the packs in series. **DO NOT SHORT CIRCUIT** the packs.
3. Connect the battery's balancing cable to the balancing port. If charging two packs in series, ensure that the first pack (connected to -ve) is connected to the master balancing port (cells 1~6). If your battery uses a different balancing connector, then balance board adaptors are available.
4. Ensure that the LED is lit for the correct battery type. If the wrong battery is shown, hold the Mode button down for 2 seconds until the battery type changes. N.B The battery type can only be changed within 10 seconds of connecting the battery to the balancing port.
5. Ensure the balancer is in 'Stand Alone Mode' with the status LED on. If the LED is flashing, press the mode button to return the balancer to 'Stand Alone Mode'.
6. The balancer will now balance the battery pack. When the balancing is complete all the LEDs will turn off and the unit will enter 'Standby Mode'.

LED STATUS & NOTES

Battery Type/Status LEDs

Status LED	Meaning
On	Stand Alone Mode
1 Flash	Connected Mode
2 Flashes	Over-voltage: The voltage of one cell is higher than 4.3V (LiPo) or 3.9V (LiFe). The corresponding cell monitor LED for that cell also flashes.
3 Flashes	Low voltage: the voltage of one cell is lower than 2.0 Volts, or a short-circuit is present; the corresponding monitor LED for that cell also flashes.
4 Flashes	Voltage sensor connection error.
Off	Standby Mode

Cell Monitoring LEDs

Cell LED	Meaning
Off	Cell with the lowest voltage.
Short Flash	Cell voltage slightly higher than lowest cell.
Long Flash	Cell voltage higher than lowest cell.
On	Cell voltage significantly higher than lowest cell.

Notes

- In extreme cases faulty cells & very high battery capacity can cause large voltage differences between individual cells. If balancing in 'Stand Alone Mode' and one of the cells falls below 2.75 Volts (LiPo) or 2.35 Volts (LiFe), the balancer will stop balancing and enter 'Standby Mode'. If this happens connect the balancer to the charger and charge the pack immediately.
- When the balancer is in 'Connected Mode' the charger input leads are connected to the battery pack and are 'Live'. Make sure the input leads never touch when a battery pack is connected.
- If the unit does not operate, check the 10A fuse. If the fuse is blown, please obtain a replacement from your local automotive store.

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