

100Ah and 200Ah Battery Recovery

Scope

- This work instruction details how to recover a 100Ah or 200Ah battery from a low-voltage state in which any cell voltage is between 1.5-2.5V.

Meanings of **WARNING**, **CAUTION**, and **NOTICE**

- **WARNING:** This heading is used to highlight that non-compliance with the indicated procedures may cause injury or death.
- **CAUTION:** This heading is used to highlight that non-compliance with the indicated procedures may cause damage to equipment.
- **NOTICE:** This heading is used to draw attention to specific information.

Safety

WARNING: Before proceeding, press the hybrid disconnect to ensure that the system is disabled. Ensure that shore power is disconnected, then disconnect the 21-pin Deutsch connector and both Rebling connectors. Note that the batteries are still energized even when disconnected.

WARNING: The cable connections must not be relocated. Doing so could cause a direct short which could lead to personal injury or damage to equipment.

WARNING: Company-approved PPE must be worn throughout the procedure. Follow all safe work practices while servicing and maintaining high-voltage components within the system.

WARNING: Employers are required to establish a program and use proper procedures for affixing appropriate lock-out/tag-out protectors to energy-isolating devices, and to otherwise disabled machines or equipment to prevent unexpected energization, start-up, or release of stored energy to prevent injury to employees. Refer to your company's lock-out/tag-out program for more details.

CAUTION: The battery sense strings are ESD-sensitive. Refer to your company's electrical standards for proper grounding practices.

Terminology

The AC 100.100-24 (pictured in this work instruction) has twelve cells, three batteries, and two packs. Battery A is the 12V pack (four cells) which supports the chassis. Batteries B and C comprise the 24V pack (eight cells) which supports hybrid system functions.

Procedure

1. Insert the key into the ignition and turn it to the Run position.
2. View the cell voltages on the operator screen.
 - To view the cell voltages on HMI software versions 4.71.05 and later, press the F3 softkey (under the *i* icon, if present), then press the Up arrow.
 - To view the cell voltages on HMI software versions prior to 4.71.05, press the F3 softkey (under the *i* icon, if present), then scroll to the right using the arrow key until you reach Information Screen 5.

NOTICE 1: The sense boards will not function if any given cell within their respective batteries is at less than 2.3V. This will cause no voltage to be displayed on the information screen for that cell or for any subsequent cell.

NOTICE 2: You may turn off the engine and remove the key from the ignition at this time.

3. If any cell reads 2.5V or below, the cell must be charged manually via this procedure.
4. If all values read “0” or the screen is unavailable, remove the lid and check the battery cells by using a volt meter on the positive and negative terminals through the slits in the Lexan cover.

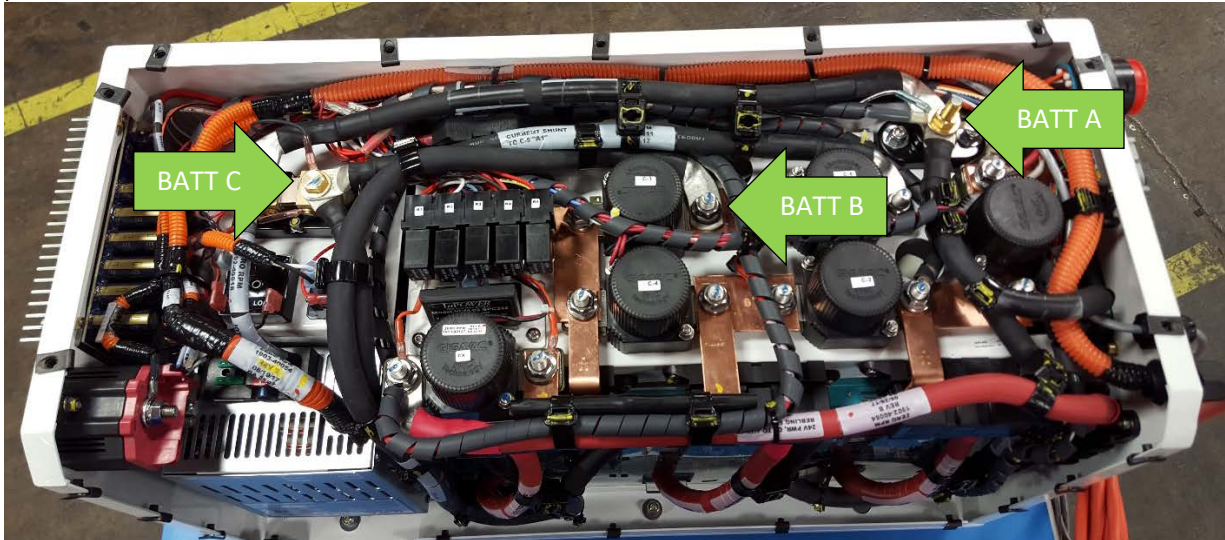
NOTICE 3: On the AC 100.100-24 (pictured below), the batteries are designated C, B, and A from left to right.

NOTICE 4: If the volt meter shows at least 2.3V on a cell but the cell voltage is not displayed on the screen, the system may need troubleshooting.



5. If one or more cells read below 1.5V, replace the affected battery according to the appropriate work instruction (4807-00104 for the AC 100.100-24; 4807-50006 for the EM 200.200-48).
6. If all cells in a battery read at or above 1.5V, trace the power connection from the battery to its termination point on the fuse holder.

7. Trace the affected battery's ground cable to its termination point on the component plate. On the AC 100.100-24 (pictured below), these are as follows: Battery C – right side of current shunt; Battery B – contactor C3 (A1); Battery A – ground stud. On other units, trace the battery power and ground cables to their termination points.



8. Connect the ground of a 1.5-5A trickle charger (such as the Autocraft 1.5A SEM-1562A) to the position to which you traced the ground cable in Step 7. Connect the trickle charger power to the cable you traced to the fuse holder in Step 6.
9. Continue to charge via the trickle charger until the cells reach 3.1V (battery voltage approximately 12.4V) according to a volt meter.
10. Disconnect the trickle charger, then wait five minutes. All four cells in the battery should read within 0.2V of one another. In case of more significant cell voltage imbalances, contact ZeroRPM.
11. If the battery drops below 12.0V within five minutes, charge the battery again. If the battery voltage does not drop below 12.0V, the procedure is complete.
12. Reinstall the lid. Reconnect the 21-pin Deutsch connector and the chassis Rebling connector (as well as shore power if needed), then disengage the hybrid disconnect.
13. Normal chassis alternator or shore power charging can be performed at this time. Refer to the BMS calibration work instruction (4807-00135 for the AC 100.100-24 and AC 100.100-36; 4807-00140 for the EM 200.200-48) for details. Always recalibrate the BMS after recovering a battery. In case of more significant cell voltage imbalances within the cells of the series pack, contact ZeroRPM. Below is the nomenclature for the series pack batteries in major ZeroRPM systems.
 - AC 100.100-24 (Batteries B and C)
 - AC 100.100-36 (Batteries B, C, and D)
 - EM 200.200-48 (Batteries B, C, D, and E)