Is it OK to not set a cut-off current for battery balancing

Why do batteries need balancing?
The inherent differences and discrepancies among individual cells within a battery packgive birth to the need for battery balancing. Production differences,aging,temperature effects,or differing load conditions can cause these inequalities. Cells are joined end-to-end,and the same current moves through each cell in a series configuration.

Can a balancer-Protection Board cut off a cell?
In a series configuration,the balancer-protection board will cut off when any one of the cells exceeds the cut off voltage. It can be as high as 4.35 V given the tolerances,and this can damage the cell. That is why you should not rely on the balancer-protection to keep the cell voltage below 4.2.

How does a battery balancing system work?
The BMS compares the voltage differences between cells to a predefined threshold voltage, if the voltage difference exceeds the predetermined threshold, it initiates cell balancing, cells with lower voltage within the battery pack are charged using energy from cells with higher voltage (Diao et al., 2018).

How do you top-balance a battery?
The ideal (and most time consuming) way to do initial top-balance for a battery will always be to take each Cell, subject it to standard charge model as mentioned above and then connecting all such cells to yield a top-balanced battery.

What are the problems associated with battery cell balancing?
Failure to properly balance cells can result in reduced usable capacity,shortened battery life,and safety hazards. Here are some of the challenges associated with battery cell balancing and various cell imbalance factors are shown in Fig. 17. The causes and solutions of cell imbalance is presented in Table 12. Fig. 17. Cell imbalance factors.

What voltage should a balancer-Protection Board be cut off?
Also note that balancer-protection boards usually cut off above 4.2 V.In a series configuration,the balancer-protection board will cut off when any one of the cells exceeds the cut off voltage. It can be as high as 4.35 V given the tolerances,and this can damage the cell.

In fact, many common cell balancing schemes based on voltage only result in a pack more unbalanced that without them. This presentation explains existing underlying causes of voltage ...

Selecting the appropriate battery balancer depends on several factors: Battery chemistry: Ensure compatibility with the specific battery type (e.g., lithium-ion, LiFePO4, lead ...

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Cell balancing current ensures that each cell receives an equal share of charging and discharging, preventing overcharging and over-discharging of cells with higher capacities ...

Of course, it is OK if the BMS is able to run more balance current than the required minimum. There is no reason to specify a BMS that can handle more balancing current than is required ...

According to Battery University: Li-ion cannot absorb overcharge. When fully charged, the charge current must be cut off. A continuous trickle charge would cause plating of metallic lithium and compromise safety. To minimize stress, keep the lithium-ion battery at the peak cut-off as short as possible. See batteryuniversity /learn/article/...

Cell balancing current ensures that each cell receives an equal share of charging and discharging, preventing overcharging and over-discharging of cells with higher capacities while avoiding undercharging weaker cells. This balance not only extends the battery"s lifespan but also promotes safety by mitigating the risk of cell failures.

1.The most advanced (best) chargers will have a current setting that the charge must get down to before going to float mode. (These chargers will often also have a max time the battery is allowed to stay in accumulation stage.) I tend to set the cut off current for the end of the accumulation stage quite low. Typically .5%C to 1%C ...

Charging sources often supply current into loads instead of charging the battery. This is not a simple application and it creates a more complex operating context for the charging equipment. I finally just gave up and did it, powered down the house, I"d lost at least half my capacity and one string of 4P was so far out of wack the minute the entire 4P4S got down to ...

When batteries are connected in parallel, the balancing will start automatically between batteries as the current flows from the higher-voltage batteries to the lower-voltage batteries. However, due to the small internal resistance of the battery, the balancing current will be so large that trigger the over-current protection of the battery when the voltage difference is ...

So charging to completely full allows the cells to be rebalanced as the cells that reach the cut-off voltage first then have the charge stopped (the current goes through a bypass resistor instead) and the not quite full cells continue to charge slowly until they are 100% full. Judging by the data that Simon Mac downloaded, the cells are normally very closely balanced ...

By enabling the battery pack to work within safe and efficient factors, battery balancing strategies are used to equalize the voltages and the SOC among the cells. Numerous parameters such ...

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With LiFePO4 it"s really hard to judge SoC from voltage unless you"re in those steep parts of the curve, so to balances the cells you need them to be in the steep part of the curve. BMS tend to have a balance voltage that is set to balance cells once they hit that voltage, (i set mine just below absorption voltage).

The above is regardless of what the cut-off voltage is. Cut-off current should taper off gradually until around 50mA or less. The lower the CC cut-off, the more "sand" you can pack in. So there is a slight increase in capacity and run time. Any lithium charger that you can set it"s cut-off voltage should taper off the current as well. But ...

So, if you don"t want to (or are not able to) cut off current as mentioned in the standard charging model in section 1, you can also (in theory) fully charge any LFP Cell by maintaining FCV across its terminals and allowing current to go zero. It will take basically forever but it should also fully charge a LFP Cell.

Low-Temperature Cut-Off: What Is It? Definition of Low-Temperature Cut-Off. Low-temperature cut-off (LTCO) is a critical feature in lithium batteries, especially for applications in cold climates. LTCO is a voltage threshold below which the battery"s discharge is restricted to prevent damage or unsafe operation. When a battery"s voltage ...

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