Resetting Cell Imbalance – Renogy 48V Lithium

Bulletin Type:	SRP
Bulletin #(s):	23-118
Job Code(s):	*If affected unit has warranty remaining, submit your claim following the normal process*
Flat Rate(s):	

Publication Date:	November 2023
Make(s):	Jayco, Entegra Coach
Model(s):	Terrain (19Y) Solstice LI (21BL) Swift LI (20AL, 20DL, 20TL) Launch (19Y) Expanse LI (21BL) Ethos LI (20AL, 20DL, 20TL)
Model Year(s):	2021-2024

Incident:	Renogy 48V Lithium Batteries have cell imbalance caused by over-discharging the battery.
Affected Units:	2021-2024 Jayco Terrain, Solstice LI, Swift LI; 2021-2024 Entegra Coach Launch, Expanse LI, Ethos LI with renogy 48V Lithium system
Parts List:	N/A
Misc. Tools & Supplies:	Shore Cord

CELL IMBALANCE INSPECTION

- Cell imbalance refers to a condition in which individual cells within a battery module have variations in their electrical characteristics, such as voltage, capacity, or internal resistance. These variations can lead to unequal performance among cells, potentially impacting the overall performance, safety, and longevity of the battery system.
- To catch cell imbalances, we need to observe them at a different reference point and not when the batteries are fully charged. Fully charged LFP cells have an acceptable cell voltage differential that can grow due to chemical variability, aging of the cell, and balancing, and be perceived as widest in the fully charged process but not necessarily indicative of a cell imbalance. Therefore, you also won't find balancing occurring during the end charge process. Balancing occurs in the recharging process.
- When reviewing the Samkoon screen, there are several parameters which will require a mandatory stoppage of this inspection and repair procedure. Immediately contact Patrick Distribution (1-800-621-2278 or email renogy-oem@patrickind.com) for approval to replace the lithium battery.

WARNING: Do not attempt to charge the battery with the following conditions:

- If the voltage difference between the min and max cell voltage is greater than 800mv.
- If the battery total voltage is less than 32V.
- If the max cell reads 8,000mV or similar.
- If the min cell is under 2,000mV.

- When determining cell imbalance, the charge source should be disconnected and the battery idle to observe the actual voltage difference gap between the maximum volt cell and the minimum volt cell. Cell imbalance is determined when the differential has grown beyond 300mV.
    - **Note:** At 500mv cell differential the Samkoon will report a Level 1 warning and at 800mv cell differential the Samkoon will report a Level 2 protection. Only when the cell differential has been closed to below 300mv will the error on the Samkoon clear.

If the Max Cell is above 8000mV or the Min Cell is below 2000mV, the battery is likely compromised and will require replacement.

RESETTING CELL IMBALANCE

- The only way to begin clearing cell imbalance is by having a stable charge source connected and ensuring the battery is not in any other alarm state such as overvoltage. The balancing algorithm is only carried out during charging, triggered when both the following conditions are met:
    1. Single cell voltage reaches 3.4V
    2. The voltage difference between cells is above 60mV.
- When the balancing starts, the cell(s) with high voltage will be discharged at 50mA. The balancing will be ON for 1 sec, then OFF for 1 sec. As long as both the above conditions are met, the balancing cycle will be carried out intermittently. It can't be a continuous process, to avoid overheating of the resistor in balancing circuit.

INSTRUCTIONS:

1. Review the Samkoon screen to verify the system is not any alarm state – warning or protections

2. With the lithium system operational and clear of any faults:
    A. Discharge the system to below 53.0V.
    B. Let the battery sit idle for 10-15 minutes.
    C. Observe and note the Total Voltage, Max_Volt and Min_Volt.

3. Change inverter settings:
    A. Press SET button on Inverter to open parameter settings
    B. Press UP or DOWN and go to Parameter #9 and then press ENT button
    C. Parameter setting will begin to flash, then change to 53.6V.
    D. Press ENT button to save setting
    E. Press UP or DOWN and go to Parameter #28 and then press ENT button
    F. Parameter setting will begin to flash, then change to 5A.
    G. Press SET button to exit setting menu
4. Connect the unit to an external 120VAC (up to 30A) power source.
5. Continue to charge with shore power for an extended amount of time.
    A. **NOTE:** Dependent on the lithium battery condition, balancing may take 1-2 days.
6. To observe the cell imbalance differential gap closing, discharge the battery to the same Total Voltage in Step 2 and compare the cell differential. It should be observed that the cell differential should be closer as this cannot be seen when the battery is fully charged.
    A. **NOTE:** Repeat Steps 2-5 until the cell differential has closed completely and/or until the Cell Imbalance error has cleared.

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