

Unstable Charging & High Voltage Trips

TN00002

OVERVIEW

This document offers you guidance on how to systematically step through the process of elimination and how to overcome the issue if it is related to the battery cell balancing. Cells within the LiFe & Eco P Series batteries are balanced at the end of the charge cycle. Under normal operation cell balancing is performed and is unnoticeable during the systems operation.

If the battery however has been sitting idle or in partial state of charge for sustained periods (3 to 6 months), the cells can drift and may cause (in rare cases) some temporary voltage

instabilities during the cell balancing process. Most of the time this will not be noticed by the system and after a few charge (to float) discharge cycles the cells will be come balanced, however battery cell balancing issues may in some cases, produce a short term high voltage on the DC bus.

SYMPTOMS

Towards the end of the charge cycle some or all of the below may be experienced:

1. System shuts down on high voltage (battery or connected output PCE shuts down).
2. System registers a high voltage event.
3. AC coupled solar ramps back too early before target voltage is achieved.
4. DC coupled solar ramps back too early before target voltage is achieved.

During cloud bursts the below may be experienced:

1. System shuts down on high voltage (battery or connected output PCE shuts down).
2. System registers a high voltage event.

CHECKS

Prior to determining if the battery is causing the issue, you must check all other possible causes.

- Check the system design meets the connected PCE's requirements, especially if the Solar is AC coupled.

AC coupled systems generally specify a battery capacity to PV/AC coupled inverter ratio. Having too much AC coupled PV will cause high voltage DC trips if the battery capacity is too small. This is generally due to time it takes for the AC coupled inverter to ramp back its power output causing too much energy to flow to the battery. This can also be experienced on DC coupled systems.

- Check PCE charge settings to be correct.
- Check PCE is operating as per manufacturers expectations.
- Check connect PCE installation and configuration to be correct and operating as expected.
- Check all DC connections to determine if there any high impedance connections (connected properly are making correct contact).
- Check all fuses and DC isolators to ensure they are not faulty and operating correctly.

IMPORTANT:

After all the above checks/corrections, test system to see fault still remains.

Procedure to allow cells to balance

To stabilise the charge voltage either of the below processes can be used.

Process 1:

Load should be isolated and any discharge from the battery removed/isolated when attempting to normalise the charge voltage.

1. Reduce charge voltages as per below:

LiFe2433P	28.5VDC
LiFe4833P	57.1VDC
Eco4840P	57.1VDC
LiFe12033P	140VDC

2. Start a charge process and determine if system is charging correctly.
3. If charging correctly, allow to charge for 15 minutes.
4. If fault still remains, follow Process 2.
5. Increase charge voltage every 15 minutes by 0.1VDC until charge voltage remains steady at original charge voltage as specified in our Installation and Operation Manual.
6. If Voltage does not remain steady when you increase, return to previous charge voltage and charge for a further 15 minutes.
7. Once the voltage remains steady at original charge voltage as specified in our Installation and Operation Manual, the batteries should be charged to Float.
8. System is now operating correctly.

Process 2:

Load should be isolated and any discharge from the battery removed/isolated when attempting to normalise the charge voltage.

1. Set charge voltages as per below:

LiFe2433P	28.8VDC
LiFe4833P	57.6VDC
Eco4840P	57.6VDC
LiFe12033P	142VDC

2. Reduce charge current until system remains stable (battery accepts charge at set charge voltage). Try reducing in 15-25% increments.
3. Gradually increase charge current every 15minutes (small increments (10% or so)) until full charge current is reached.
4. When the voltage remains steady at original charge current as specified in our Installation and Operation Manual the batteries should be charged to Float.

Note: If the system can be accessed remotely to change charge settings, the 2 processes can be performed off site.