



SB-0001 Orion VII/NG Li-Ion ESS Mitigation Measures

Bulletin Number:	SB-0001	Revision:	A	EIC Number:	N/A	Std. Repair Time:	N/A
Application:	Orion VII and Orion VII NG model hybrid buses with Li-Ion Energy Storage Systems.						
Classification:							
Information Letter	<input checked="" type="checkbox"/>	Parts Bulletin	<input type="checkbox"/>	Service Manual Update	<input type="checkbox"/>	Operator's Manual Update	<input type="checkbox"/>

NOTE: For more information, please contact the Orion Service Line at 1-800-71-ORION (1-800-716-7466).

1.0 INTRODUCTION

This Service Bulletin provides the BAE Systems-suggested mitigation measures to reduce potential/probability of double-ended ground faults and possible Lithium-Ion Energy Storage System (ESS) thermal events on an Orion VII or Orion VII NG model hybrid bus.

2.0 LI-ION ESS MITIGATION MEASURES

 **NOTE**

For more information, please contact your local BAE Systems-certified service technician.

High Voltage Hazards

Please review all Danger, Warning, and Caution symbols prior to removing or installing the ESS or performing any task related to the ESS.

 **DANGER**

Serious risk of electrical shock. Only qualified maintenance personnel should access components of the battery system. Also, ensure that no other personnel are working on the vehicle while batteries are being serviced. Failure to observe all electrical safety precautions may result in personal injury and/or death.

 **DANGER**

Always wear protective clothing and use insulated equipment when working on the hybrid battery enclosure. Inspect all equipment for wear and damage before each use. Failure to observe all recommended procedures may result in personal injury and/or death.

 **DANGER**

Even with the battery isolator switch in the OFF position, the hybrid battery system remains a severe shock hazard because the battery modules themselves are not de-energized by this switch.

 **DANGER**

Ensure that the engine is not running before beginning any procedure on the hybrid battery system. High voltage is present at all times while the engine is running and for 4 minutes afterwards. Failure to follow these procedures may result in personal injury and/or death.

 **WARNING**

When working on the roof always wear an appropriate safety harness and observe all necessary precautions for height hazards. Ensure that the area above the vehicle is well ventilated and not contaminated with exhaust or other toxic or flammable gases.

 **WARNING**

Always use the "buddy system" when working in High Voltage areas.

 **WARNING**

Ensure that the work area is free from falling obstacle hazards or liquid spray hazards which can short out electrical components if they fall into the battery enclosure.

 **WARNING**

To avoid serious personal injury, remove all metal objects (necklaces, etc.) that may accidentally make contact with the inside of the battery enclosure.

 **WARNING**

All wiring in the tub carries high voltage, including the small signal wiring. To avoid serious personal injury, never touch any wires or wiring connections within the battery enclosure with exposed hands.

 **WARNING**

Even with the bus turned OFF, there is a potential for a thermal event, possibly resulting in a fire.

Mitigation Measures

 **NOTE**

For more information, please contact your local BAE Systems-certified service technician.

Suggested mitigation measures to reduce potential/probability of double-ended ground faults and possible Li-Ion ESS thermal events:

1. Whenever a BAE Systems-certified technician is servicing an ESS (e.g., replacing a module):

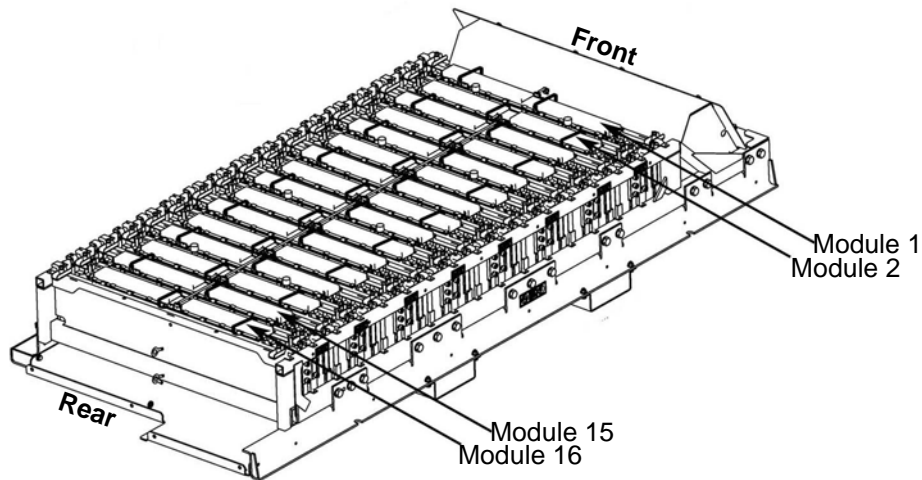


Figure 1-1

 **NOTE**

Instructions to perform this procedure will be provided to BAE Systems-certified service personnel.

- a. Remove modules 1, 2, 15, and 16 (**see Figure 1-1**) to clean the ESS frame module support rails.
 - b. Clean the bottom surface of each of the removed modules.
2. Maintenance personnel should monitor the CHECK HEV light on the driver's front dash panel. If illuminated, check for active fault(s).

 **NOTE**

Instructions to perform this procedure will be provided to BAE Systems-certified service personnel.

- If an **A045** fault is active, the bus should be moved out of service and a BAE Systems-certified technician should complete the ESS inspection and cleaning process.
3. When not in service, park buses in an area protected from adverse weather if possible.

 **WARNING**

Do not shut the engine down using the battery isolator switch. Substantial damage to the vehicles electrical system will occur.

CAUTION !

Extended bus idle times outside the garage have been implicated in previous thermal events.

4. Drivers and service personnel should monitor extended bus idle times outside the garage and shut the vehicle down when appropriate.
5. Suspend/shut-off the top-of-bus spray hose in the bus wash lines, thus reducing the amount of water/moisture that can work its way through the ESS environmental cover center seam and the ESS top cover seams.
6. Install the BAE Systems' Bundle **L3.1.1** software (S/W version R8.1.2) on any bus being serviced.
- BAE Systems' Bundle **L3.1.1** features the addition of the **A161** fault - "Heater Contactor Stuck Off" - which annunciates when the Heater Contactor is noted as open.
 - This condition is typically due first to Shutter Solenoid failure, which then causes failure at the BMS of the Heater Contactor circuit, thus ESS side louvers remain open during cold weather, inclement operating conditions.