INSTRUCTION TO SERVICE

ITS61623	April 6, 2026
SECTION:	260 – Battery System
SUBJECT:	Replace XALT batteries with ABS batteries XE40 ELFA2 5 str
ISSUE:	Freudenberg Gen 3 batteries (XMOD125E, XMOD123E, XMP123E) recall.
SUMMARY:	Replace XALT ESS batteries with ABS ESS batteries, change coolant and rework existing harness.

ITS61623

Ref. NHTSA Recall No.	Ref. Transport Canada Recall No.
25V631	2025-495

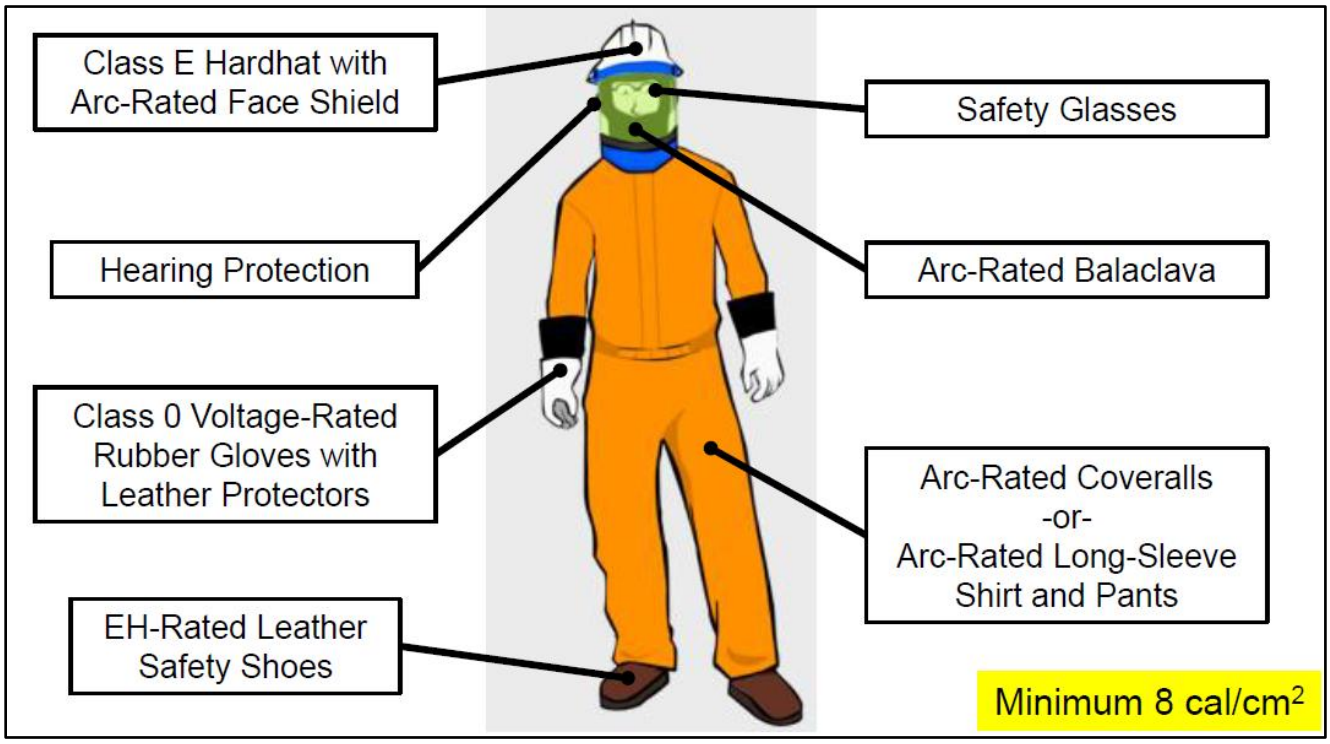
THIS ITS DOCUMENT SHOULD BE RETAINED AND REFERRED TO FOR FUTURE MAINTENANCE UNTIL THE NEW FLYER PARTS AND/OR SERVICE MANUAL IS UPDATED TO REFLECT WORK DONE AS A RESULT OF THIS DOCUMENT. ENSURE THAT THIS DOCUMENT IS AVAILABLE FOR PARTS AND MAINTENANCE STAFF GOING FORWARD.

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SAFETY:

When exposed to high voltage, NFPA 70E Class 2 (8 Cal/cm^2) PPE is required. Inspect the provided PPE for damage or defects prior to use. See below for the required equipment. Never work with high voltage alone. Always have another qualified electrician in the area. Use 1000V insulated tools wherever possible, when voltage is present. CAT 0 1000V gloves and leather liners should be worn if there are exposed terminals.

CAT 2 PPE



Arc Flash Boundaries

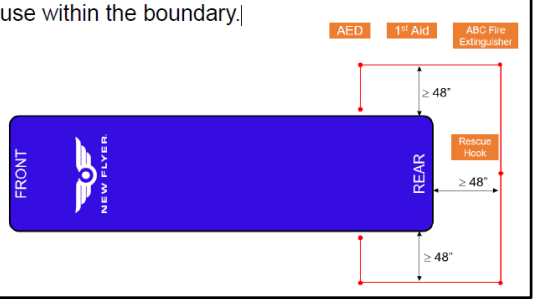
- Barricades must be red.
- Barricades must say "HIGH VOLTAGE" or "ARC FLASH."
- Barricades must instruct unqualified people of how to approach boundary such as "KEEP OUT" or "DO NOT ENTER."



- Boundaries must be established when working on energized coaches or HV systems.
- Barricades must be 4' (48") away from exposed energized HV components.
- Barricades must be at least 48" tall to ensure visibility.
- Ensure AED, 1st Aid Kit and Fire Extinguisher are in the area in case of Emergency.
- Rescue hook to be available for use within the boundary.

DANGER

Only trained, qualified persons in Cat 2 PPE (8 cal/cm²) are allowed inside of boundary!



PROCEDURE:

1. Set park brake and chock wheels.
2. Use the front suspension kneeling feature to kneel the front suspension to the bump stops, this will make the bus more stable when the ESS units are being removed and replaced.
3. Lower the rear suspension to the bump stops.
   - On vehicles with rear suspension kneeling, use the kneeling feature to lower the suspension to the bump stops.
   - On vehicles with Shipping Mode this feature can be used to lower the suspensions to the bump stops.
   - Alternatively, the levelling valves can be used to exhaust the air from the rear air springs. Place Jack stands under the vehicle frame following the instructions in the Service Manual. Disconnect the levelling valve links from the suspension beam brackets (do not disturb adjustment). Pull the levelling valve lever down to drain air from the air springs.
4. Drain the air from the rest of the air system.
5. Turn the main battery disconnect switch to the “OFF” position.
6. Turn the HV interlock switch to the “OFF Position.
7. Tag and lockout the switch.



Figure 1: Main Battery & HV Disconnect Switches

8. Verify that the HV electrical system is not live by performing De-Energizing Procedure level 1, 2 and 3 outlined in the New Flyer Service Manual.
9. Save the removed MSD plugs (NF PN: 805480) for the new ABS batteries from De-Energizing Procedure.



Figure 2: MSD Plug

ESS Cooling System Drain

10. Open the curbside rear fusebox access door and locate the dry break coolant fill connector next to the curbside corner of the rear bumper.
11. Place a large container capable of holding at least 15 gallons under the dry break connector.
12. Remove the dry break connector from the vertical blue silicone hose and set the assembly and hose clamp aside.
13. Open the quarter turn valve at the base of the clear coolant tube next to the blue silicone hose and allow the coolant to drain into the catch container.

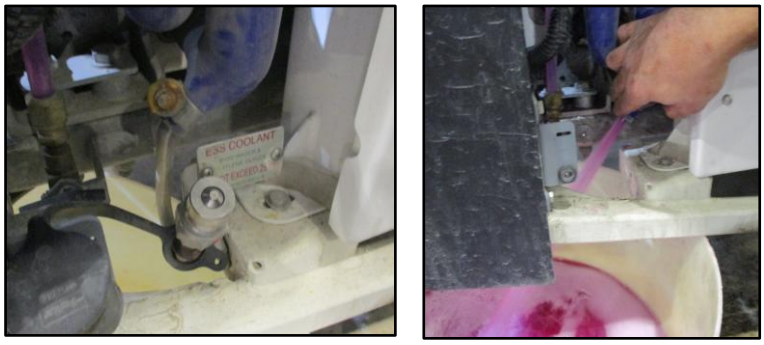


Figure 3: Dry Break Connector & Quarter Turn Valve

14. Access the roof of the bus, open the curbside access cover on the BTMS (Battery Thermal Management System) box and locate the cooling system pressure cap.

    Note: The cooling system is under pressure and contains hot fluids that can spill or spray and cause serious scalding injuries. Allow an appropriate amount of time for the cooling system to cool down below 120°F (49°C) before working on the cooling system unless otherwise noted.
15. Ensure the pressure relief cap on the coolant fill neck is tight and the pressure relief lever on the cap is closed. The BTMS cover must be removed and the 4 psi pressure relief cap replaced with the high pressure test rad cap (NF PN: 590112).

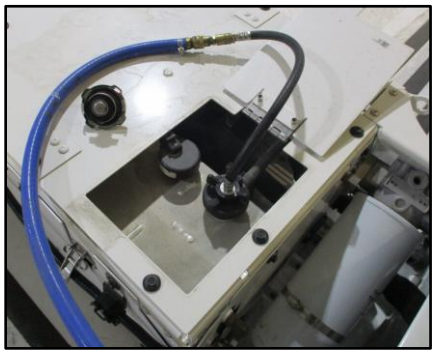


Figure 4: BTMS with High Pressure Rated Cap

16. Connect the pressure test cap to an air supply regulated to 15 Psi maximum.
17. Collect the extra coolant in the catch bucket at the curbside rear of the bus. When coolant stops draining, the 15 psi air can be disconnected.

Rear ESS Removal

18. Mark the hinges where they attach to the rear compartment door to aid in alignment when the door is reinstalled later, then disconnect the door struts and remove the door. Store the door in a safe location.

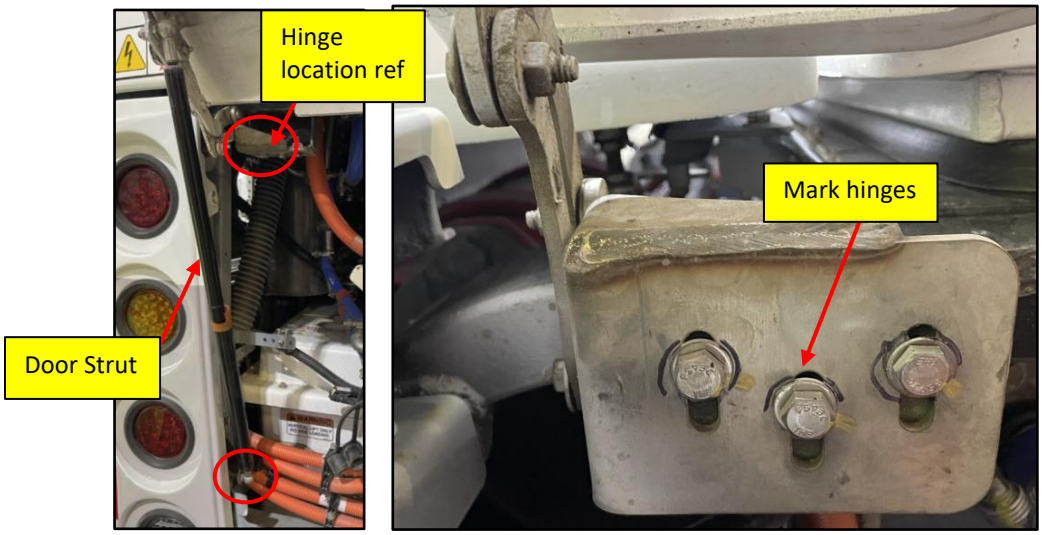


Figure 5a & 5b: Alignment Marks on Rear Door Hinges

19. Unbolt the rear bumper. Note the number and location of any alignment shim that may be present to aid in re-installation later. Remove the bumper and set it aside.
20. Disconnect the wiring connectors for the taillights and any hose clamps or tie straps connected to the corner pillar structure behind the rear lights next to the rear door opening. Remove the nut and bolt at the top and bottom of the pillar structure and carefully free the structure and taillight surrounds from the vehicle. Set them aside in a safe location.



Figure 6a & 6b: Pillar Structure Attachment Points

21. Disconnect the HVAC drain lines that are attached to the rear vertical struts at three points. Set the hardware aside for reuse and tuck the HVAC drains away above the HV box.
22. Disconnect the bracket for the HV cables attached to the curb side vertical strut.



Figure 7a & 7b: Rear Struts, HVAC Drains & HV Cable Mounts

23. Remove the five bolts that secure motor / inverter coolant fill panel. Remove the two twin clamps that secure the HV cables above and behind the fill panel and set them aside. Disconnect the electrical connectors to the fill panel lights and flip the panel upwards out of the way. It is not necessary to disconnect the motor / inverter fill lines.

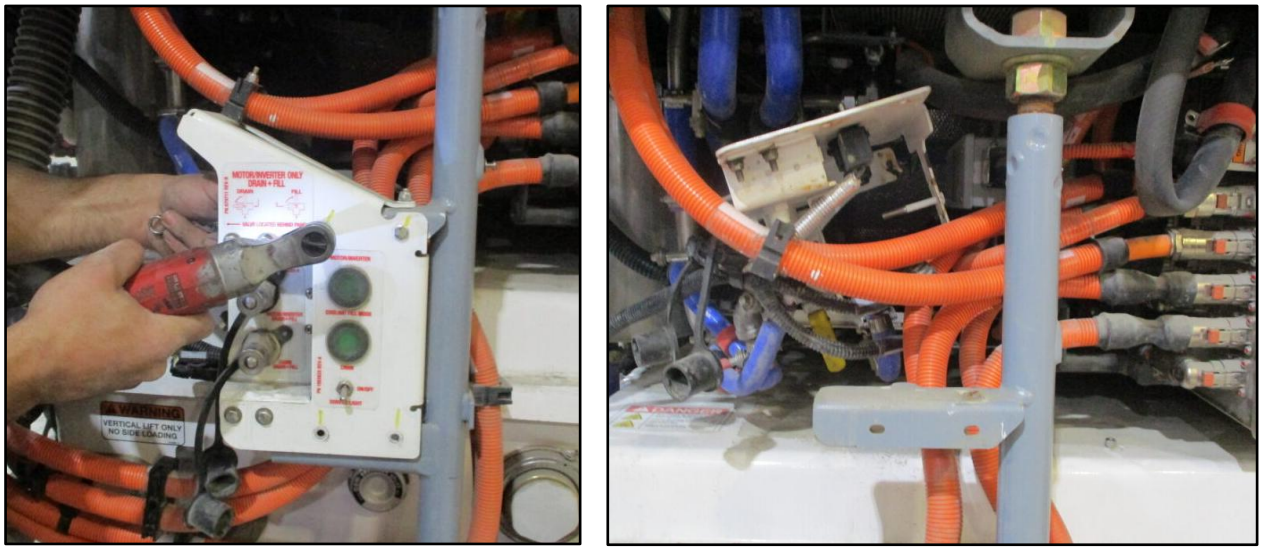


Figure 8a & 8b: Motor/Inverter Coolant Fill Panel

24. Remove the upper and lower nuts on the two vertical struts at the rear of the bus using a socket and large breaker bar.



Figure 9: Loosening Strut Hardware

25. Un-plug the two HV cables on the street side of the upper and lower ESS units. Apply tape to the cable connector ends and connection points on the ESSs to prevent contamination.
26. Un-plug the two LV cables on the curb side of the upper and lower ESS units. Apply tape to the cable connector ends and connection points on the ESSs to prevent contamination.

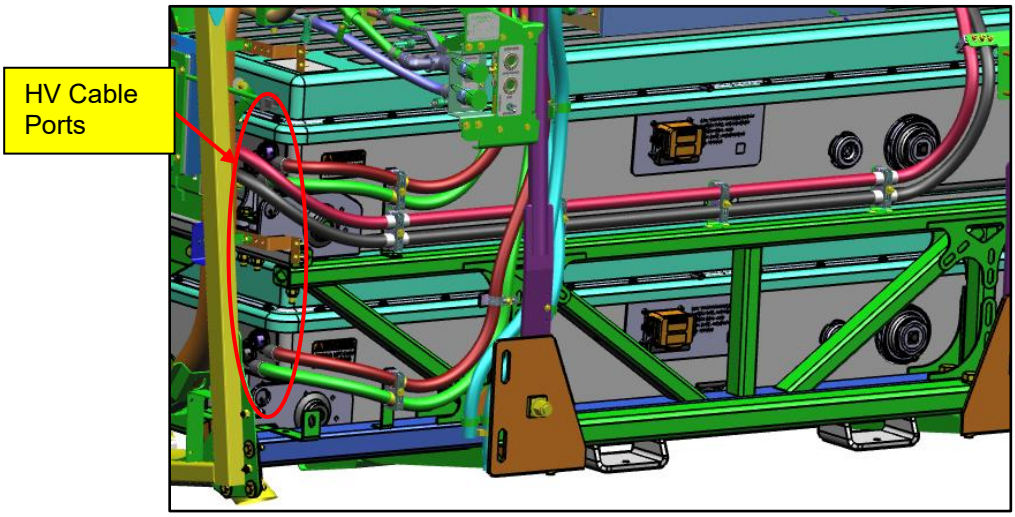


Figure 10: Loosening Strut Hardware

27. Locate the charger box on the streetside rear of the bus. Disconnect the HV cables and remove the bolts that attach the charger box to the ESS cradle. Let the Charger box hang.

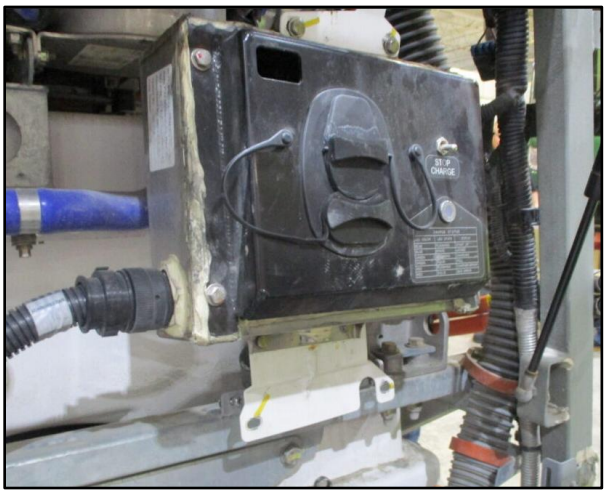


Figure 11: Charger Box Mounting Hardware & Cable Connection

28. Disconnect the coolant lines on the curbside of the ESS units and collect any coolant that spills in the catch bucket at the curbside rear of the vehicle.

    Note: Inspect coolant hoses for any damage or foreign material. Ensure no orifice retained on hoses.

29. Install coolant port caps (NF PN: 6701871) on ESS to prevent leaks.
30. Install plugs or cover all the ESS hose connections to prevent dirt and debris entering the cooling system.

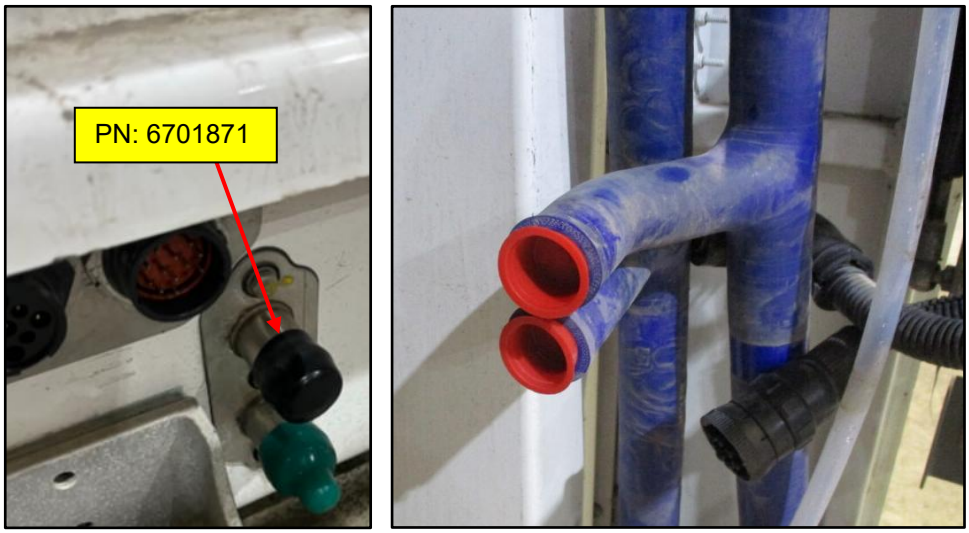


Figure 12: Plugged Coolant Hoses

31. Remove the bolts of the ESS cradle cross member at each rear lower corner of the bus chassis, remove the four bolts at each side and set the hardware aside.



Figure 13: ESS Cradle Cross Member Hardware Removal

32. Disconnect the four HV cables that run from the ESS units to the streetside of the High Voltage box.



Figure 14: HV Cables Disconnected on Streetside of HV Box

33. If applicable, disconnect the two HV cables that run from the ESS units to the curbside of the High Voltage box. Cover the connectors with bags to prevent corrosion.



Figure 15: HV Cables Disconnected on Curbside of HV Box

34. Lift the bus to a reasonable height for rear rack assembly removal. Place jack stands under the frame members near the lifting pads.

    Note: Do not crawl under the bus unless jack stands have been installed.

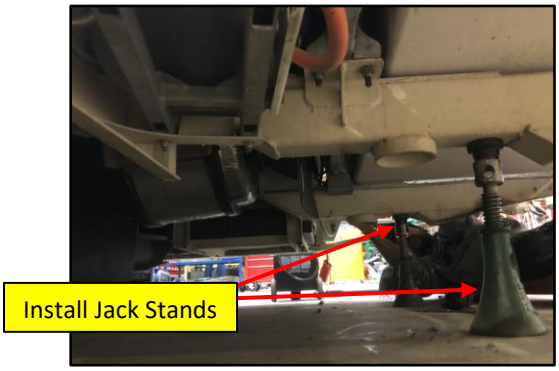


Figure 16: ESS Frame Member Jack Stand Location Reference

35. Remove the four bolts at the forward end of the ESS rack near the jacking points.

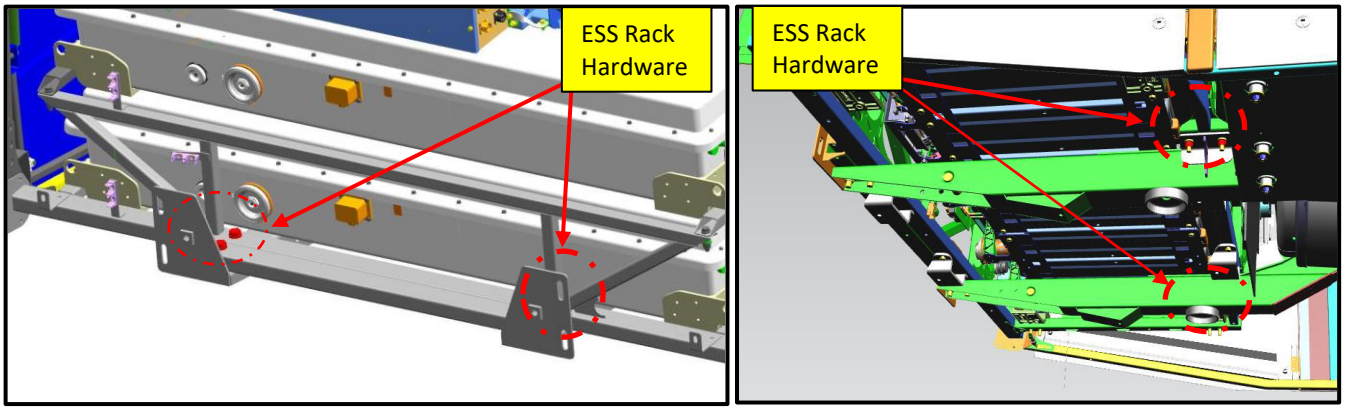


Figure 17: ESS Pack Assembly Mounting Hardware Location Reference

36. Position an appropriately sized fork-lift truck behind the bus and carefully insert the forks into the fork brackets on the underside of the ESS cradle. Secure the cradle to the forklift with two large clamps.
    Note: There is some compressive force exerted on the sides of the ESS cradle by the bus frame. The clamps will prevent the forks pulling out from under the cradle during the removal procedure.



Figure 18: ESS Cradle Secured to Forklift

37. Lift the ESS slightly and slowly remove it from the rear of the vehicle taking care to ensure that none of the components snag on each other and looking out for anything that may not have been disconnected.
38. Place the ESS rear rack assembly on the floor or area for ESS enclosure removal.

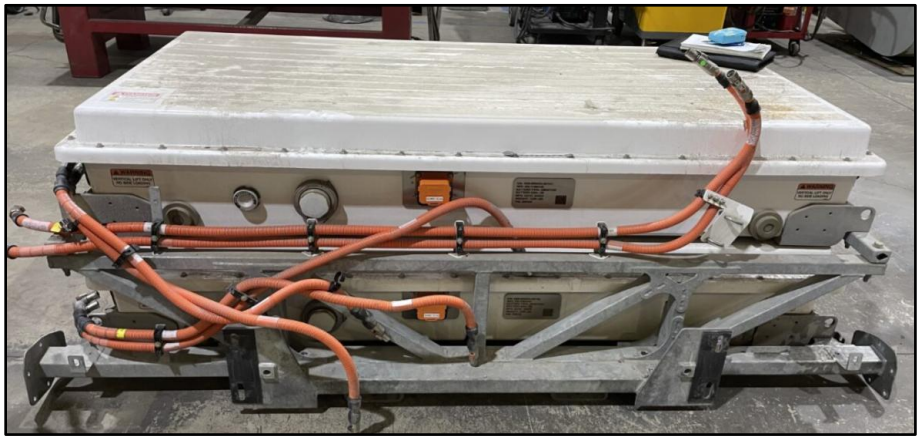


Figure 19: ESS Cradle on the Floor

39. Disconnect electrical connections and ground straps. Cover all electrical connectors.
40. Remove the eight bolts that secure each ESS unit to the ESS rack and set the hardware aside.



Figure 20: ESS Rack Assembly Side View

41. Position the boom over the rear top ESS unit to be lifted.
42. Attach the boom to the lift points at each corner of ESS unit.
43. Carefully lift the ESS from the rack and place it on the floor.



Figure 21: Lifting ESS

44. To remove the bottom ESS from the rack, the upper rear rack assembly must be removed by removing all highlighted hardware.

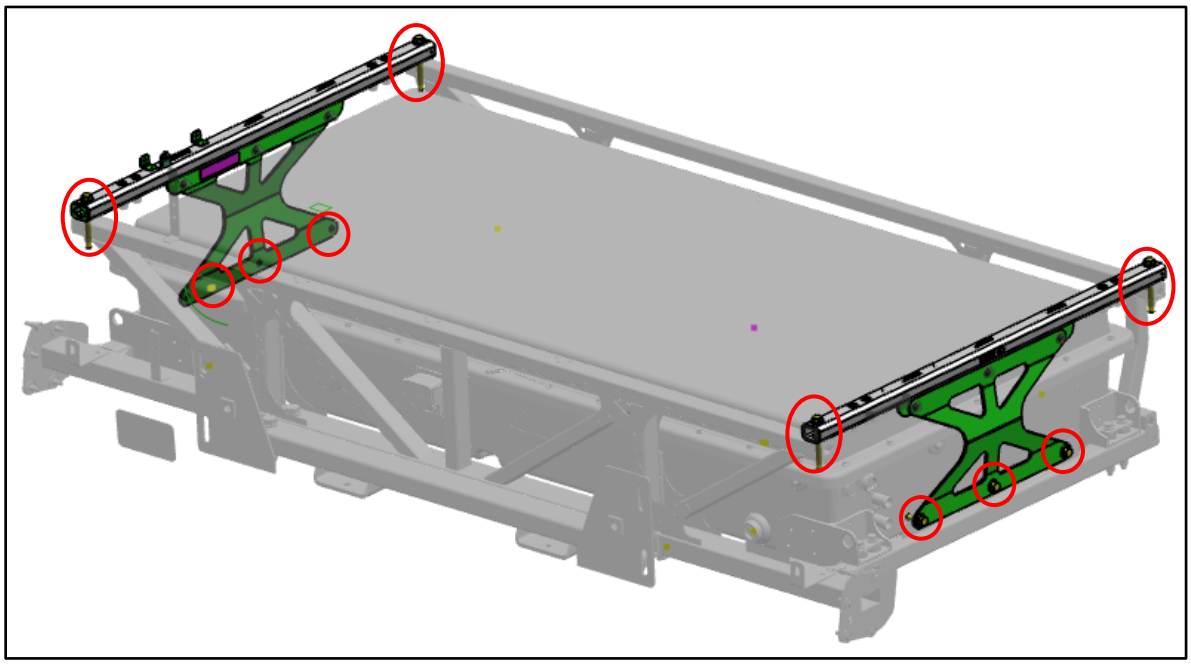




Figure 22a & 22b: Upper Rear Rack Removal

45. Set the upper rear upper rack assemblies and mounting hardware aside for reinstallation late.



Figure 23: Rear Upper Rack Assemblies

46. Position the boom over the rear bottom ESS unit to be lifted.
47. Attach the boom to the lift points at each corner of ESS unit.
48. Carefully lift the ESS from the rack and place it on the floor or the appropriate storage rack.

    Note: XALT ESS Modules and BDU are to be harvested using ITS-61522.

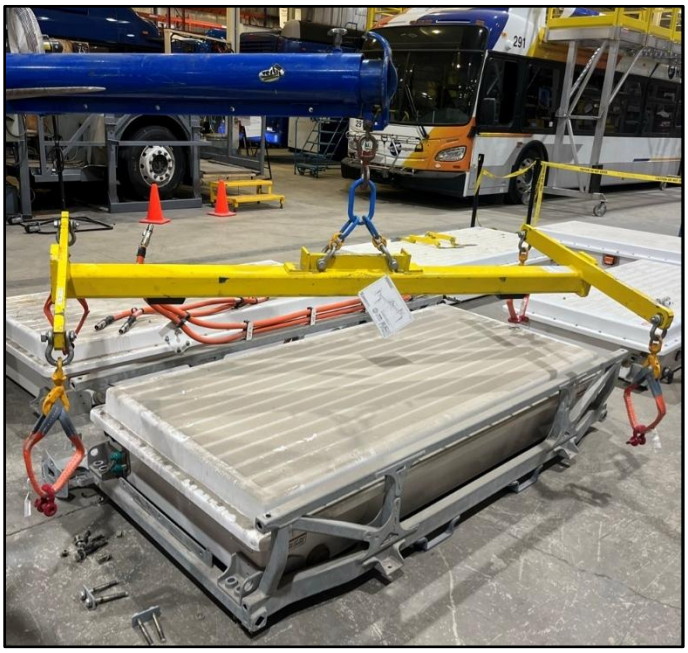


Figure 24: Bottom ESS Removal from Rear Rack

Open Sidescreen Access Panels

49. Access the roof of the bus. Remove and set aside the bolts that secure the roof side panels to the side panel mounting towers and pivot the panels to the open service position. Once the panels are open reposition the scaffolding if necessary.

    WARNING: Working on the roof of the bus requires appropriate scaffolding and/or fall protection harnesses. When the roof side panels are open, take care to step over the panels from the scaffold to the roof of the bus. Do not step on the open side panel, they will not support your weight and a fall could result.

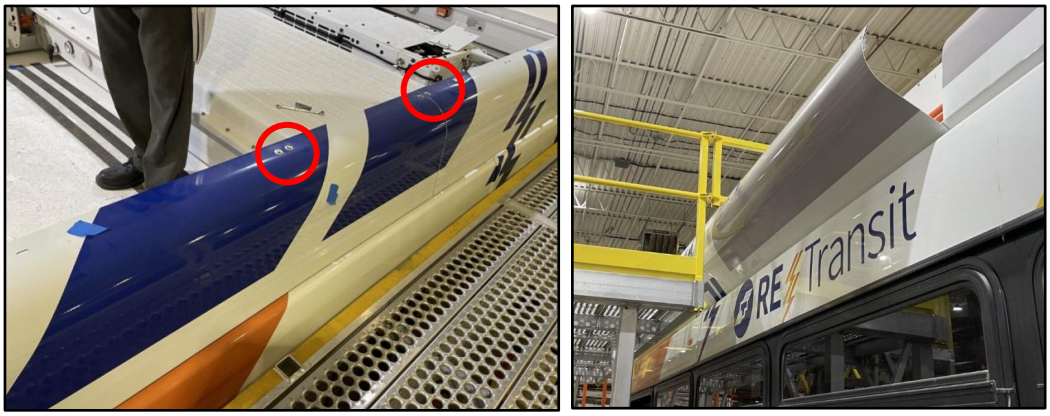


Figure 25: Sidescreen Access Panels

Overhead Charge Rail Removal (As Required)

50. Remove HV charge rail as required. Move to following page if not required. HV cable clamps from street side of charge rail and disconnect HV cable quick disconnects from charge box. Secure HV cables out of the way for charge rail assembly removal.
51. Disconnect WLAN antenna from bus harness. Secure WLAN harness for charge rail assembly removal.

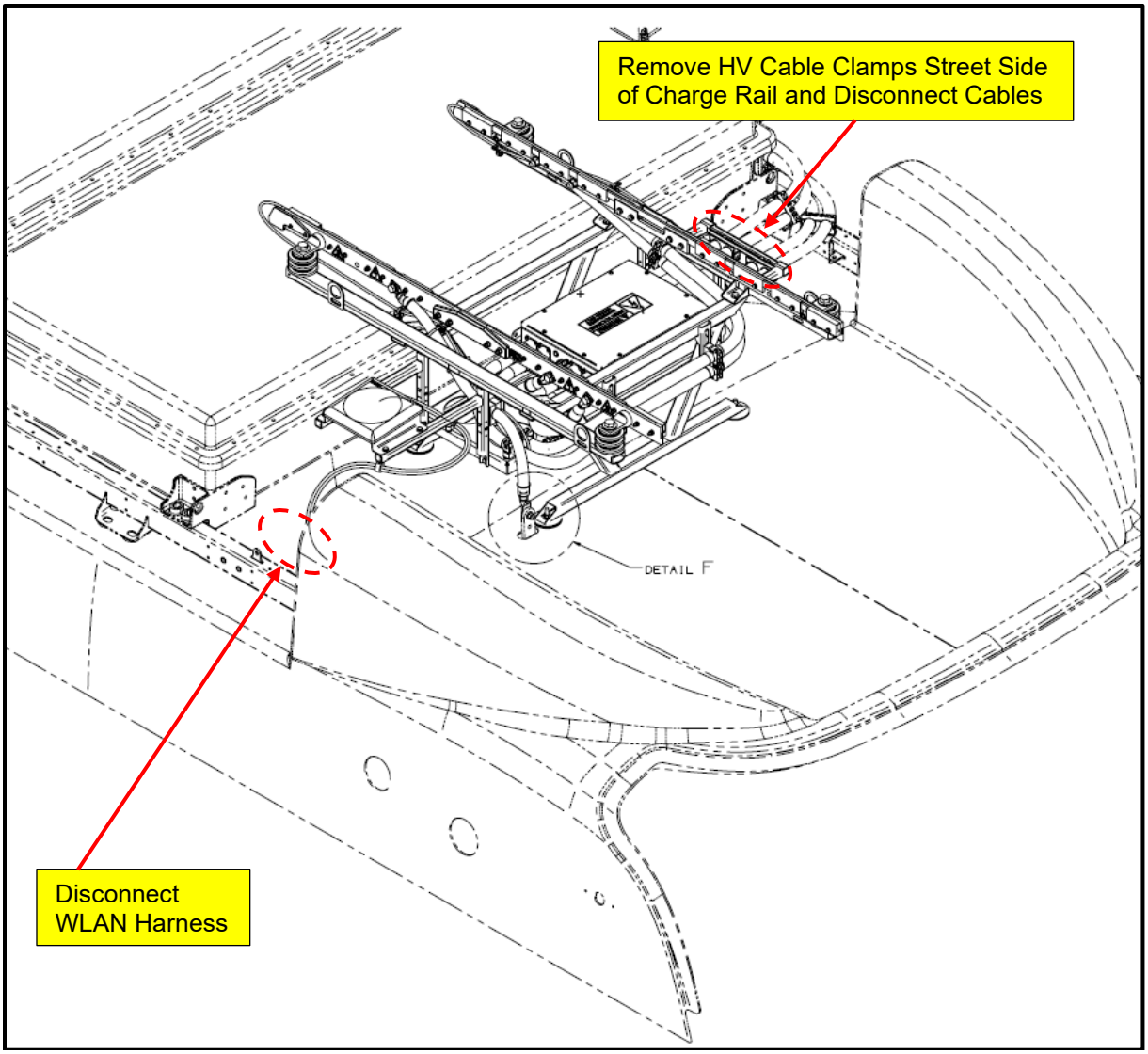


Figure 26a: Charge Rail Removal Location Reference

52. Remove curb side and street side charge rail heater clamps and wiring securement and set clamps and hardware aside for re-installation.
53. Disconnect the curb side and street side heater wiring from charge rails and set hardware aside for re-installation.
54. Remove the low voltage harness connections and clamps to the DC charge box and set camps and hardware aside for re-installation.
55. Disconnect the temp sensor from under the DC charge rail box on the street side.
56. Secure the harnesses disconnected out of the way for charge rail assembly removal.

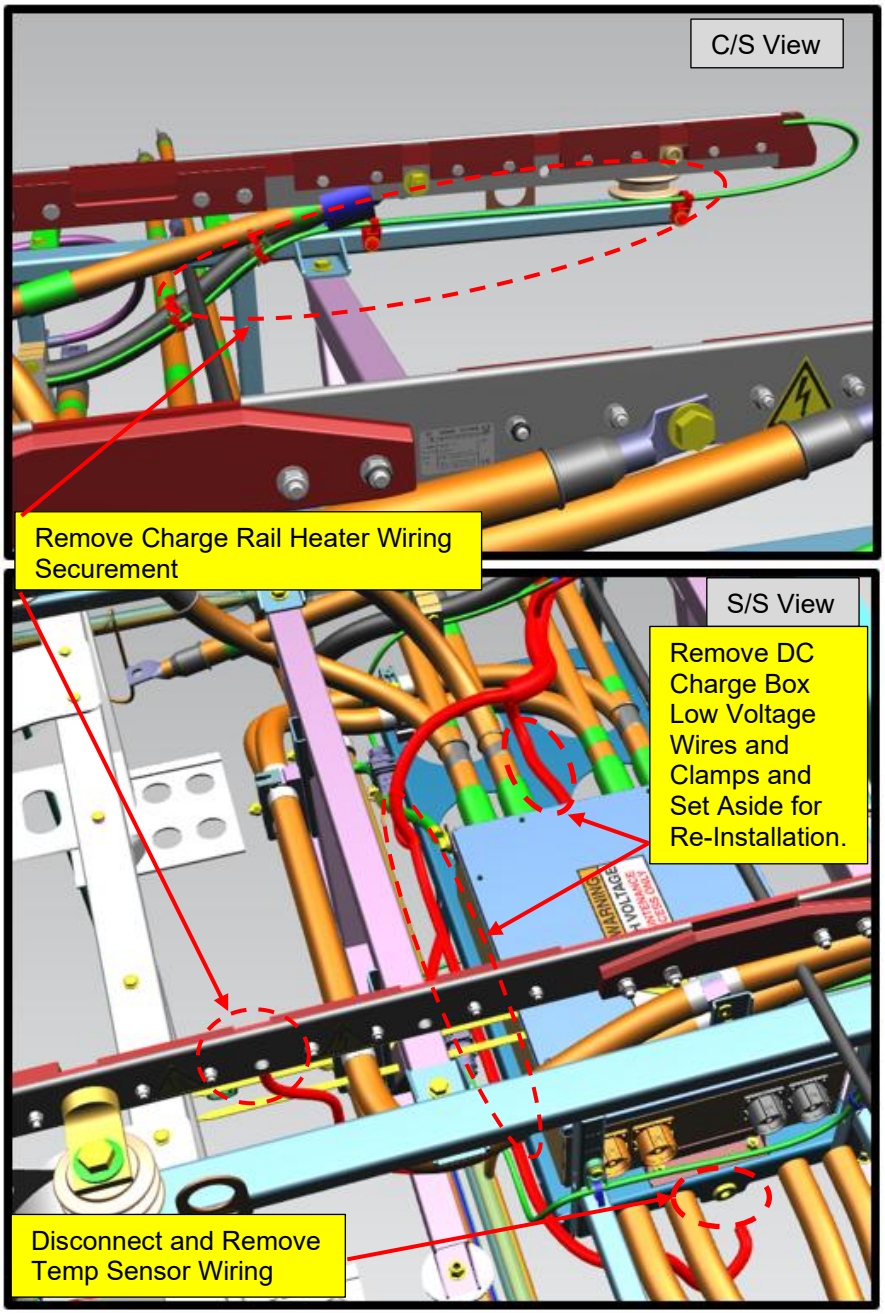


Figure 26b: Charge Rail Removal Location Reference

57. Disconnect the charge rail ground cable to the body ground stud and set mounting hardware aside for re-installation.
58. Disconnect the charge rail box ground to the body ground stud and set mounting hardware aside for re-installation.
59. Remove the charge rail assembly mounting hardware to the roof structure and set hardware aside for re-installation.
60. Connect an appropriate lifting device to the charge rail assembly and remove the assembly.

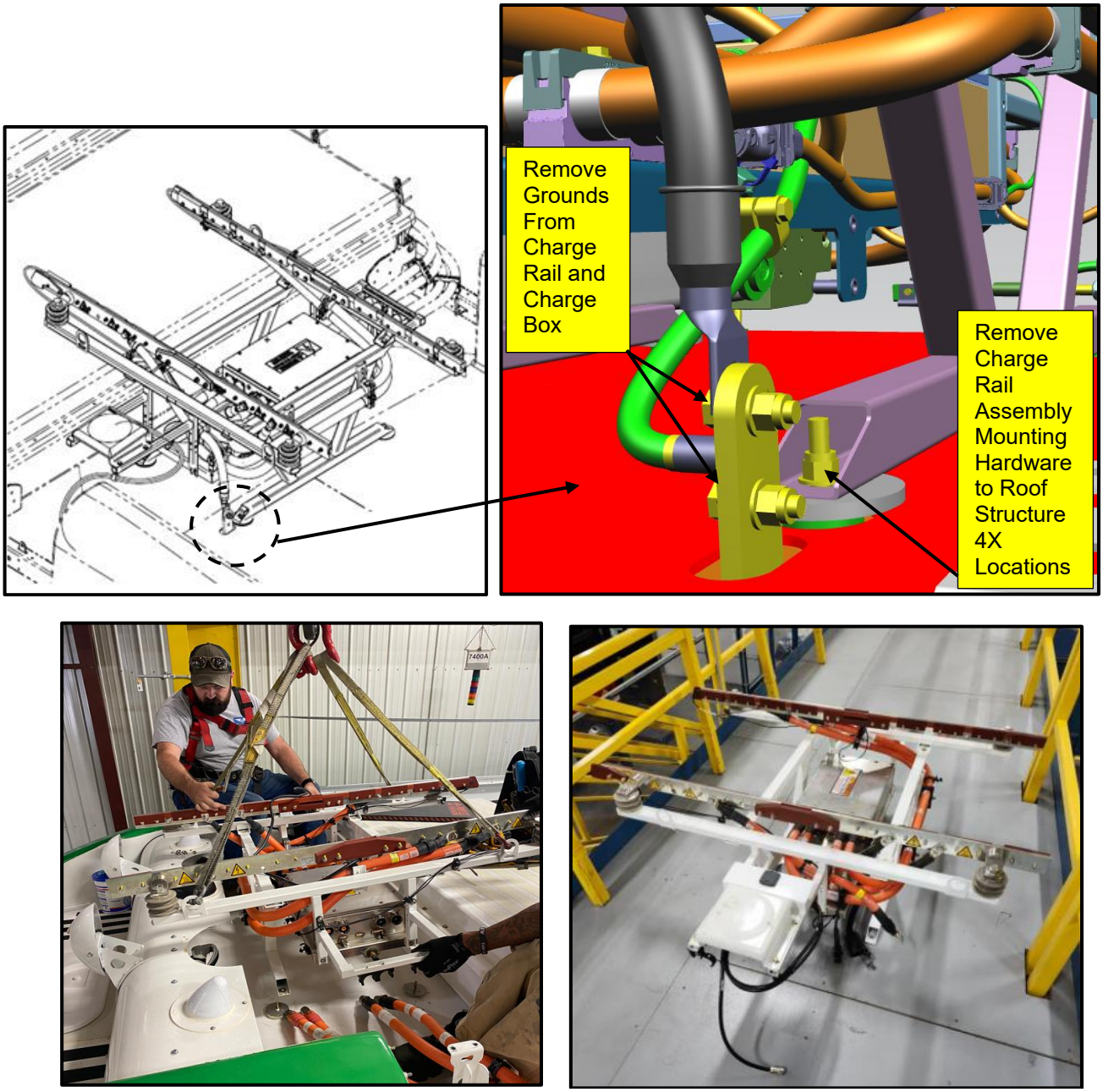


Figure 26c: Charge Rail Removal Location Reference

Removal of the Rooftop ESS Units

61. Access the roof of the bus using appropriate scaffolding and fall protection safety equipment.
62. Disconnect the two High Voltage cables on the streetside of each ESS unit on the roof.



Figure 27: HV Cables Disconnected on Streetside of Rooftop ESS Enclosure

63. Disconnect the Low Voltage cables on the curbside of each ESS unit on the roof.



Figure 28: LV Cables Disconnected on Curbside of Rooftop ESS Enclosure

64. Place plastic bags over all the electrical connectors to ensure that they remain clean and dry.



Figure 29a & 29b: Bagged Electrical Connectors

65. Disconnect the ground strap on the streetside of each ESS unit near the HV connectors.



Figure 30: Ground Cable Disconnected on Streetside of Rooftop ESS Enclosure

66. Disconnect the twin clamps near the coolant hose connections on the curbside of each rooftop ESS unit.

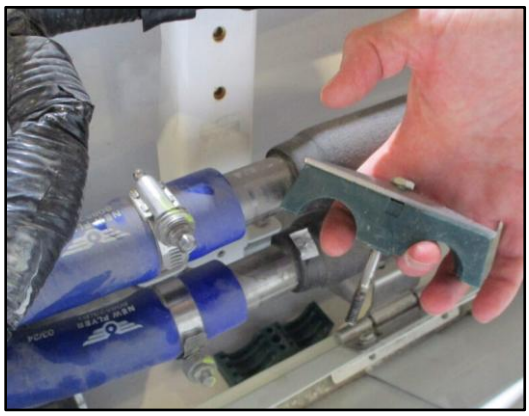


Figure 31: Twin Clamps Disconnected on Curbside of Rooftop ESS Enclosure

67. Loosen the hose clamp at the coolant hose connections at each ESS and remove the hose. Plug the coolant opening with end caps to prevent spillage of any coolant that may remain trapped in the ESS.

    Note: Inspect coolant hoses for any damage or foreign material. Ensure no orifices retained on hoses.

68. Remove and discard the orifices installed on the ESS coolant supply (lower port).

    Note: Refer to step 139 for the correct orifice size and location

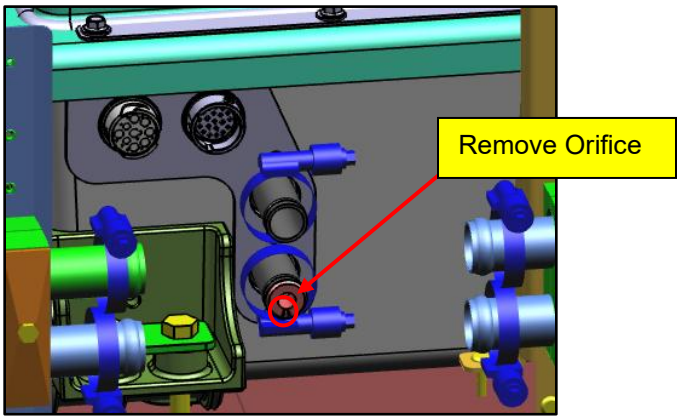


Figure 32: Reducer Orifice on ESS Pack Supply Coolant Port

69. Install caps (NF PN: 6701871 or any caps available) on ESS coolant ports.
70. Install plugs or cover all the roof ESS hose connections to prevent dirt and debris entering the cooling system.

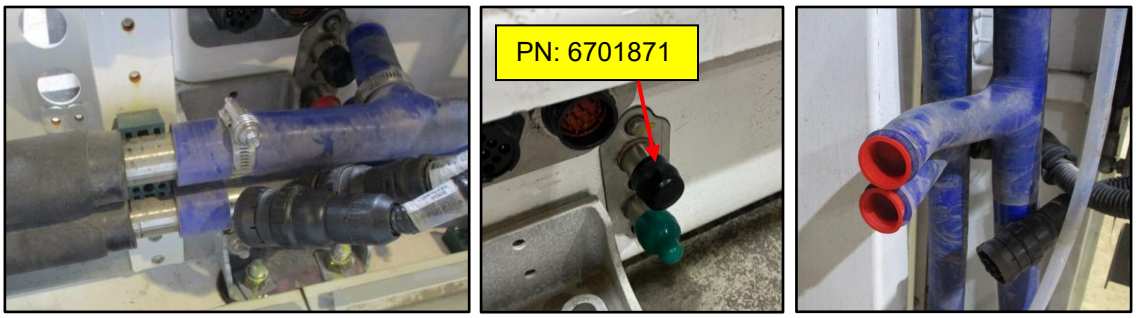


Figure 33a, 33b & 33c: Coolant Lines Disconnected on Curbside of Rooftop ESS Enclosure

71. Remove the eight bolts that secure each ESS unit to the ESS rack. Discard the existing bolts and ESS support plates as new hardware will be provided.

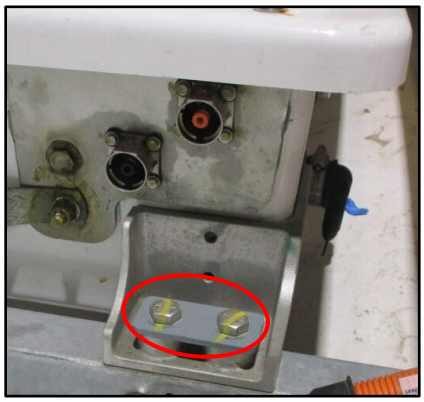


Figure 34: Mounting Hardware

72. Prior to removing the scaffolding on the scaffold on one side of the bus install safety strap hooks on the ESS rack to allow for the connection of a fall protection safety harness.

    Note: Once the scaffold is removed on one side, a fall protection harness must be worn when working on the roof of the bus.

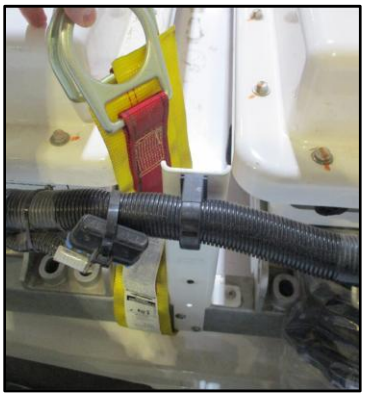


Figure 35: Safety Hook Attached to ESS Rooftop Rail

73. Position an appropriately rated forklift truck and lifting boom next to the bus.
    - Position the boom over the ESS unit to be lifted.
    - Attach the boom to the lift points at each corner of ESS unit.
    - Carefully lift the ESS from the roof of the bus and place it on the floor.



Figure 36: Lifting the ESS from Rooftop

74. Remove the rest of the rooftop ESS units with the same procedure.

ESS Coolant Loop Flush

Remove and rinse the existing BTMS Coolant Filter. Reinstall rinsed filter for flushing.

75. Install U-Shaped loop ESS coolant ports.

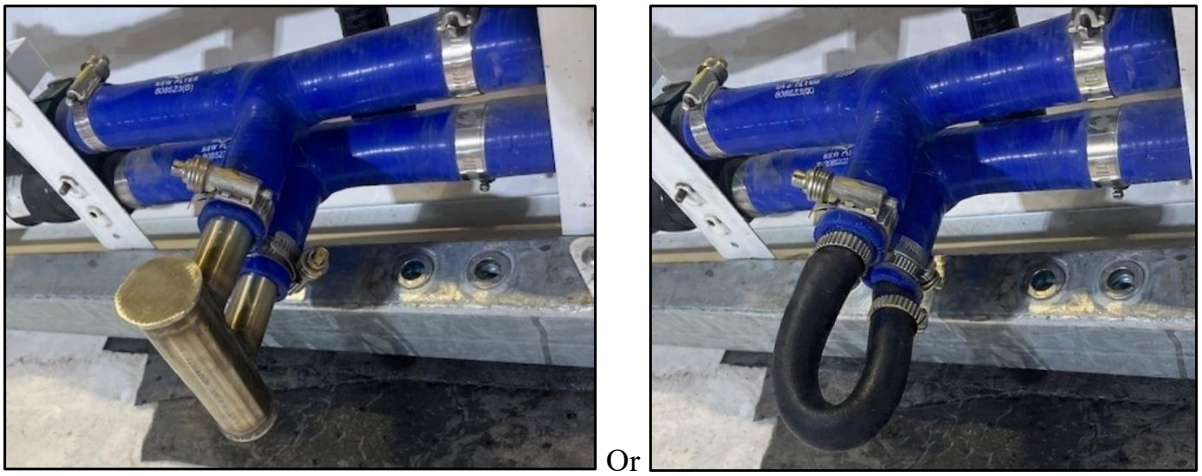


Figure 37: Install U-Shaped Plugs and Clamp on Coolant Hose

76. Connect a 90-degree hose with drain valve to the return coolant hose.
77. Place a clean bucket under the ¼ turn vent valve near the pressure fill location. Open the ¼ turn vent valve attached to the clear vent line.



Figure 38: ESS Coolant Drain/Flush Setup

78. Connect hoses on the rooftop vent valves and direct hoses into empty containers. Keep the valves closed.

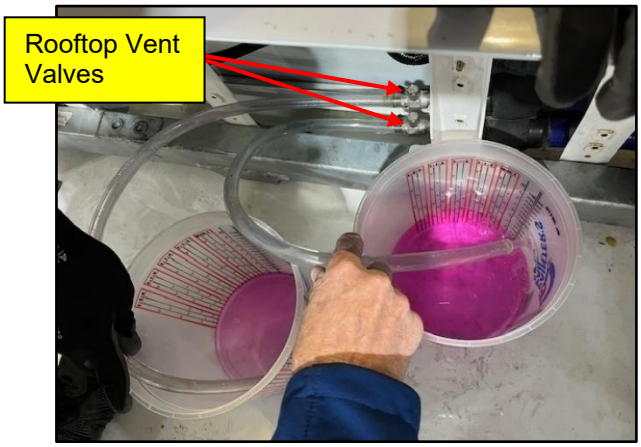


Figure 39: Drain/Flush from Rooftop Vent Valves

79. Connect pressure fill hose to the coupler located at the bottom curbside rear corner.



Figure 40: Pressure Fill Hose to the Coupler

80. Fill the system with distilled water until,
    - The coolant level indicator indicates FULL.
    - Steady stream of water comes out the clear vent line into the bucket.
    - Steady stream of water comes out the rooftop drain valves. Bottom vent valve may need to be closed.
81. Connect a battery charger to the 12/24V batteries.

82. Switch the 12/24V Battery Disconnect switch to ON. Set the MRS to DAY-RUN.
83. Turn ON the BTMS Circulation Mode for 10 minutes.

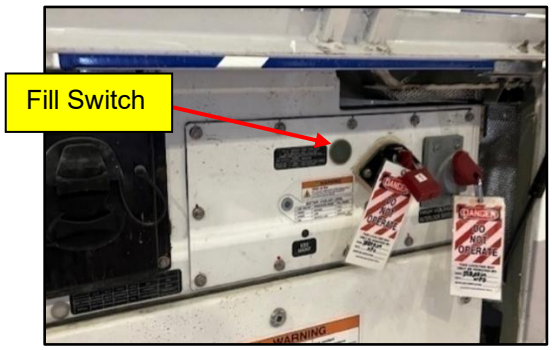


Figure 41: 12/24V Battery Disconnect Switch On

84. Inspect sight glass and ensure fluid shows clear.

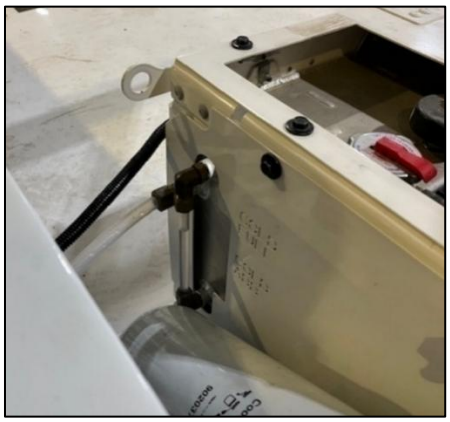


Figure 42: BTMS Sight Glass

85. Drain distilled water from the system. Ensure BTMS Fill/Circulation mode is turned off when draining.
    - Drain via return drain hose with all vent valves closed.
    - Drain via rooftop vent valves with return drain valve closed.
86. Inspect the color of water coming out of the system and ensure it's clear. Otherwise, pump more distilled water in until the system is clear then fully drain the system again.
87. Replace the existing BTMS coolant filter with new coolant filter (NF PN: 902037).
    - Place a suitable container beneath the coolant filter.
    - Use a filter wrench to remove the spin-on coolant filter.
    - To prevent thread damage when installing new filter, fully lubricate the entire thread and o-ring surfaces with P37 Molykote (NF PN: 901706), and install by hand.
    - ½ turn max after filter starts to seat. Do not overtighten.
88. Perform cooling system flush for Cabin loop and Motor/Inverter loop per Appendix A.

BTMS Rework (Ref: EAD-030370)

89. Gain access to the BTMS filter side on the rooftop of the bus.
90. Secure surge tank to BTMS as shown below using supplied hardware from BTMS surge tank kit (NF PN: 1163123) and existing mounting holes on BTMS unit. Torque hardware to 10-12 Nm.

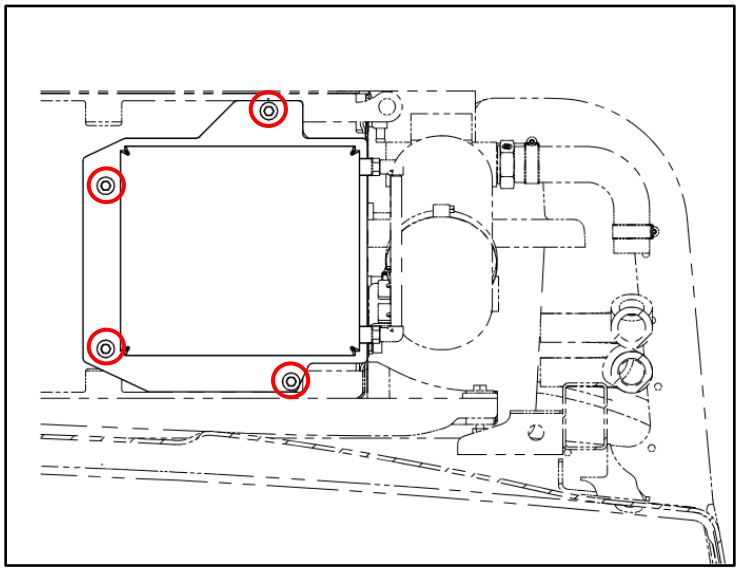


Figure 43: BTMS Surge Tank Mounting Pattern

91. Remove BTMS sight glass tube and reinstall into ports on surge tank. Trim hose supplied in kit into two 3" sections and install hose sections and compression fittings in kit to join surge tank plumbing to BTMS. Torque all compression fittings to 18 Nm.

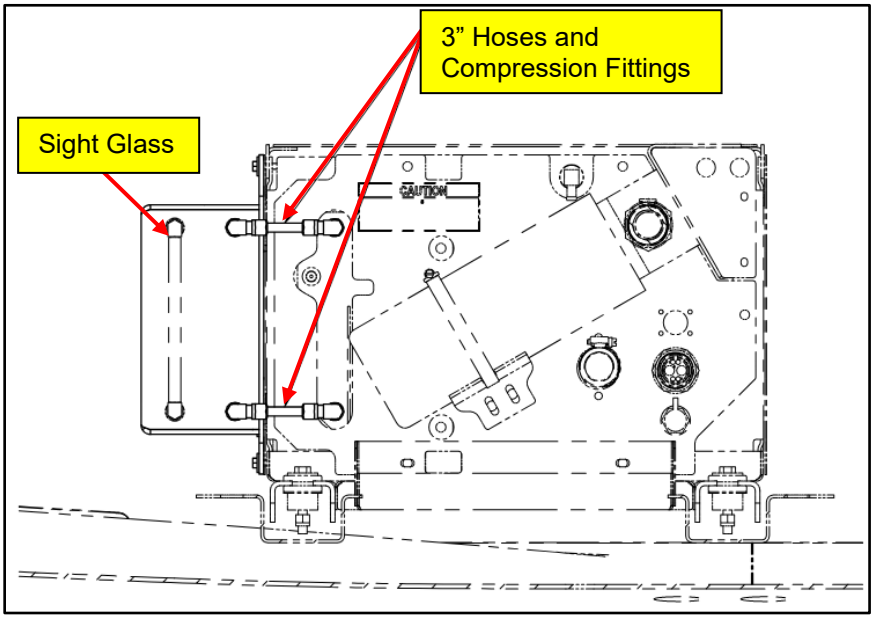


Figure 44: Sight Glass Relocation and Plumbing of BTMS Rework Reference

Interior Harness Rework (Ref: EAD-030544)

92. Gain access to the interior side of the curbside pothead plate by removing the hardware. Set aside for reinstallation later. Clean pothead plate surface with sika cleaner (NF PN: 005702). Discard existing gasket.
93. Remove side screen hinge as needed to supplement pothead removal.

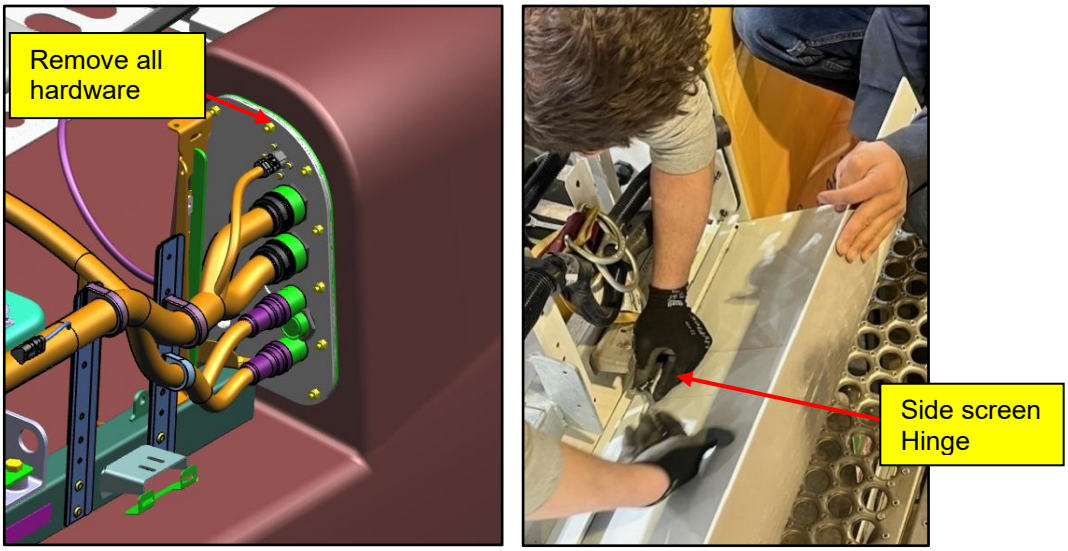


Figure 45a & 45b: Curbside Pothead Plate Removal

94. Disconnect existing connector XJRFRHFRT2-SHR. Secure and cap using (NF PN: 182470).

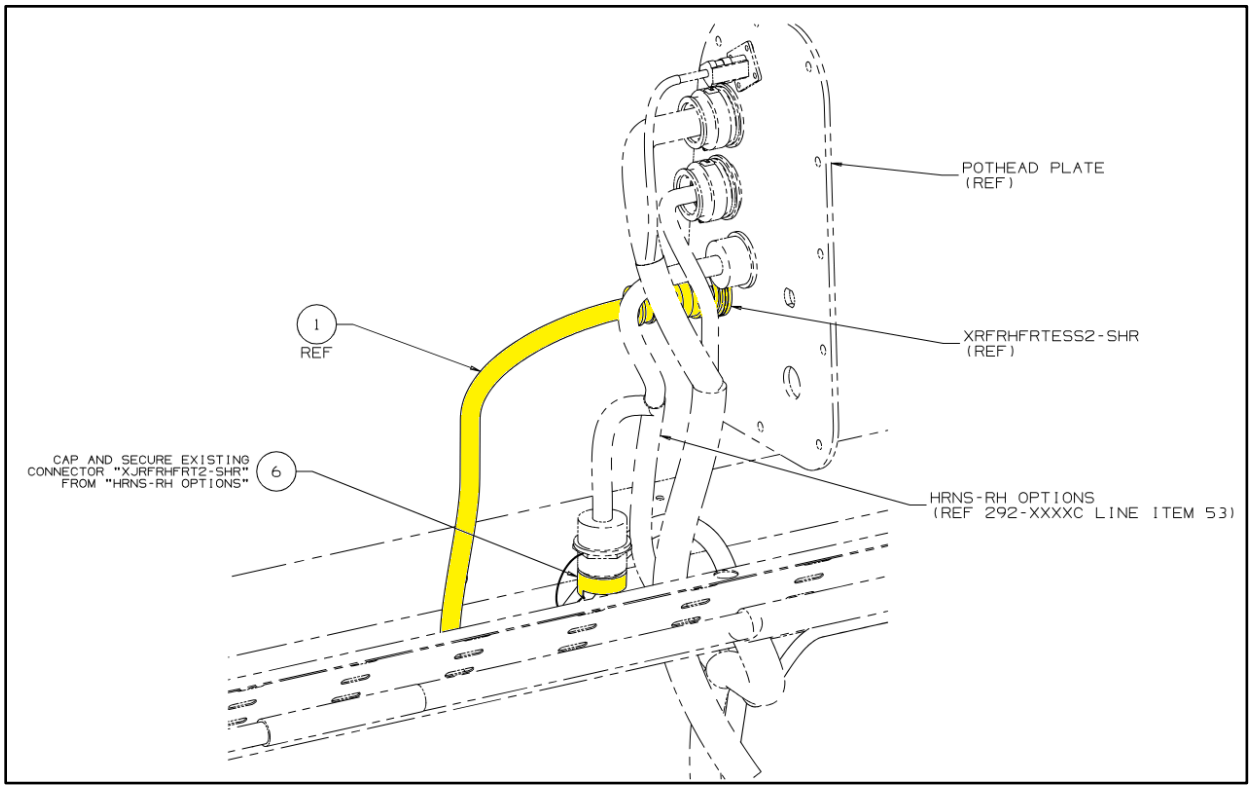


Figure 46: Pothead Interior Side

95. Reinstall curbside pothead plate after connecting and routing the new harness in (NF PN: 1166935). Install new gasket (NF PN: 849968). Wipe surfaces clean and apply a bead of sika (NF PN: 242702) around plate after all passthrough connections and plates have been installed and torqued down.
96. Apply loctite-243 and retorque side screen hinge to 10 ft-lbs as needed.

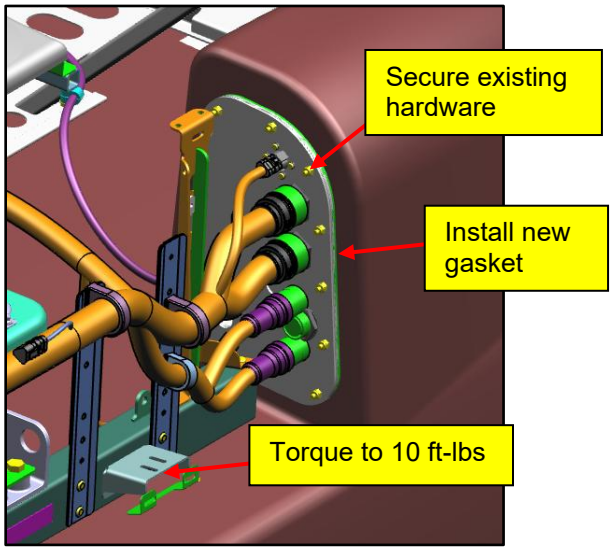


Figure 47: Curbside Pothead Plate Reinstallation

97. Route XRFRHFRT TO XSDS Jumper Harness (NF PN: 1166935) shown below figure from pothead plate to SDS panel.

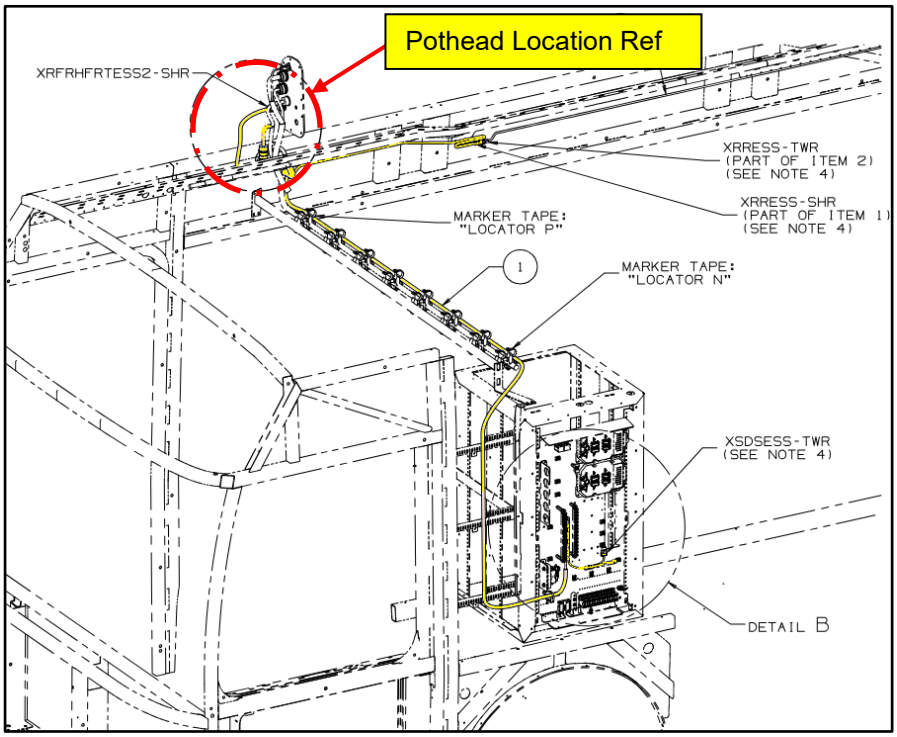


Figure 48: Jumper Harness PN 1166935 Routing Ref

98. Open the mechanical box door, SDS enclosure door and front HVAC cover door to route the new jumper harness all the way to the SDS panel.
99. Secure jumper harness along existing harness with tyraps. Once routed to SDS panel, close mech box door, SDS enclosure door and front HVAC cover door.

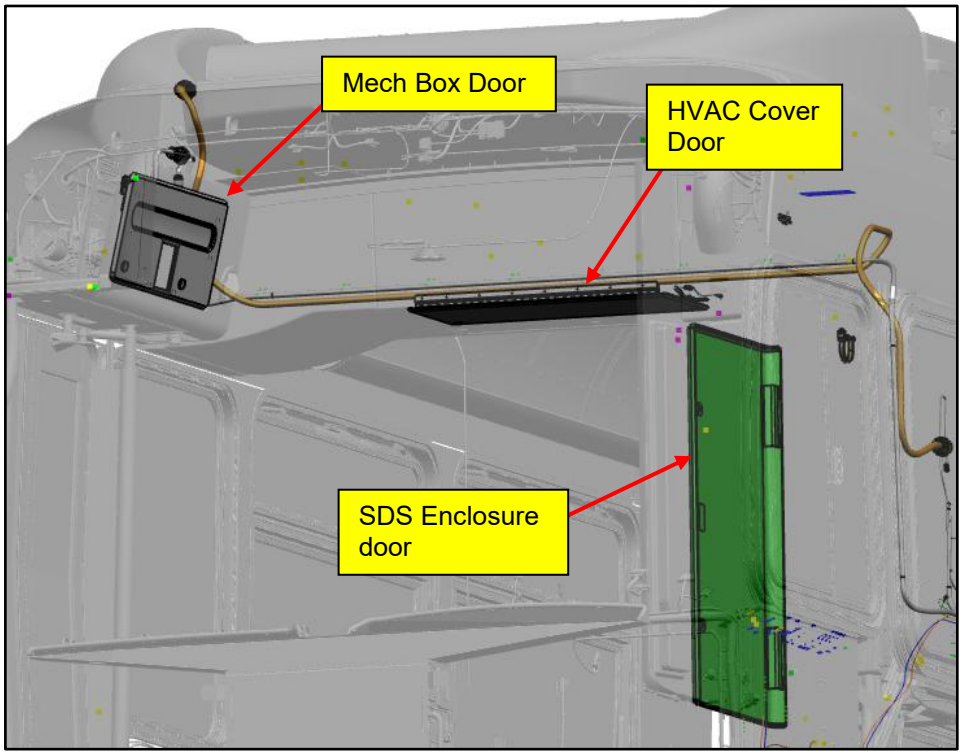


Figure 49: Jumper Harness PN 1166935 Routing Ref

100. Gain access to SDS panel by opening the SDS window.



Figure 50: SDS Window

101. Mount SDS Mini Panel (NF PN: 1150926) using existing holes on SDS rack. Shift panel as required to ensure no interferences.
102. Connect XSDSESS-TWR from jumper harness (NF PN: 1166935) to XSDSESS-SHR from SDS mini panel harness.
103. Ensure terminated wires XBBEP12-A, D and E are inserted into existing bus bar connector "XBBEP12" from SDS panel harness.

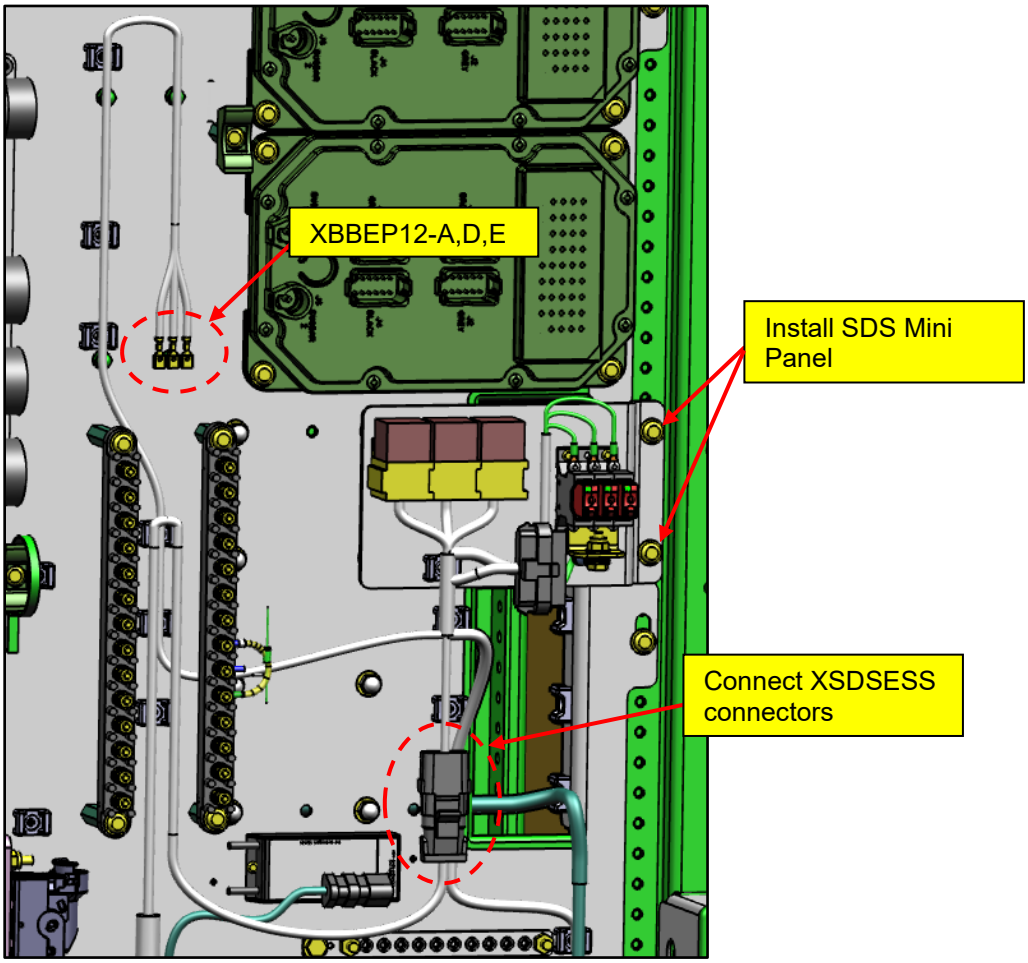
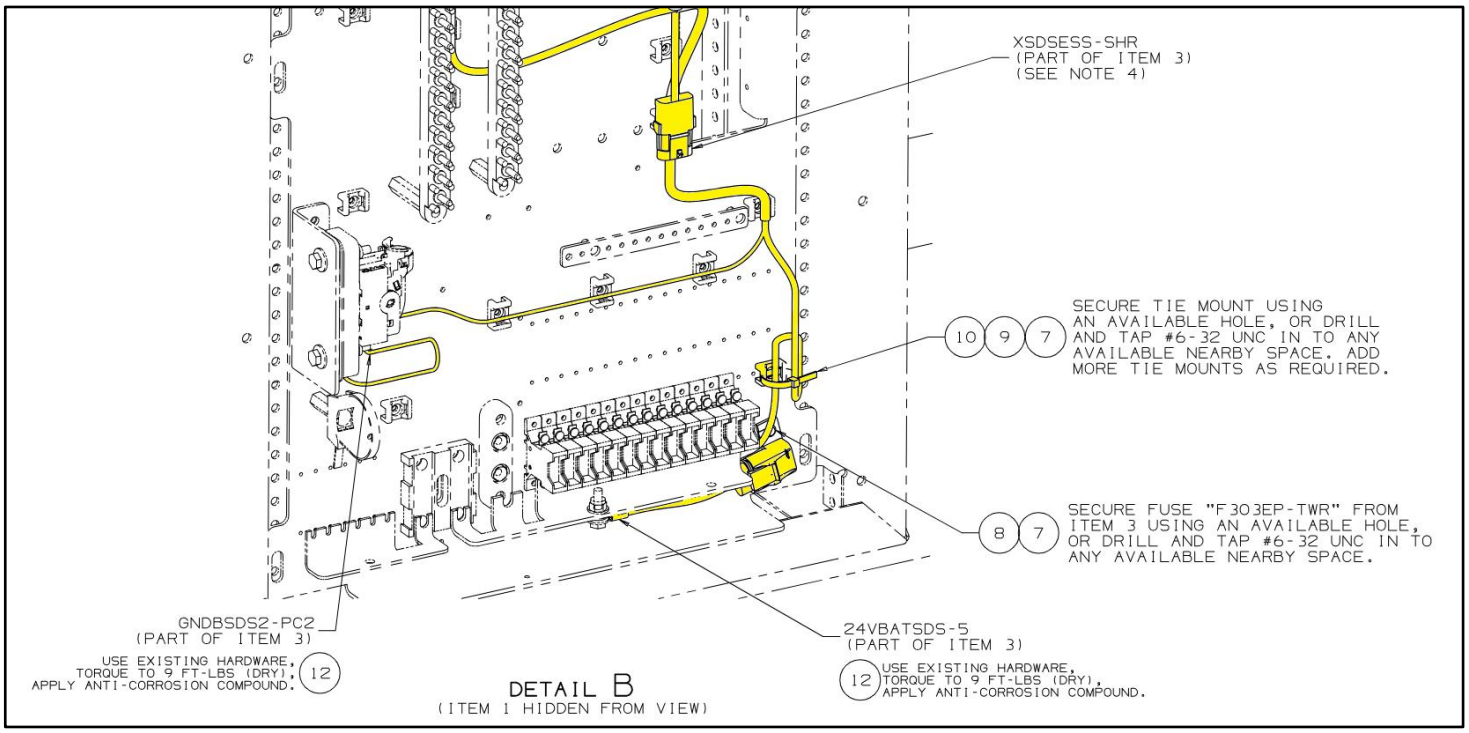


Figure 51: SDS Mini Panel

104. Refer to figure below to connect ground, secure fuse and 24Vbat connection.

105. Apply loctite-243 to all threaded fasteners where locknuts are not used.



Item	Part Number	Description
7	14S96006	SCREW MACHINE 3/8
8	50W96000	WASHER FLAT SS NO. 6
9	291987	TIE-CABLE MOUNT
10	5958112	TYRAP-7.0 BLACK
12	8111767	ANTI-CORROSION COMPOUND NYK-77

Figure 52: SDS Panel Rework

106. Remove and set aside curbside AD Panels and Duct liners to route repeater jumper harness (NF PN: 1166937) along HRNS-RH CROWN XE-40.
107. Ensure XRRESS connectors from two jumper harnesses are connected.

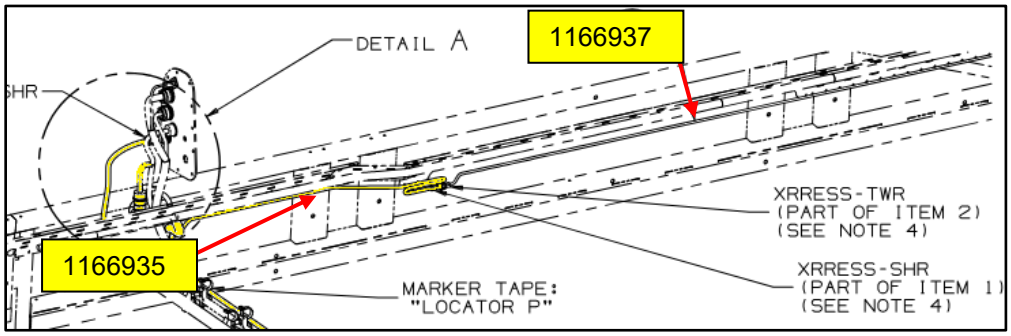


Figure 53: XRRESS Connections from Two Jumper Harness

108. Ensure terminated wire ends from jumper harness (NF PN: 1166937) are inserted into existing connector “REPEATER-J1” from existing RH OPTIONS HRNS.
    - Yellow wire labelled “REPEATER-J1-18” goes to cavity 18.
    - Green wire labelled "REPEATER-J1-19" goes to cavity 19,
    - Drain wire labelled "REPEATER-J1-17" GOES TO CAVITY 17.

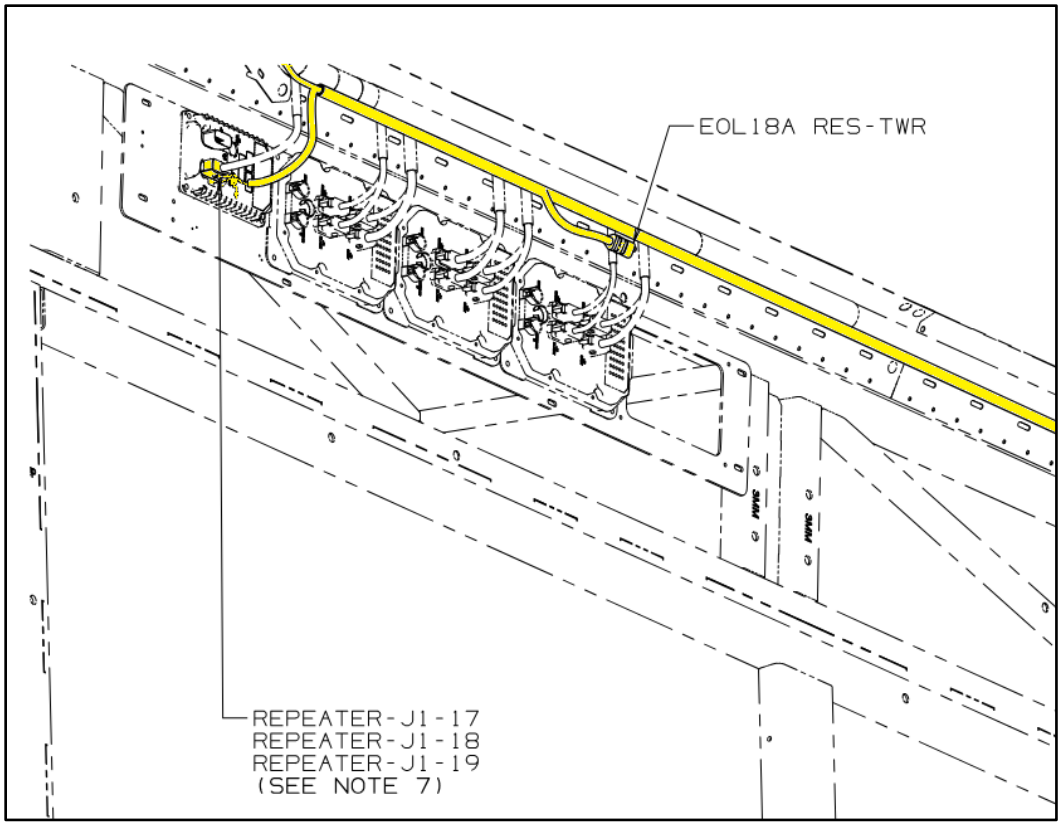


Figure 54: Repeater J1 Connection Location Ref

109. Clean ground point to bare metal. Torque to 40 in-lbs (dry). Apply anti-corrosion compound.
110. Cap and secure existing MCU connectors, “MCU-285” & “MCU-295”. Apply shrink tubing over front of connector, shrink, then fold and secure using cable ties.
111. Dismount MCU module (NF PN: 660238) and return to stock or discard.

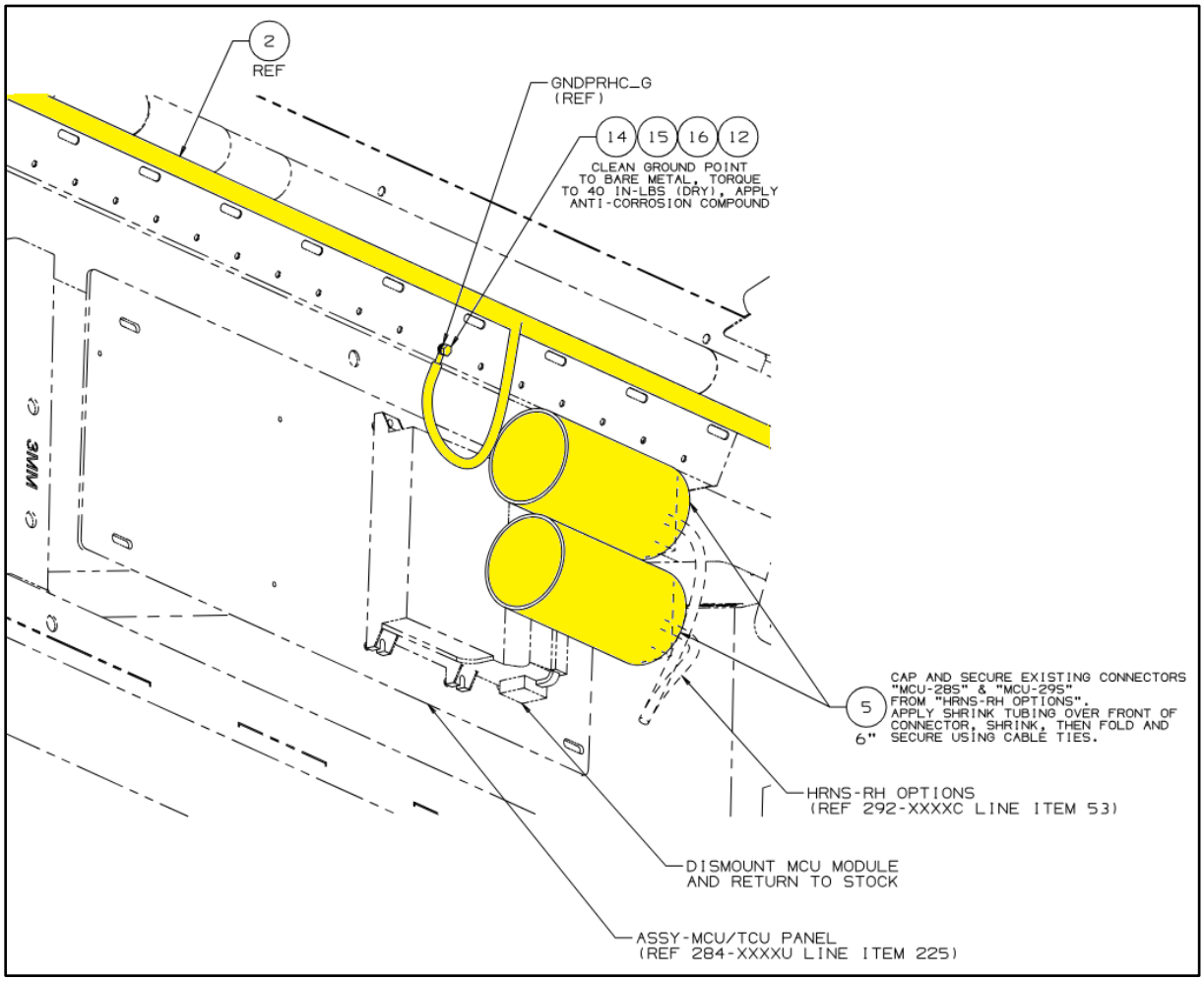
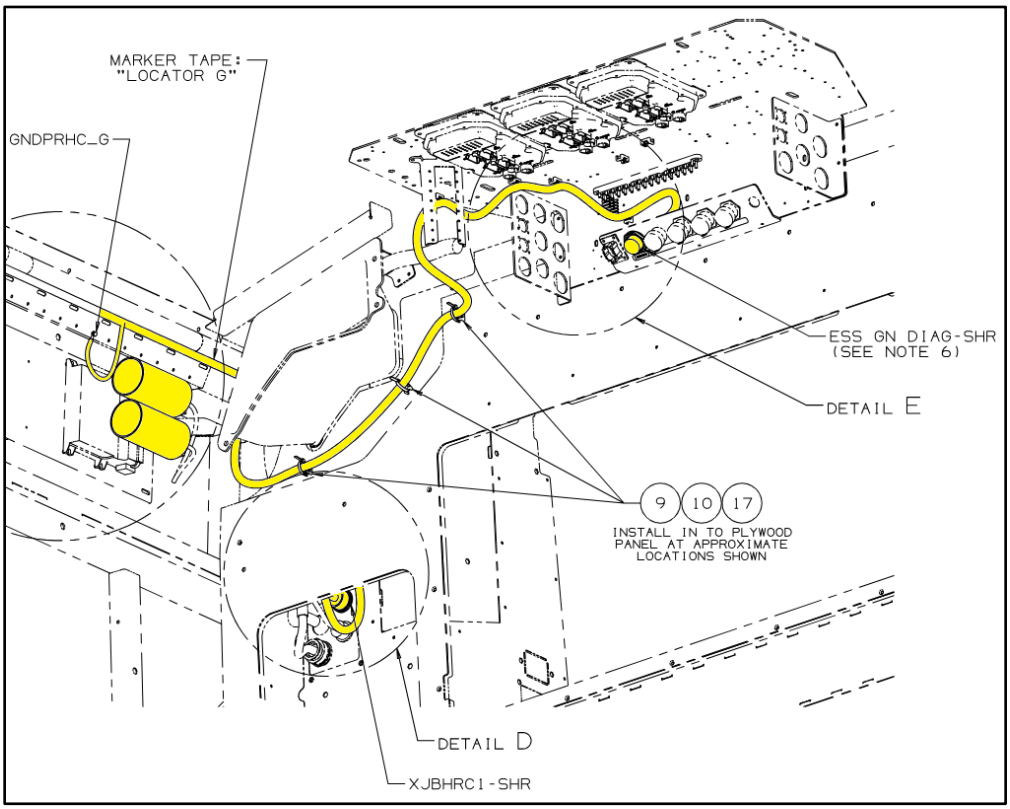


Figure 55: MCU Module Location Ref

Item	Part Number	Description
5	053084	TUBING-HEATSHRINK-4ID
12	8111767	ANTI-CORROSION COMPOUND NYK-77
14	22S00012	SCREW-MACH 10-24X0.75LG
15	500540	WASHER FLAT SST .205 ID
16	42N00000	NUT-NYLON LOCK #10 SST

112. Route ESS GN DIAG-SHR part of the jumper harness to rear PLC panel area like below. Secure harness with item 9, 10 and 17 shown below (NF PN: 291987, 5958112, 54S00012).
113. Route XJBHRC1-SHR part of the jumper harness to plywood panel like below by poking through the existing spray foam using a stick or air hose.
114. As required, reapply spray foam after routing the jumper harness.



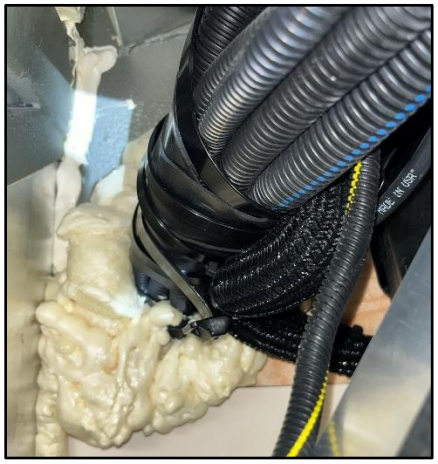


Figure 56: Jumper Harness to Rear PLC and Plywood Panel Routing

115. Cut and discard existing connector "BDU DIAG-SHR" FROM "HRNS-CAN REAR PANEL". end cap all wires using end caps (NF PN: 8111672), except re-use the following wires:
    - Terminate existing red wire "10EP48J" using pin (NF PN: 149833), item 18 below, then insert into cavity "B" of connector "ESS GN DIAG-SHR" from jumper harness.
    - Terminate existing white wire "10EP48H" using pin (NF PN: 149833), item 18 below, then insert in to cavity "A" of connector "ESS GN DIAG-SHR" from jumper harness.
116. Cover existing label “BDU DIAG” with new “ESS DIAG” (NF PN: 612394).

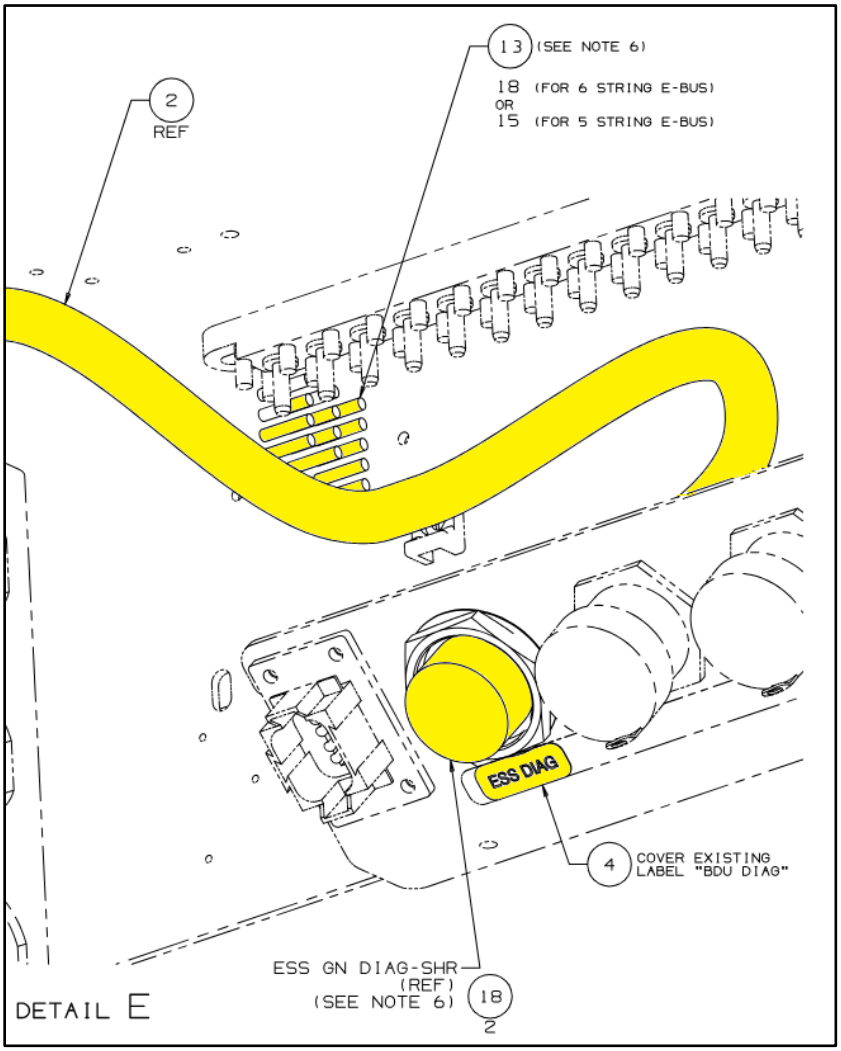


Figure 57: ESS GN DIAG Routing

117. Cap existing connector “XJBHRC-SHR” from “HRNS-RH OPTIONS” using (NF PN: 182470).

118. Install XJBHRC1-SHR on curbside rear bulkhead plate.

Note: You may need to access the other side of the plate from curbside upper corner pillar door.

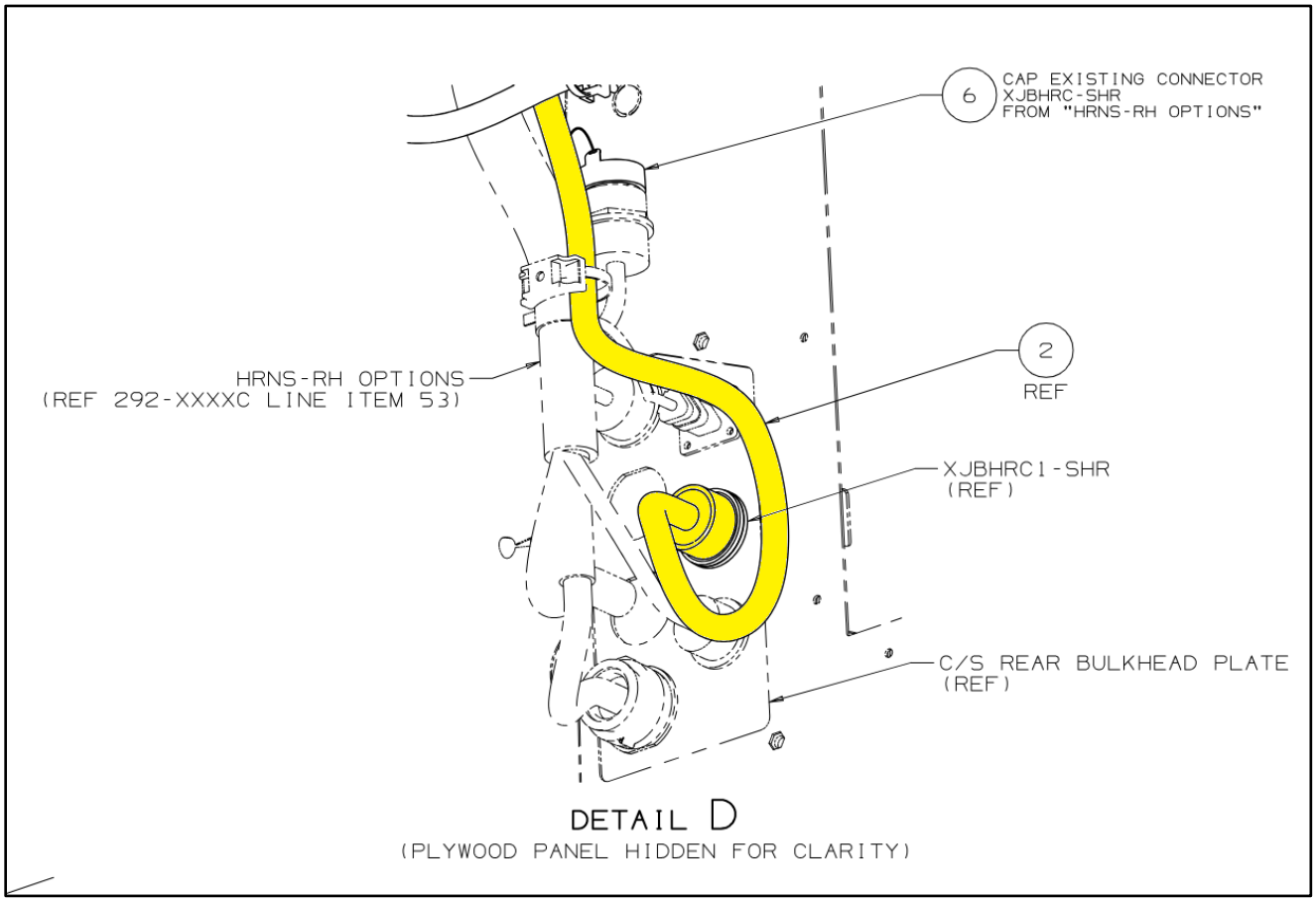


Figure 58: XJBHRC1-SHR to Plywood Panel Routing

119. Remove and replace SDS Box decal and rear panel decal with new provided decals.

120. Reinstall AD Panel, duct liner, rear plc door and curbside rear bulkhead access panel after harness rework.

Roof Harness Rework (Ref: EAD-030550)

121. Take the roof jumper harness (NF PN: 1167337) and rear compartment jumper harness (NF PN: 1167372). Use below figure for routing reference.

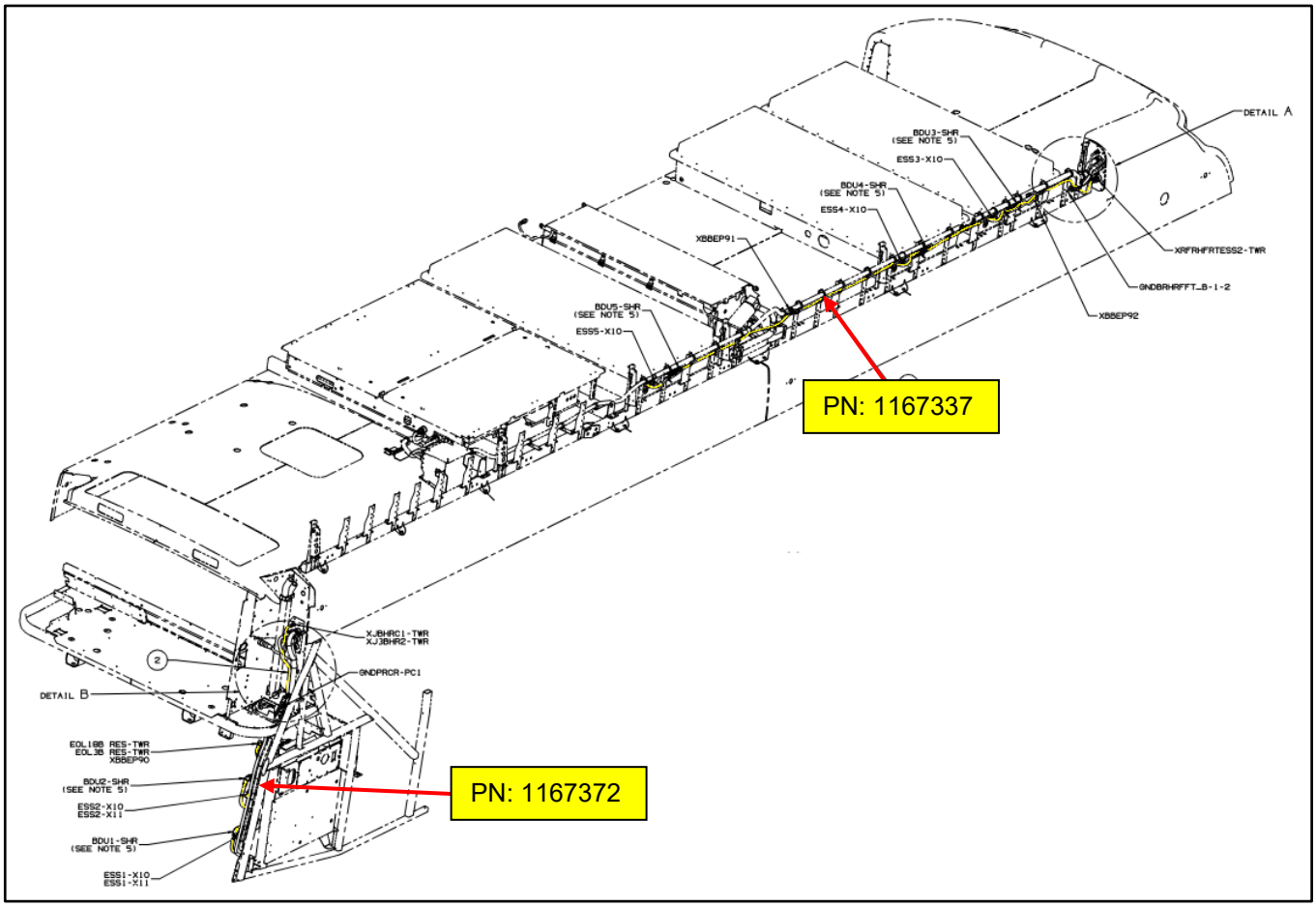
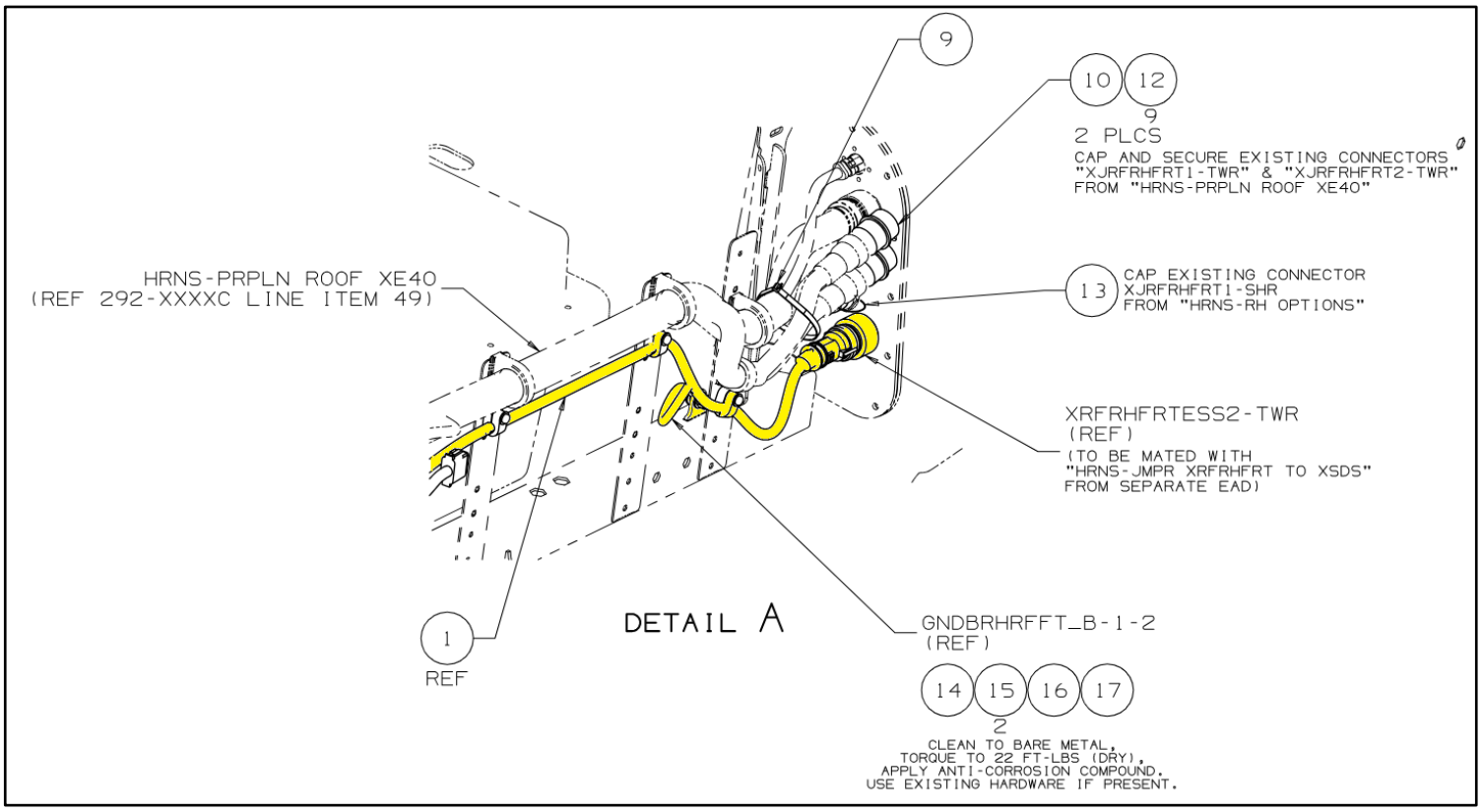


Figure 59: Roof and Rear Jumper Harness Routing Reference

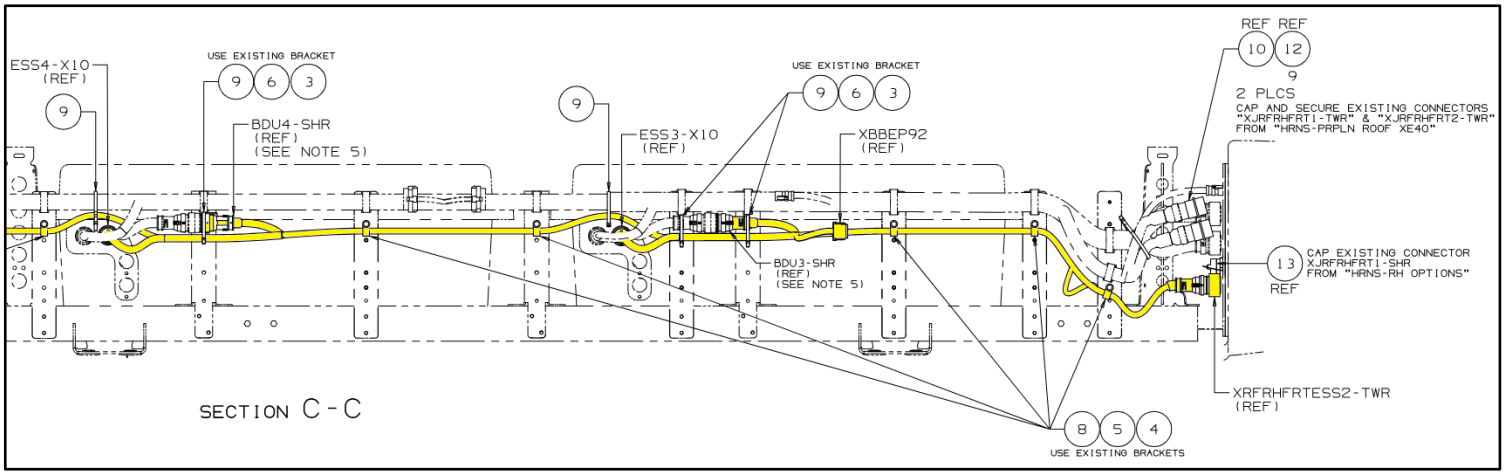
122. Starting on pothead plate side. Connect roof jumper harness (NF PN: 1167337) as shown below. Perform all notes on drawing below.

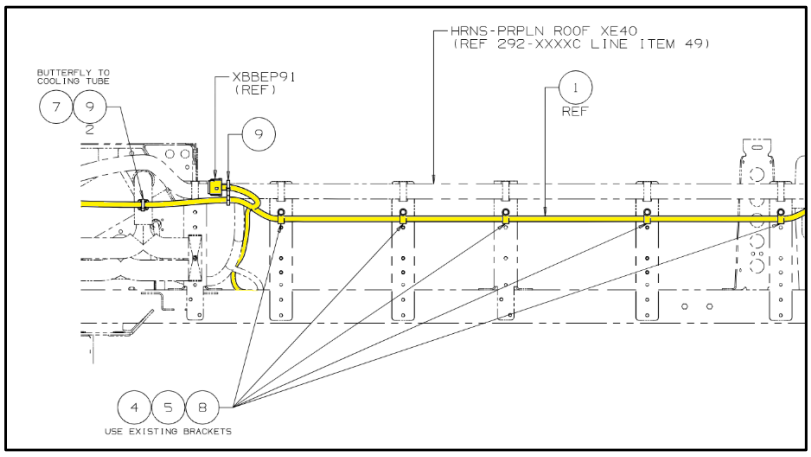


Item	Part Number	Description
1	1167337	HRNS-JMPR ROOF XE40 5 STRING ELFA2
9	5955945	TYRAP-14.0 BLACK
10	543632	CONN-9CCT SHR HD10 BK
12	8110650	PLUG SEAL 16-12GA
13	182470	CAP-DUST 9CCT DIAG W/LANYARD
14	20B06016	BOLT SS 3/8 X 1 LG
15	50W06000	WASHER FLAT SS 3/8 NOM
16	42N06000	NUT-3/8-16 UNC NYLON LOCK SST
17	8111767	ANTI-CORROSION COMPOUND NYK-77

Figure 60: Roof Jumper Harness Pothead Plate Connection

123. Route new jumper harness (NF PN: 1167337) along existing propulsion roof harness. Use existing brackets to secure jumper harness with clamp, screw, washer, tyraps, and cable mount as shown below.
124. Ensure "BDU**x**-SHR" mates with "BDU**x**-XESS" from existing propulsion roof harness.
125. Connect ESS**x**-X10 to ESS string pack #**x** connector after ESS installation.
    - For string #3 and 4.





Item	Part Number	Description
3	14S04010	SCREW PH CROSS RECESS SS 1/4" 20 UNC X 5/8" LG.
4	14S04024	SCREW PH CROSS RECESS SS 1/4" 20 UNC X 1 1/2" LG.
5	50W04000	WASHER-FLAT SS 1/4 NOM
6	258045 or 19-11-1010	BASE-CABLE MOUNT
7	351500	SPACER-DUAL SWIVEL SADDLE
8	608614	CLAMP-12MM DIA LN
9	5955945	TYRAP-14.5 BLACK

Figure 61a & 61b: Jumper Roof Harness on ESS #3 and #4

126. Locate ground by BTMS, clean to bare metal and use existing hardware to connect GNDBRHRF_D-1-2 to ground. Torque to 22 ft-lbs (DRY). Apply anti-corrosion compound.

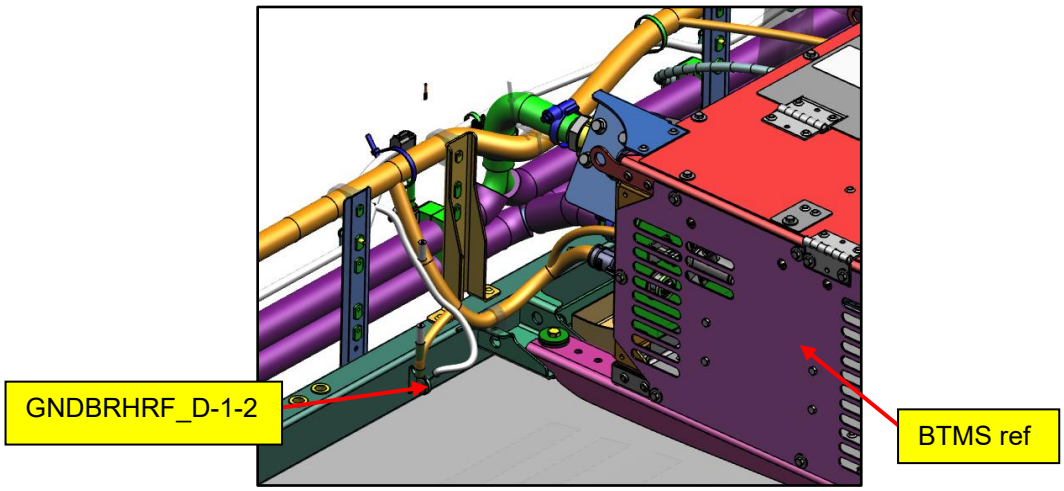
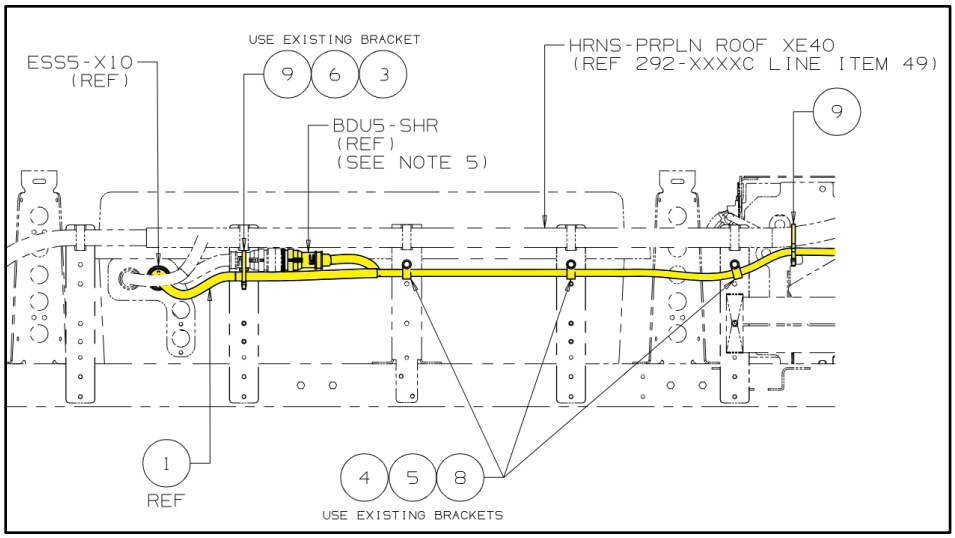


Figure 62: GNDBRHRF_D to Ground

127. Ensure "BDU5-SHR" mates with "BDU5-XESS" from existing propulsion roof harness.

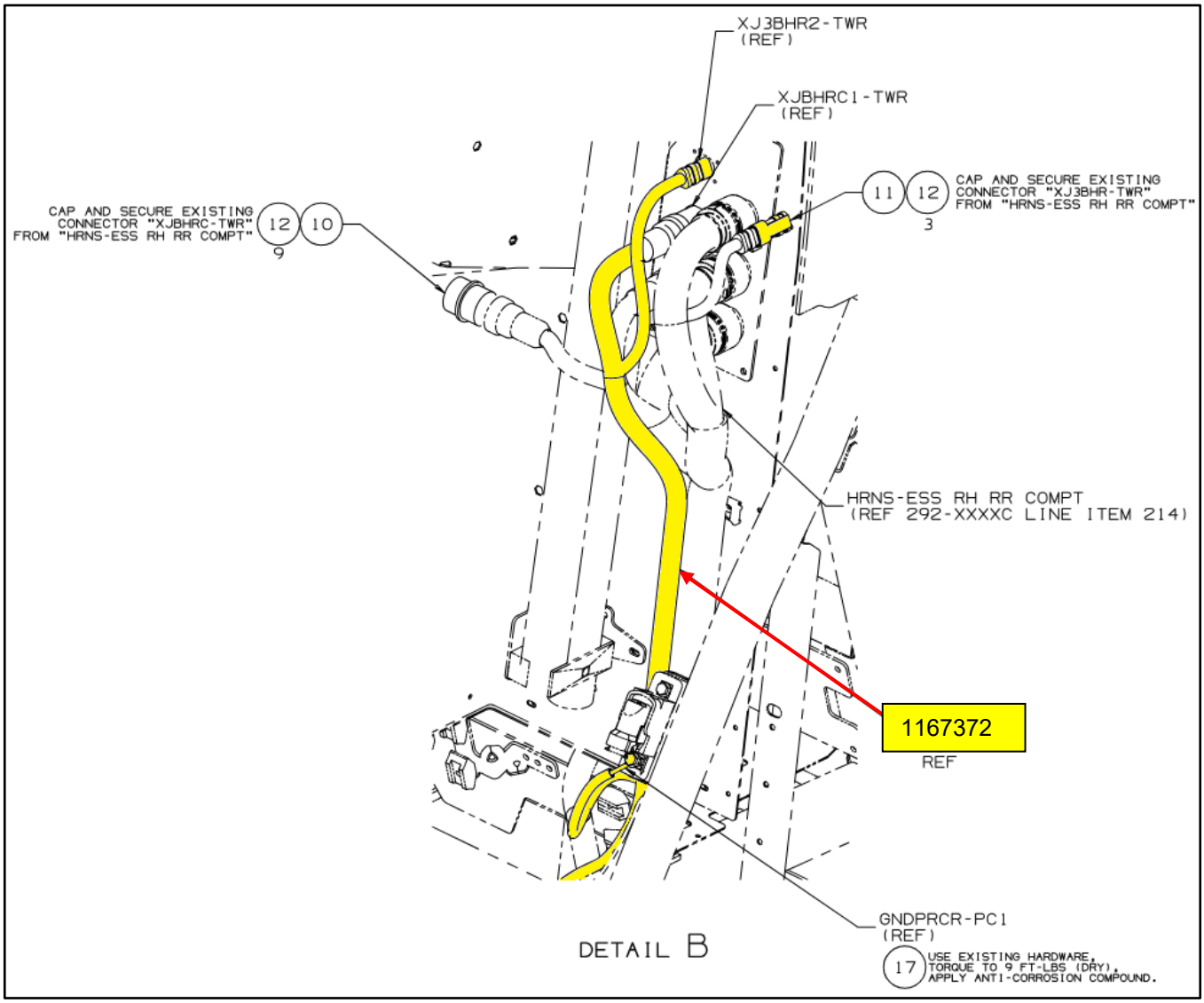
128. Connect ESS5-X10 to ESS string pack #5 connector after ESS installation.



Item	Part Number	Description
3	14S04010	SCREW PH CROSS RECESS SS 1/4" 20 UNC X 5/8" LG.
4	14S04024	SCREW PH CROSS RECESS SS 1/4" 20 UNC X 1 1/2" LG.
5	50W04000	WASHER-FLAT SS 1/4 NOM
6	258045 or 19-11-1010	BASE-CABLE MOUNT
8	608614	CLAMP-12MM DIA LN
9	5955945	TYRAP-14.5 BLACK

Figure 63: Jumper Harness on ESS #5 Reference

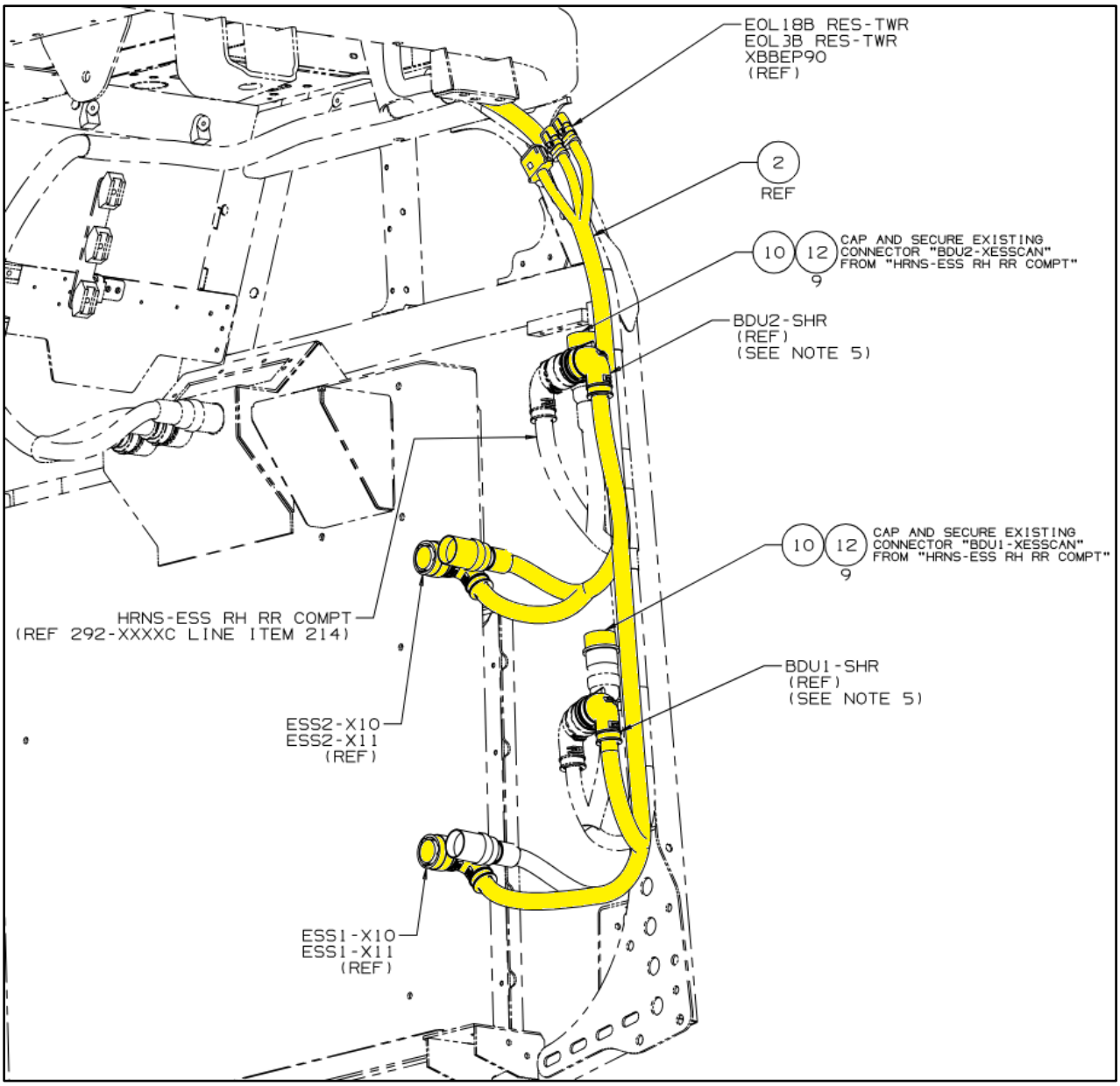
129. Open curbside upper corner pillar access panel.
130. Cap and secure existing connectors “XJBHRC-TWR” and “XJ3BHR-TWR”.
131. Connect new connectors from jumper harness, “XJ3BHR2-TWR” and “XJBHRC1-TWR”, to removed connectors’ location.



Item	Part Number	Description
10	543632	CONN-9CCT SHR HD10 BK
11	525366	KIT-3CCT SHR DT BK
12	8110650	PLUG SEAL 16-12GA
17	8111767	ANTI-CORROSION COMPOUND NYK-77

Figure 64: Upper Rear End of Jumper Harness Routing

132. Ensure "BDU**x**-SHR" mates with "BDU**x**-XESS" from existing propulsion roof harness.
133. Connect ESSx-X10 to ESS string pack #**x** connector after ESS installation.
    - For string #1 and 2.
134. Cap and secure existing BDU-XESSCAN connectors using connector (NF PN: 543632) and plug all pins using (NF PN: 8110650). Secure harness with tyraps as needed.



Item	Part Number	Description
10	543632	CONN-9CCT SHR HD10 BK
12	8110650	PLUG SEAL 16-12GA

Figure 65: Lower Rear End of Jumper Harness Routing

Installation of the Rooftop ESS Units

135. Prior to installation of rooftop ABS assembly units (NF PN: 1054287), ensure ABS packs have drains installed, and pressure leak test and checkout procedure are completed on each ABS units. Refer to Appendix C, D and E.
136. Attach lifting device to all four corners of the ESS enclosure. Lift the ESS enclosure to the roof of the vehicle.
137. Align the holes and slowly lower the enclosure to the mounting rails of the vehicle.
138. Apply Loctite 243 to the new ½" mounting bolts (NF PN: 10B08036) and install with ESS support plates (NF PN: 842568). Torque to 80 ft-lb to secure the enclosure to the roof. Reapply torque marks after torquing.

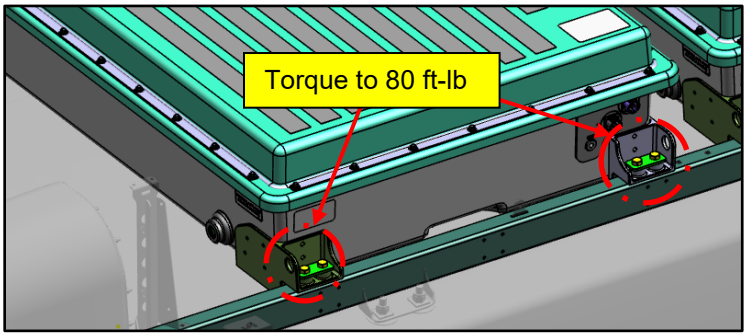


Figure 66: Upper ESS Assembly Installation Location Reference

139. Prior to installing the coolant hoses, inspect the supply (lower) tube to ensure the new correct size orifices are installed.
    - 11mm Orifice (NF PN: 1084632) is used on string 3 and 4.
    - 12mm Orifice (NF PN: 1084631) is used on string 5.

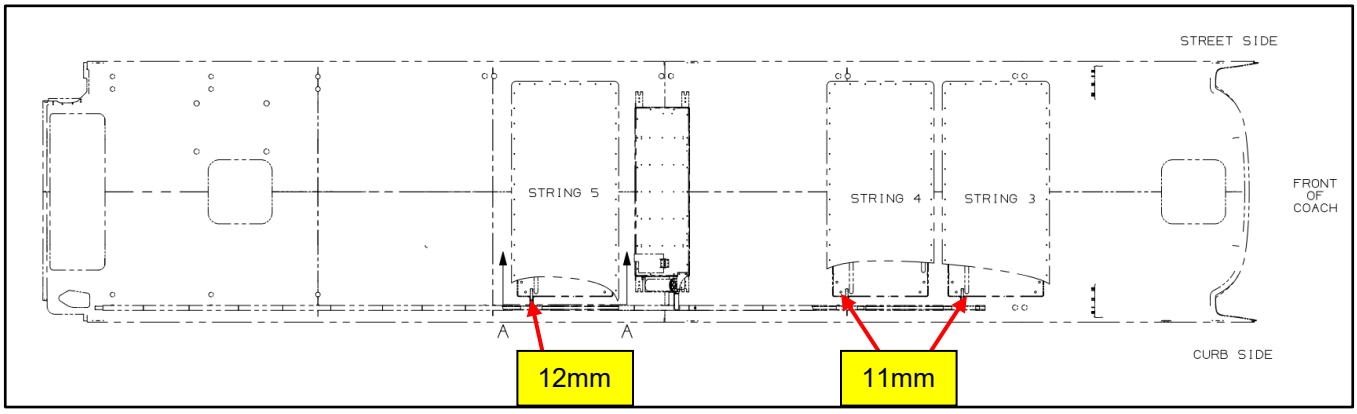


Figure 67: Orifice on ESS String # Reference

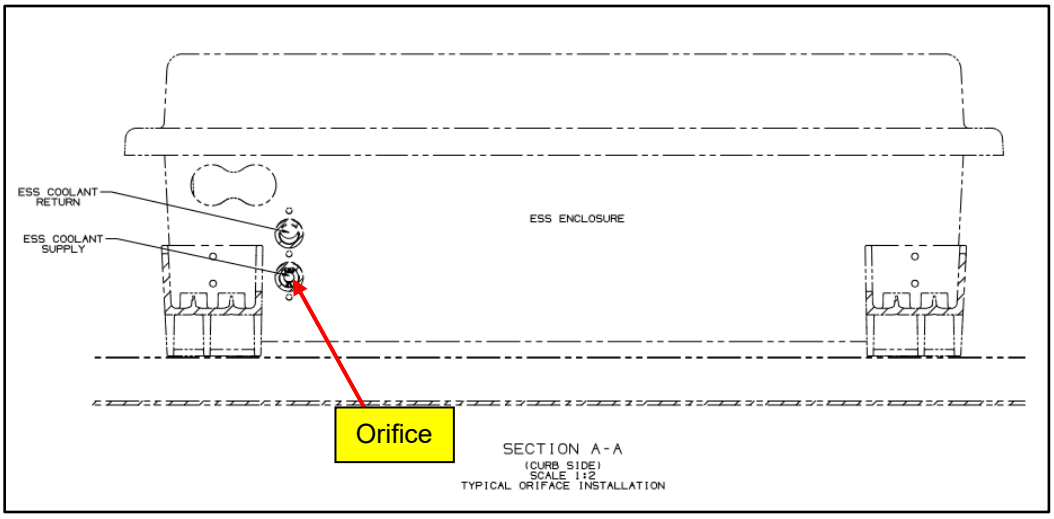


Figure 68: Orifice on ESS Coolant Supply (Lower Port)

140. Place clamps over the upper and lower coolant line. Attach the coolant lines to the ESS and torque to spec.
    - If bus is equipped with waveseal clamps (NF PN: 553153), torque to 80 in-lbs. Reapply torque marks.
    - If bus is equipped with breeze clamps (NF PN: 438971), torque to 40-45 in-lbs. Reapply torque marks.
141. Reinstall the twin clamps. Torque to 72 in-lbs. Reapply torque marks.
142. Connect the low voltage connectors from both existing harness and jumper harness.

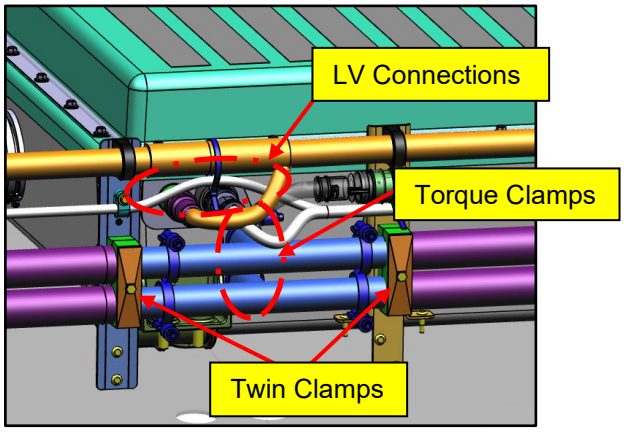


Figure 69: Upper ESS Assembly Installation Location Reference

143. Reconnect the high voltage connectors to the ESS unit during energizing procedure.

Note: Refer High Voltage Safety for this procedure.

144. Connect the grounding strap and torque to 22 ft-lb. Apply NYK-77 lubricant to the ground connection. Reapply torque marks.

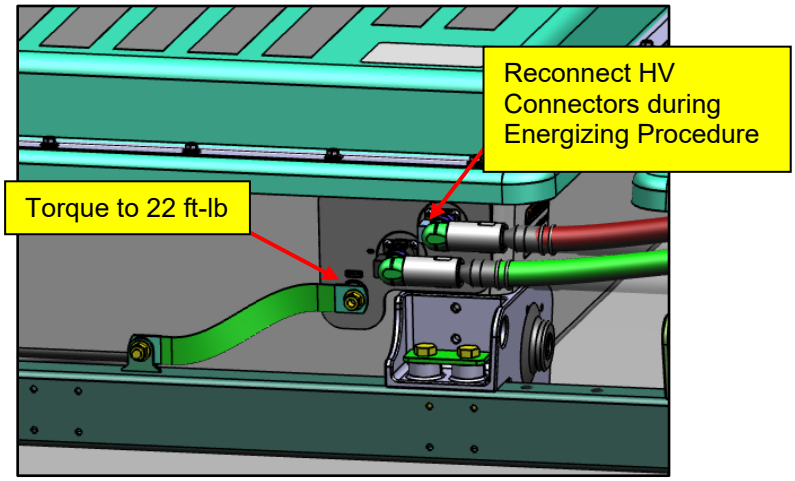


Figure 70: Upper ESS Assembly Ground Stud and HV Cable Re-installation

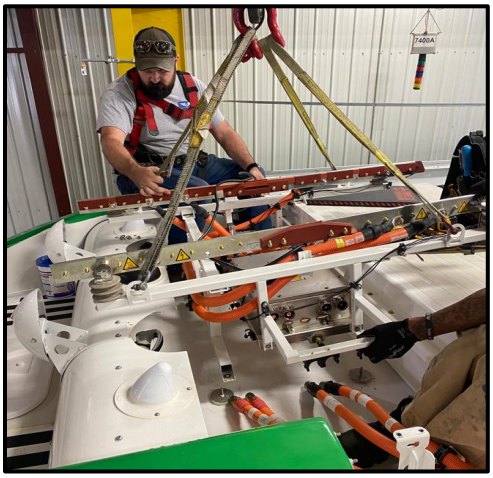
145. Flip close the curbside side screen panels and re-install the existing hardware applying one or two drops of Loctite to their threads and torque to 50 in-lbs. Reapply torque marks.

Note: Streetside sidecreen can be left open/loose for energizing procedure later.



Figure 71a & 71b: Sidescreen Access Panels

146. Place the charge rail assembly on the roof and re-install the existing flat washer and nylock nuts (NF PN: 42N06000) mounting to the roof structure and torque to 22 ft-lbs. Reapply torque marks.
147. Re-connect the charge rail ground cable to the body ground using existing washers and nylock nuts (NF PN: 42N06000) and torque to torque to 22 ft-lbs. Reapply torque marks. Applying anti-corrosion compound.
148. Re-connect the charge rail box ground to the body ground using existing washers and nylock nuts (NF PN: 42N06000) and torque to torque to 22 ft-lbs. Reapply torque marks. Apply anti-corrosion compound.



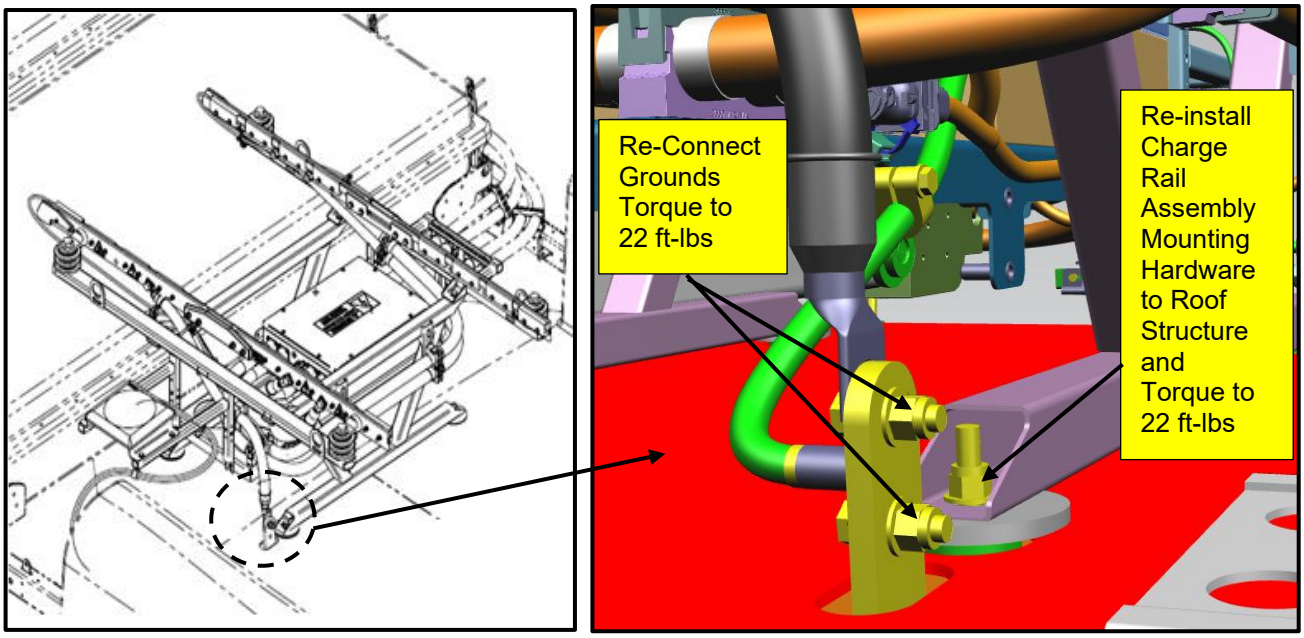
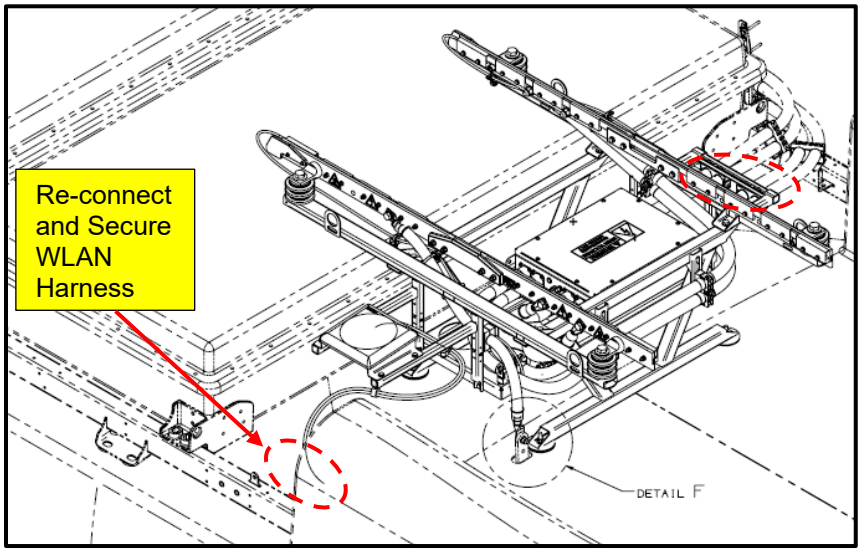


Figure 72a: Charge Rail Installation Location Reference

149. Re-connect HV cable quick disconnects on the street side to appropriate charge box receptacles.
150. Re-connect and secure the WLAN antenna to the bus harness.
151. Re-install the HV cable clamps on the street side of charge rail with the existing hardware and the nylon lock nuts (NF PN: 42N04000) and torque hardware to 6 ft-lbs. Reapply torque marks.

Note: Refer High Voltage Safety for this procedure.



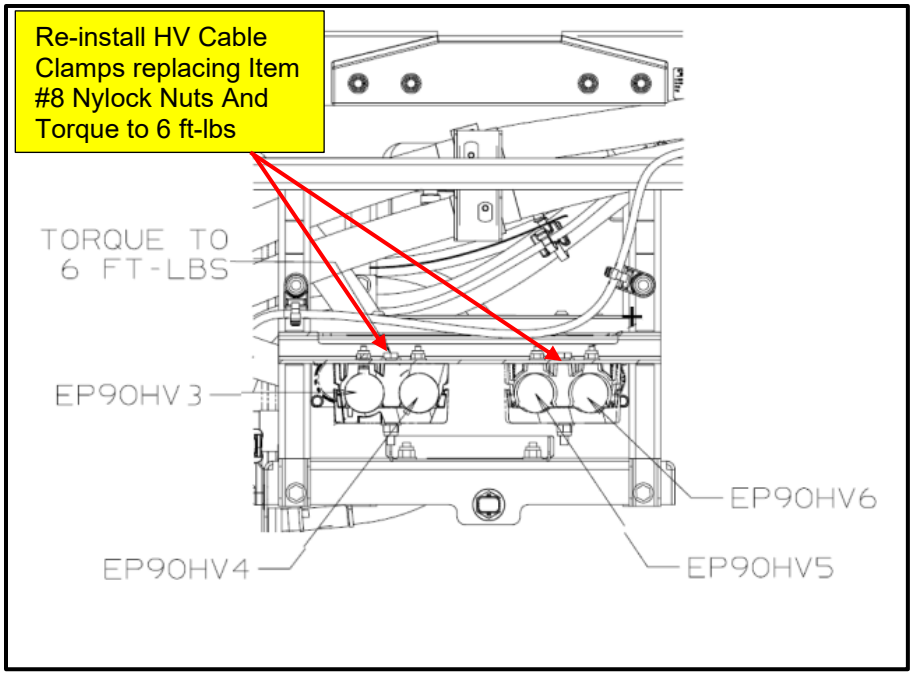


Figure 72b: Charge Rail Installation Location Reference

152. Re-connect the curb side and street side heater wiring to the charge rails using the existing hardware applying anti-corrosion compound and torque to torque to 22 ft-lbs. Reapply torque marks.
153. Re-connect the temp sensor from under the DC charge rail box on the street side and all low voltage wiring.
154. Re-install clamps on low voltage harnesses with existing hardware applying one or two drops of loctite-243 to the fastener threads.
155. Re-secure harness with tyraps (NF PN: 5955945) as required.

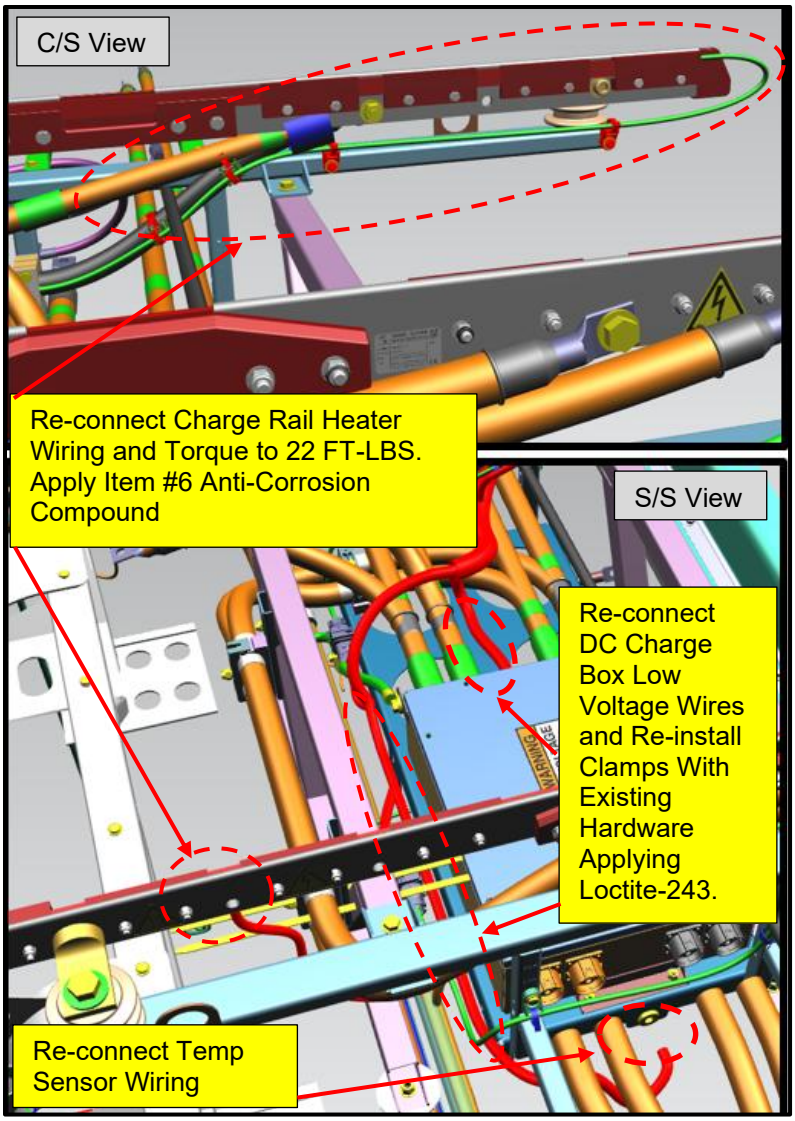


Figure 72c: Charge Rail Installation Location Reference

Installation of the Rear ESS Units

156. As required, locate the clamp by the ball valve under the cabin coolant surge tank. Replace bolts with new shorter bolts (NF PN: 10B04048 or 20B04048). Reuse existing washers and lock nut. If stainless steel bolt is used, apply never seize per spec (NF PN: 506929).

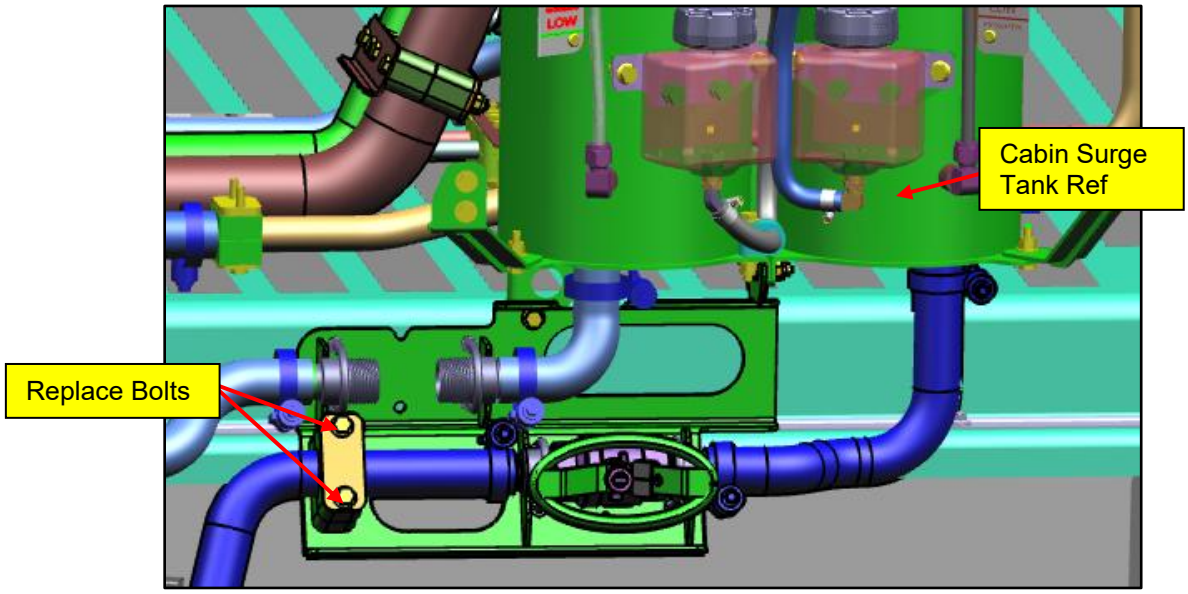


Figure 73: Coolant Hose Clamp under Cabin Surge Tank

157. Replace existing heater inlet coolant line clamp with new modified clamp (NF PN: 115306). Reuse the existing spacer plates.

158. Replace hardware with (NF PN: 20B04040 & 50W04000). Apply 1 to 2 drops of loctite-243 to threads.

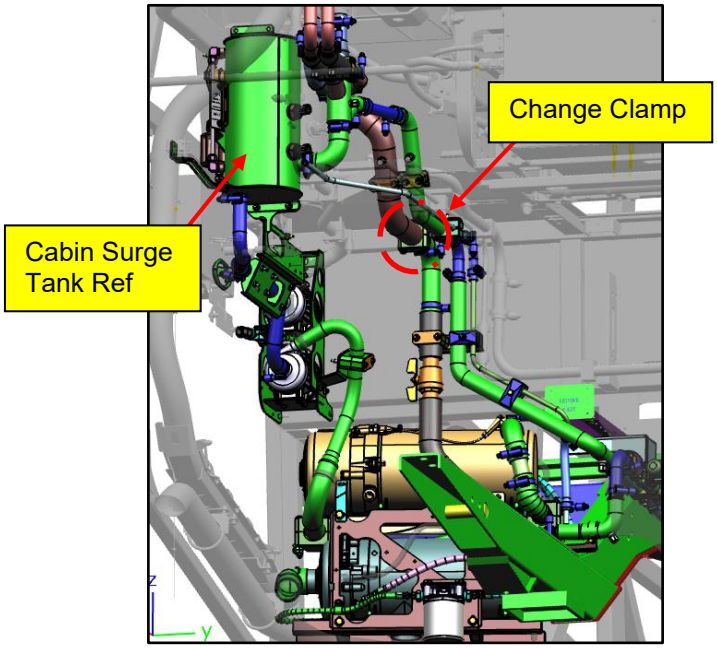


Figure 74: ESS Mounted on Lower Rack Reference

159. Prior to installing new ABS packs on rear rack assembly, install reinforcement brackets (NF PN: 1157818, 1157819, 1158424) shown below. Ensure tabs are facing outwards on lower rack as shown below.

Note: Clean/Grind out surface of tubes where these brackets go as required.

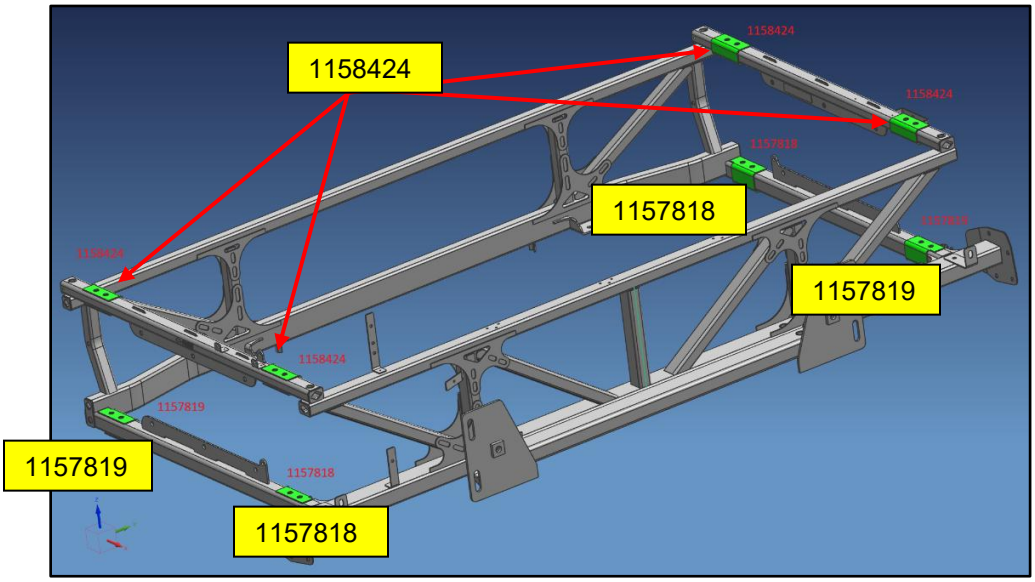


Figure 75: Reinforcement Brackets Added on Existing Rear Rack

160. Position the boom over the rear top ESS unit to be lifted. Attach lifting device to all four corners of the ESS enclosure.

161. Lift the ESS enclosure to lower rack. Fasten all four corners using new provided hardware (NF PN: 10B08076, 20W08000, 40N08000 and 842568) and apply never seize (NF PN: 5928660). Torque to 69 ft-lbs. Apply torque marks after torquing.

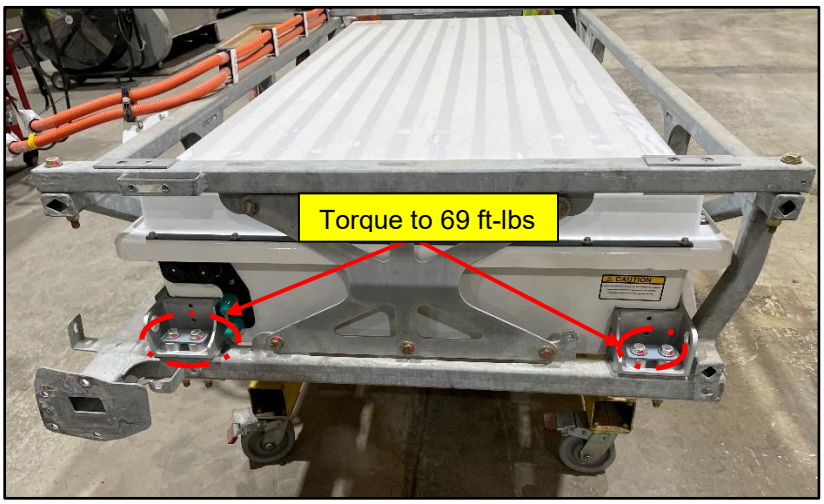


Figure 76: ESS Mounted on Lower Rack Reference

162. Reinstall the upper rear rack assembly with hardware (NF PN: 10B08024, 20W08000 x2, 40N08000) on the side brackets, (NF PN: 10B08072, 20W08000 x2, 40N08000) on top corners. Apply never seize (NF PN: 5928660). Torque hardware to 69 ft-lbs. Reapply torque marks.

    Note: Ensure direction indicator "front" is visible from the outside and pointing to the front of the bus during installation. This applies to both sides. Also, streetside upper rear rack has the ground lug.

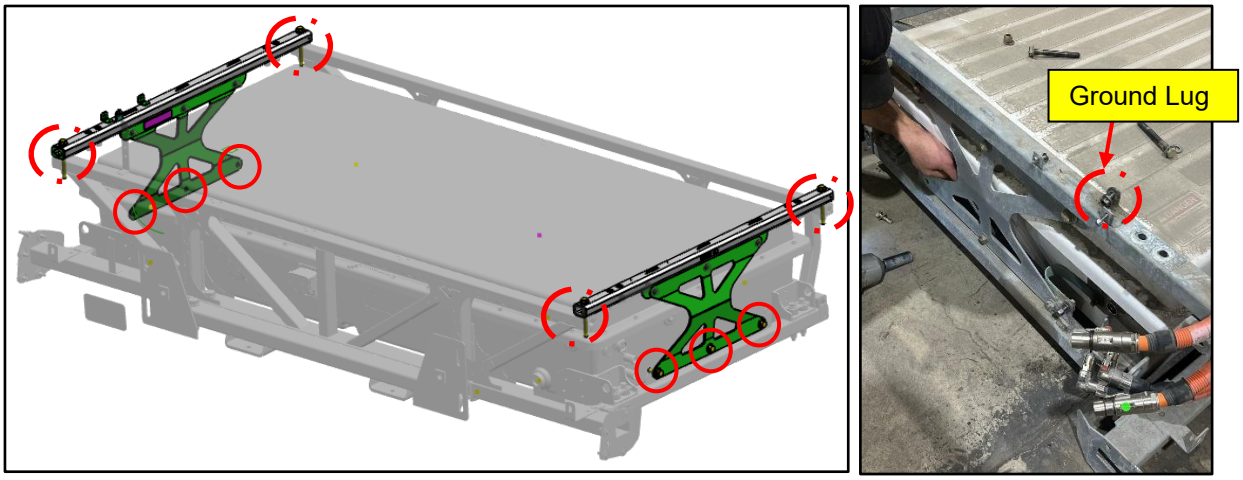


Figure 77a & 77b: Upper Rear Rack Streetside

163. Position the boom over the rear top ESS unit to be lifted. Attach the boom to the lift points at each corner.
164. Lift the ESS enclosure to upper rack. Fasten all four corners using new provided hardware (NF PN: 10B08068, 20W08000, 40N08000 and 842568) and apply never seize (NF PN: 5928660). Torque to 69 ft-lbs. Reapply torque marks.
165. Install ground straps to ABS packs. Torque to 22 ft-lbs and apply corrosion compound (NF PN: 8111767).

    Note: Ensure reinforcement brackets are installed.

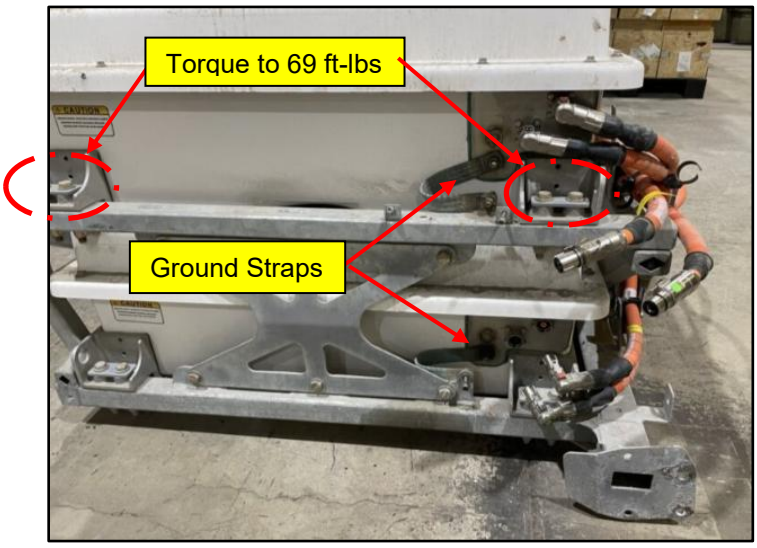


Figure 78: Upper ESS ABS Pack Installation

166. Lift the bus to a reasonable height for rear rack assembly reinstallation.
167. Using a forklift, carefully install the ESS battery rack assembly back inside the vehicle and align the mounting holes to the vehicle structure.



Figure 79: Rear Rack Assembly with ABS Packs Installation

168. Secure corner pillar brackets to pillars using existing 3/8” hardware on each side of the bus replacing the nylock nuts (NF PN: 42N06000) if damaged and torque hardware to 28 ft-lbs. Reapply torque marks.
Note: Ensure the bolts are installed from outside toward the center.
169. From streetside rear corner, reconnect the ESS grounding strap to bus frame applying anti-corrosion compound and torque to torque to 22 ft-lbs. Reapply torque marks.

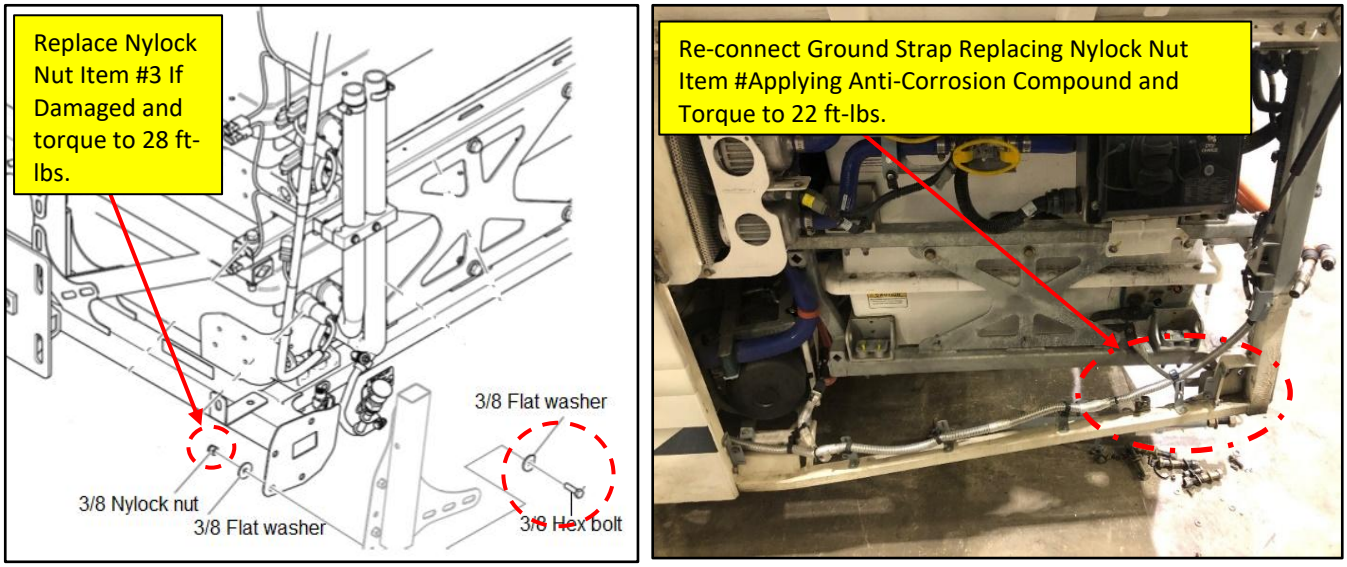


Figure 80: ESS Ground Strap to Bus Frame and Corner Pillar Brackets to Pillar Location Reference

170. Secure the forward ESS battery rack bolts using existing 1/2” hardware (NF PN: 10B08032, 2 x 20W08000 & 40N08000) applying never seize to bolt threads prior to reinstallation. Replace the nylock nuts if damaged and torque to 69 ft-lbs. Reapply torque marks.
171. Secure the rear of the ESS battery rack assembly using existing 3/4” hardware (NF PN: 10B12068, 2 x 20W12000 & 40N12000) applying never seize to bolt threads prior to reinstallation. Replace the nylock nuts if damaged and torque to 245 ft-lbs. Reapply torque marks.

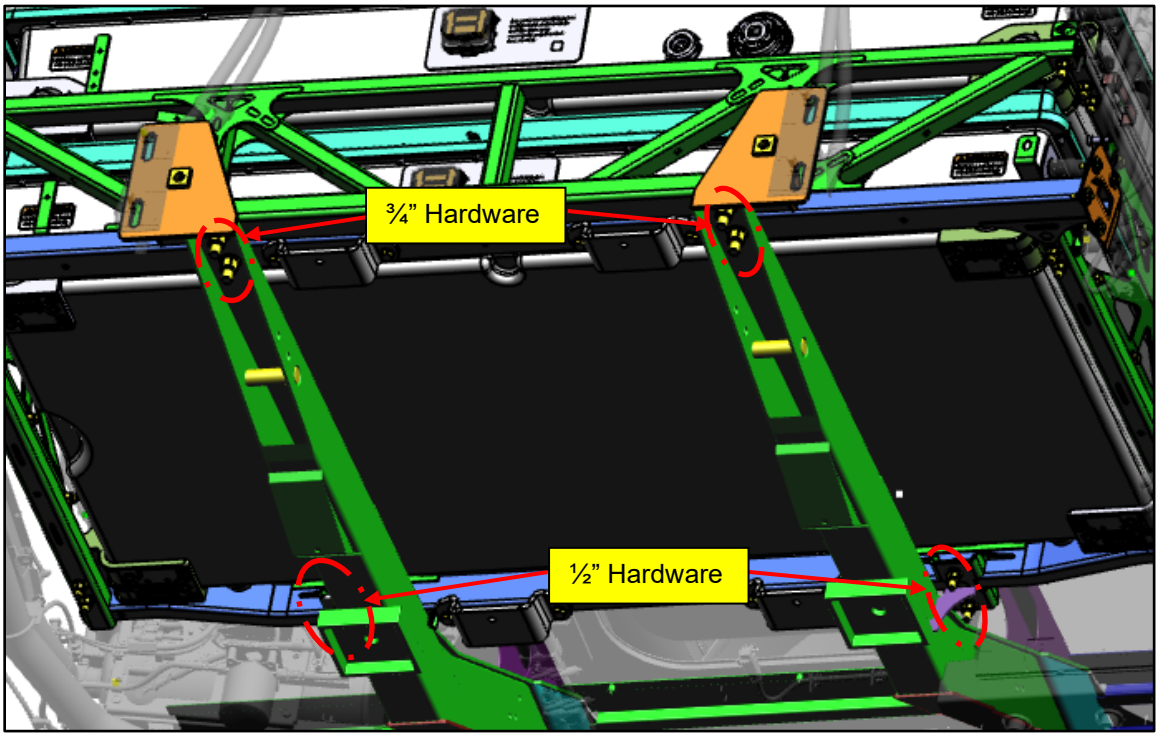


Figure 81: ESS Rear Rack Assembly Reinstallation

172. Re-install the clear BTMS vent line to the ESS frame using existing hardware applying one or two drops of loctite-243.
173. Reconnect the reworked low voltage harnesses to the rear ESS packs.
174. Reconnect the coolant supply and return hoses and install the existing clamps from each ESS unit. Torque clamps per below. Allow clamps to rest for 30 min and re-torque to spec. Reapply torque marks.
    - If bus is equipped with waveseal clamps (NF PN: 553153), torque to 80 in-lbs.
    - If bus is equipped with breeze clamps (NF PN: 438971), torque to 40-45 in-lbs.
175. Re-install the ESS pressure fill Replace the Nylock nuts (NF PN: 42N04000) if damaged and torque to 12 ft-lbs. Reapply torque marks.

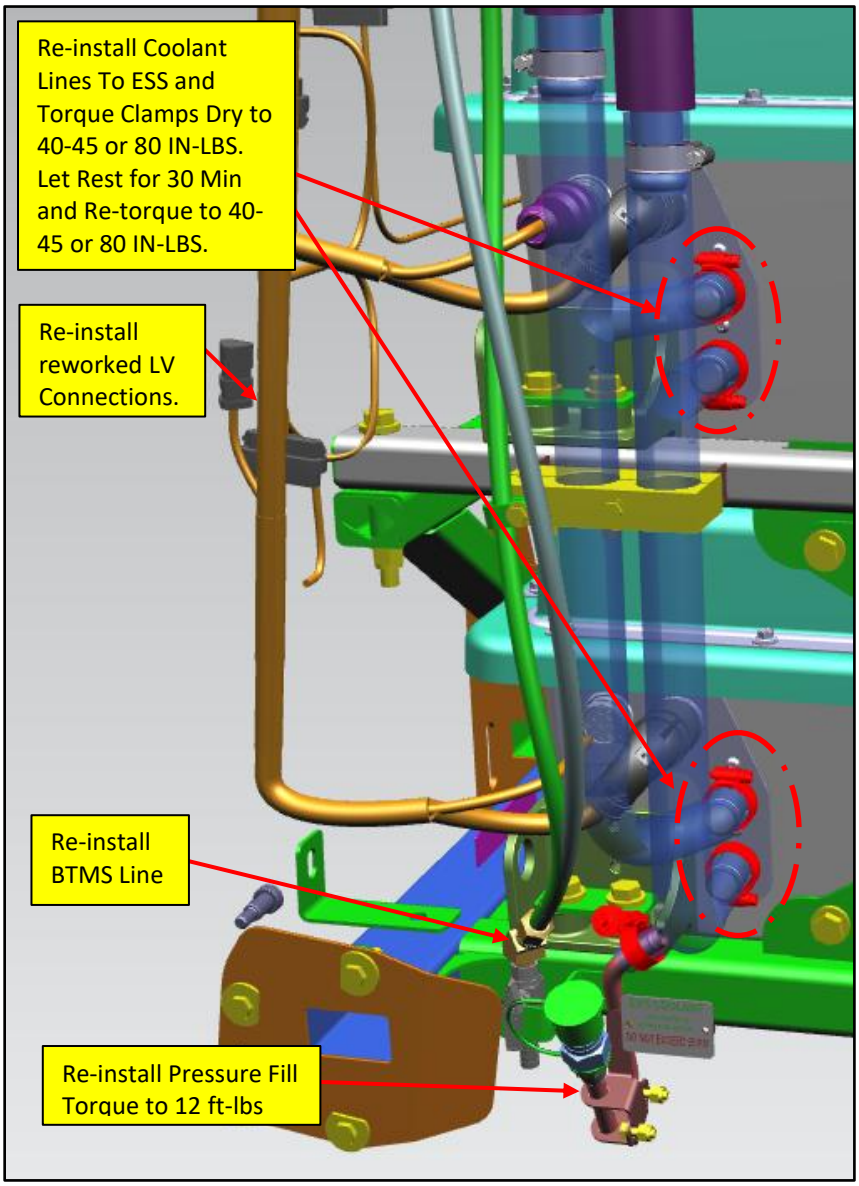


Figure 82: Low Voltage and Coolant Line Connections Location Reference

176. Fill ESS cooling system with Final Charge Coolant (NF PN: 376119), bleed thoroughly.

Note: Ensure BTMS filter is replaced with a new filter (NF PN: 902037).

- Perform cooling system pressure test prior to filling the system. See Appendix B.
- Connect a battery charger to the 12/24V batteries.
- Switch the 12/24V battery disconnect switch to ON.
- On the Driver's Side Console, set the Master Run switch to DAY-RUN.
- Place a clean bucket under the ¼ turn vent valve near the pressure fill location.
- Open the 1/4 turn vent valve attached to the clear vent line, located in the propulsion compartment beside the pressure fill port.
- Connect pressure fill hose to the coupler located at the bottom curbside rear corner.
- Fill the system until the coolant level indicator indicates FULL or a steady stream of coolant comes out the clear vent line into the bucket. Disconnect pressure fill hose.
- Turn ON the ESS Coolant Fill Mode.
- Maintain the coolant level at FULL on the coolant level indicator. Disconnect the pressure fill hose when not filling to prevent back-filling of the filling device.
- The fill mode will run for 20 minutes after the last CRITICAL LOW coolant indication to deaerate the system. The fill mode will turn itself off once the time has been reached.
- Verify the coolant level display is displaying FULL.
- Close the 1/4 turn vent valve located near the pressure fill port.

177. Replace all existing coolant plates i.e. motor/inv, cabin and ESS with new coolant plates. (NF PN: 1168788, 1168790 & 1168631). Reuse hardware.

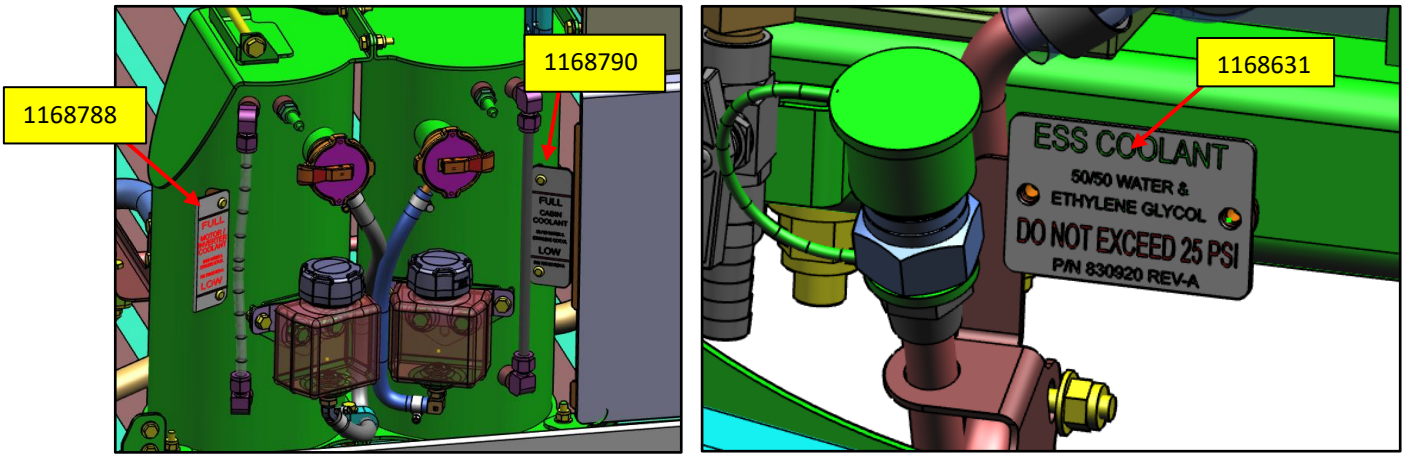


Figure 82: Replace Coolant Plates

179. Connect the ground cable to the ESS unit using the correct hardware. Apply anti-corrosion compound to ground connections.
    - For units with a ground stud application place cable on the ground stud with the existing flat washer and Nylon nut item #3 and torque nut to 17 ft-lbs. Reapply torque marks.
    - For units with the ground cable bolt mounting secure the ground cable to the unit with the existing washer and ½ IN bolt item #4 and Torque to 22 ft-lbs. Reapply torque marks.

    Note: Do not use mounting bolts longer than ½". Ensure to validate the torque based on stud or bolt application.
180. Re-connect the Pos and Neg HV connections to each rear ESS unit during the energizing procedure.

    Note: Refer High Voltage Safety for this procedure.

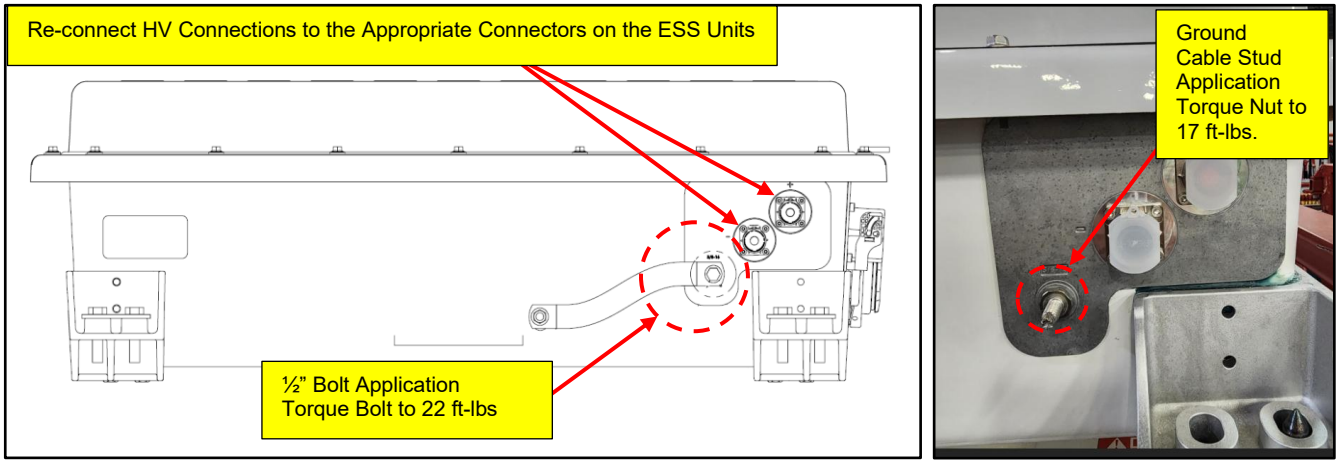


Figure 83: Rear Upper and Lower ESS Assembly Ground Stud and HV Cable Re-installation Location Reference

181. Reinstall support struts.

- Apply Never-Seez to upper threads of the struts and all hardware.
- Re-install struts and all hardware, leaving the upper hardware loose. Torque the lower lock nut to 250 ft-lb. (339 Nm). Reapply torque marks.
- Ensure the lower 1" nut at the top end of the strut is backed off, then tighten upper 1" nut until contact is made with upper mounting bracket.
- Measure the distance between the lower frame rail and upper vehicle structure.
- Continue to tighten upper nut until the 44.84" dimension is achieved and then tighten an additional two turns.
- Tighten lower 1" jam nut to 426 ft-lb. (578 Nm). Reapply torque marks.

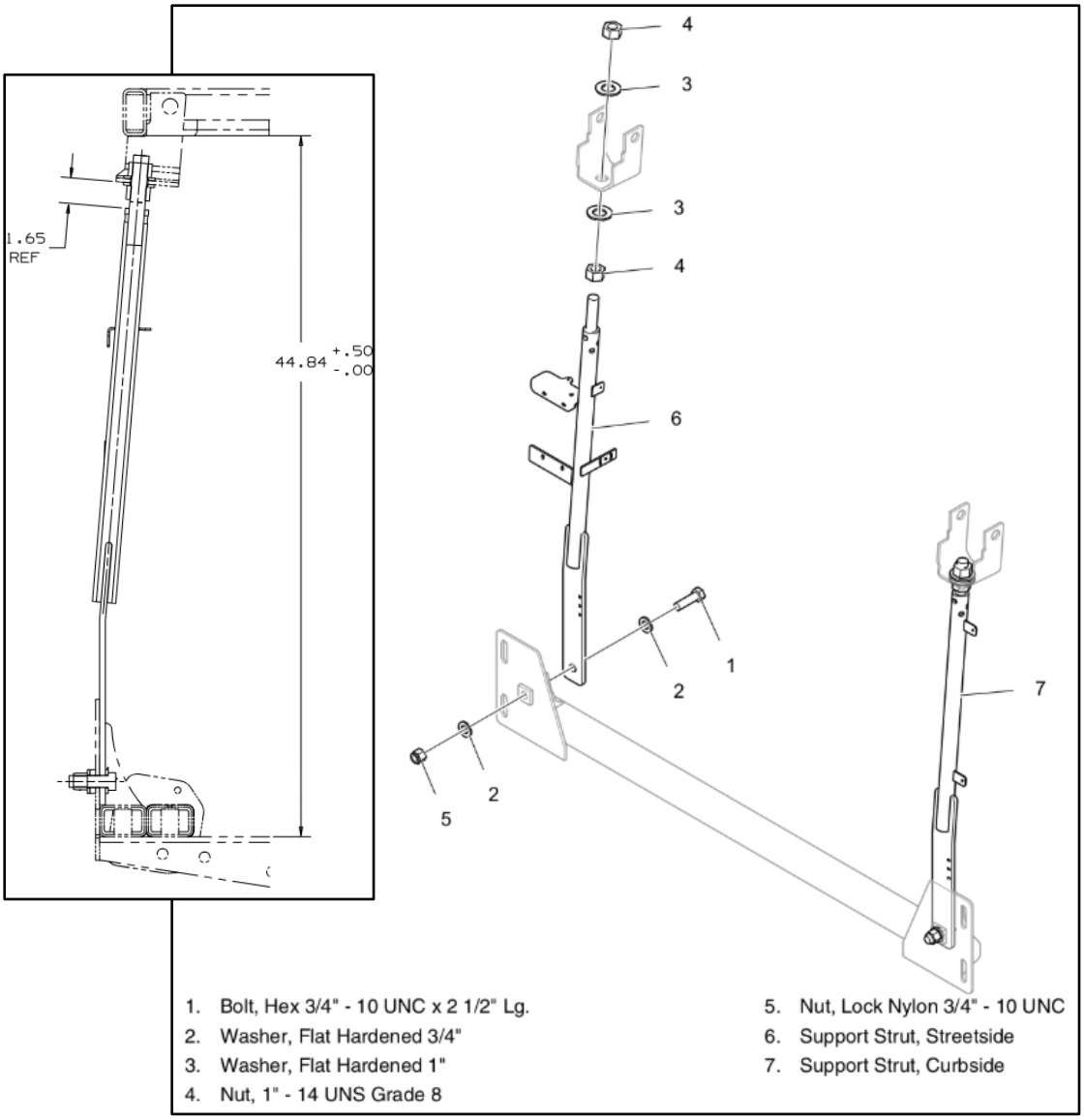


Figure 84: Support Strut Installation

182. Reconnect the HVAC drain lines that are attached to the rear vertical struts at three points. Reapply loctite-243 on hardware for mounting HVAC drain lines.

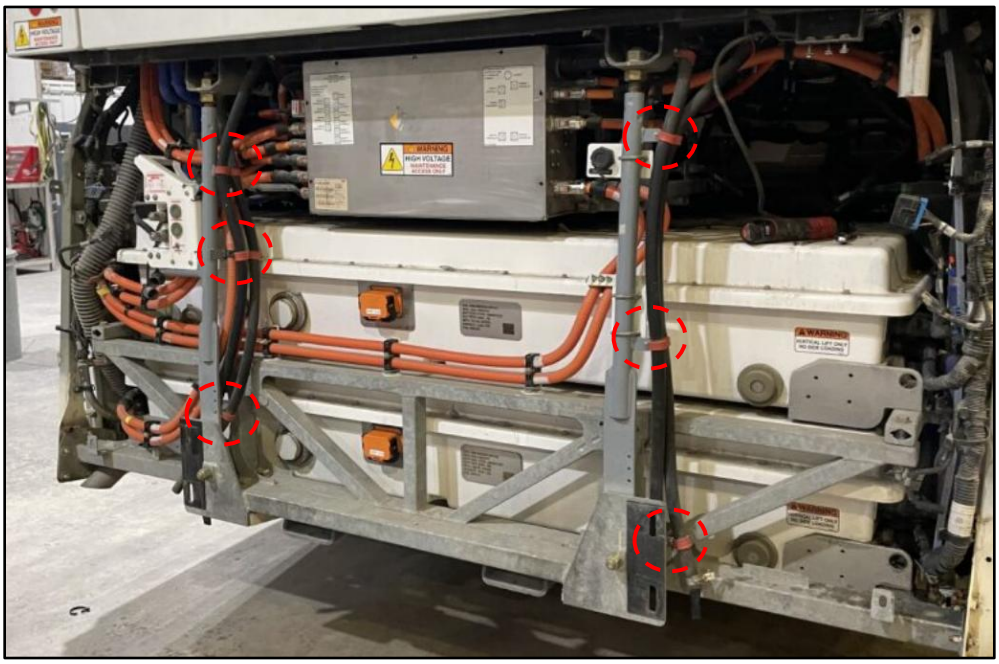


Figure 85: HVAC Drain Lines Reinstallation

183. If applicable, re-attached the charger box to the ESS cradle. Torque to 6 ft-lbs. Apply never seize.

184. Reconnect the HV cables to the charger box.

Note: Refer High Voltage Safety for this procedure.

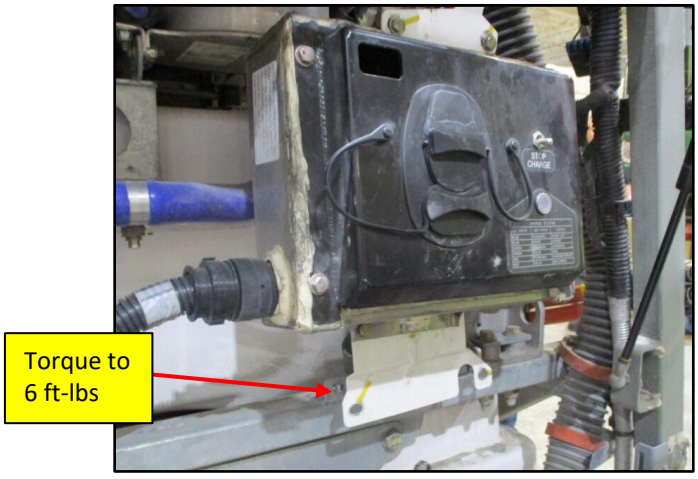


Figure 86: Charger Box Reinstallation

185. Reinstall the motor / inverter coolant fill panel to the streetside support strut. Reconnect the two twin clamps that secure the HV cables above and behind the fill panel. Reconnect the electrical connectors to the fill panel lights. Torque to spec per below. Reapply torque marks.

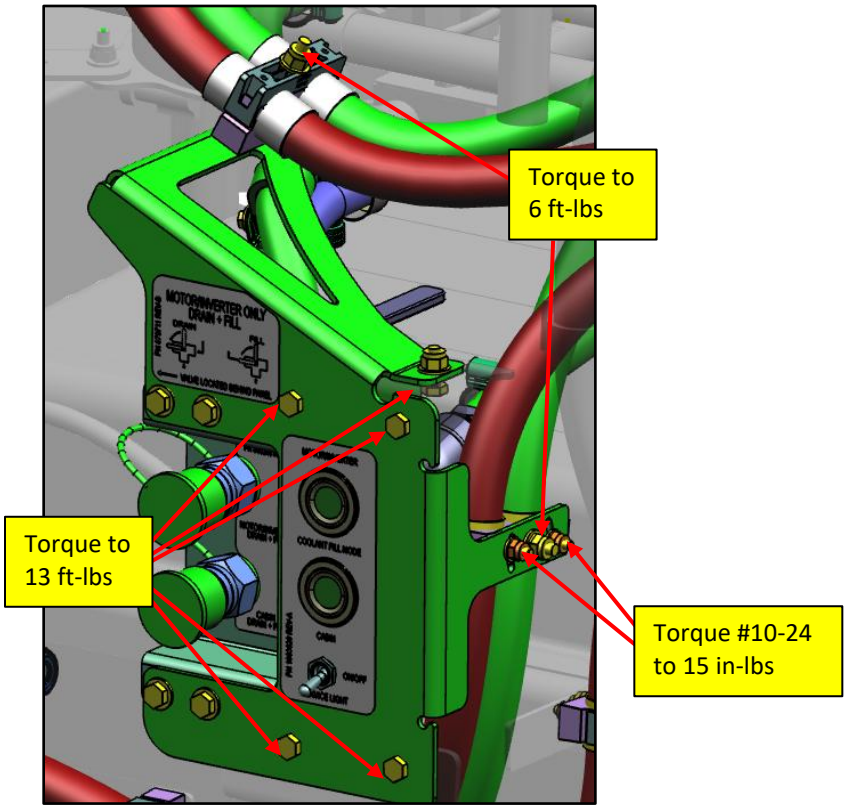


Figure 87: Motor / Inverter Fill Panel Reinstallation

186. Reconnect the four HV cables that run from the ESS units to the streetside of the High Voltage box. Follow the HV box connectors decal for connections.

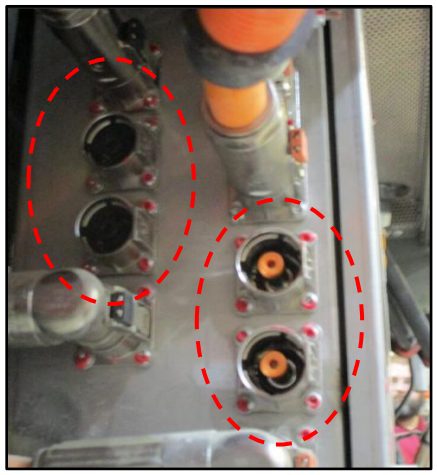


Figure 88: HV Box Streetside Connections

187. If applicable, reconnect the two HV cables that run from the ESS units to the curbside of the High Voltage box. Follow the HV box connectors decal for connections.

Note: Refer High Voltage Safety for this procedure.

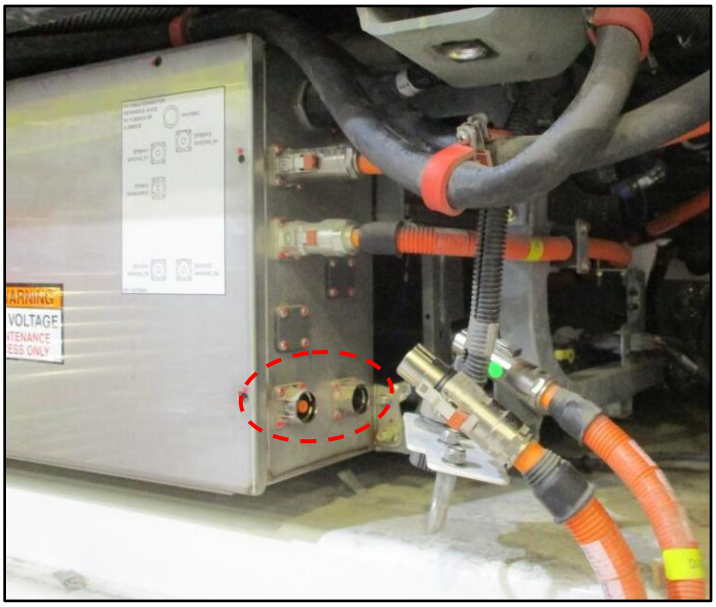


Figure 89: HV Box Curbside Connections

188. Re-install the curbside and streetside lower pillar mounting brackets and taillight. Secure using existing ½" bolts, flat washers replacing Nylock nuts (NF PN: 40N08000) if damaged. Torque hardware to 69 ft-lbs. Reapply torque marks.
189. Reconnect taillight electrical connections.

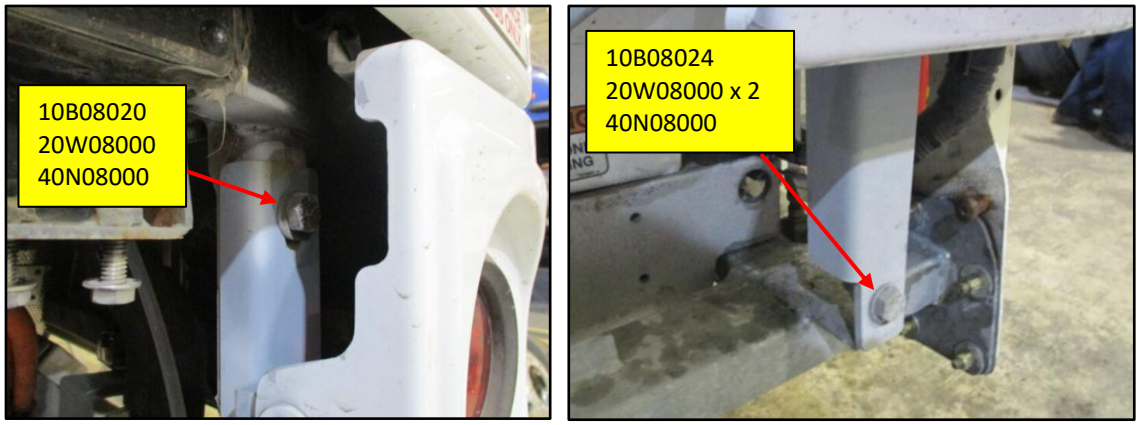


Figure 90a & 90b: Upper and Lower Corner Pillar Mounting Bracket Location Reference

190. Reinstall the rear ESS access door. Ensure proper alignment of the door, flush with the style lines of the rear crown and corner pillars. Torque hinge brackets hardware to 14 ft-lbs. Apply loctite-243. Reapply torque marks.
191. Reconnect gas springs to the bracket and door.

Note: During door removal, hinges were marked to help with alignment for reinstallation.

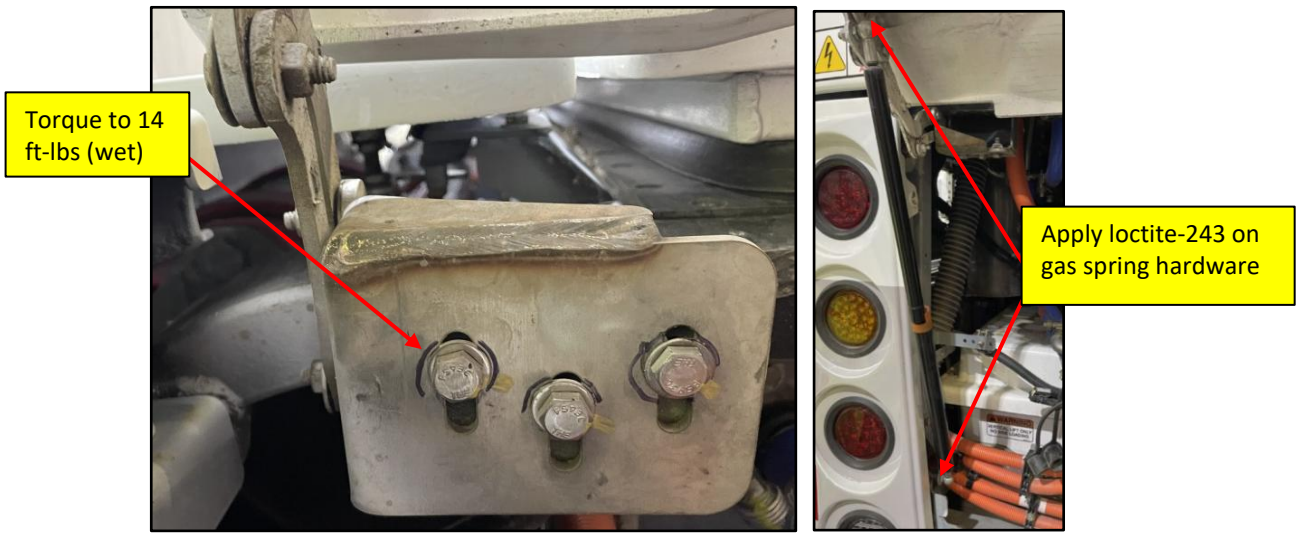


Figure 91a & 91b: ESS Door Reinstallation

192. Reinstall the rear bumper. Retorque rear bumper hardware to 106 ft-lbs. Apply 1-2 drops loctite-243 to the hardware threads. Reapply torque marks.

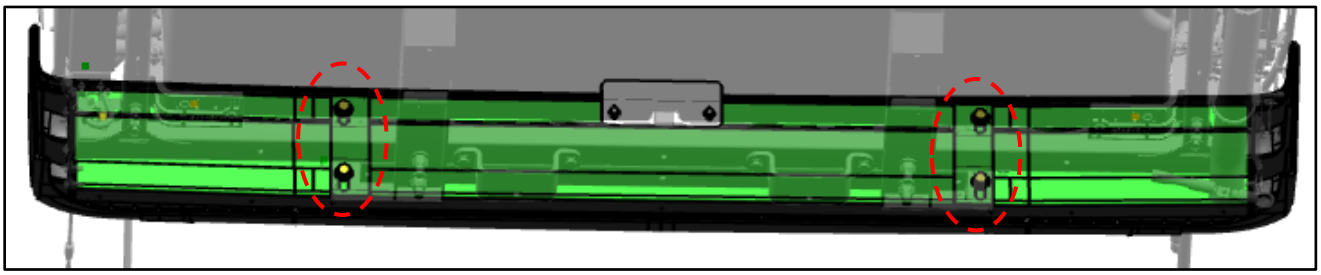


Figure 92: Rear Bumper Reinstallation

193. Perform High Voltage Energizing Procedure according to NF Service Manual.

Note: Refer High Voltage Safety for this procedure.

- Reconnect HV Connections to all ABS units.
- Reinstall MSD Plugs and save dummy plugs/dust caps.

194. Flip close the streetside sidescreen panels and re-install the existing hardware applying one or two drops of loctite-243 to their threads and torque to 50 in-lbs. Reapply torque marks.

195. Ensure bus has the latest programs loaded.

- PLC Program
- IP Program
- PVSG Program
- ABS APP and CAL Program (Procedure ref NF PN: 1068018)

196. Ensure all air drain valves are closed. Readjust bus ride height per New Flyer Service Manual.

197. Remove all tools and debris from work.

198. Perform Electrical Checkouts per Appendix F.

199. Notify NF Connect when the rework is completed to update the NF Connect software from XALT to ABS configuration. The bus needs to be in a location where cell service is available and needs to be powered up. Send an email to the following contact providing SR # and Bus Unit #:

- Andre Glicenstajn (andre_glicenstajn@newflyer.com)
- Jennifer Adriano (Jennifer_Adriano@newflyer.com)
- Ver Gamboa (Ver_Gamboa@newflyer.com)
- nficonnect_hardwarefieldsupport@newflyer.com

200. Charge the vehicle to 100%.

201. Perform Road Test Requirements per Appendix G.

202. Charge the vehicle back up to 100%.

203. Record the serial number of ABS packs and their corresponding string location, SR# and VIN#. Please send the following information to:

- Kira Petty (Kira_Petty@newflyer.com) and Sheldon Chudyk (Sheldon_Chudyk@newflyer.com)

SR	VIN	String Location #	ABS Serial Number

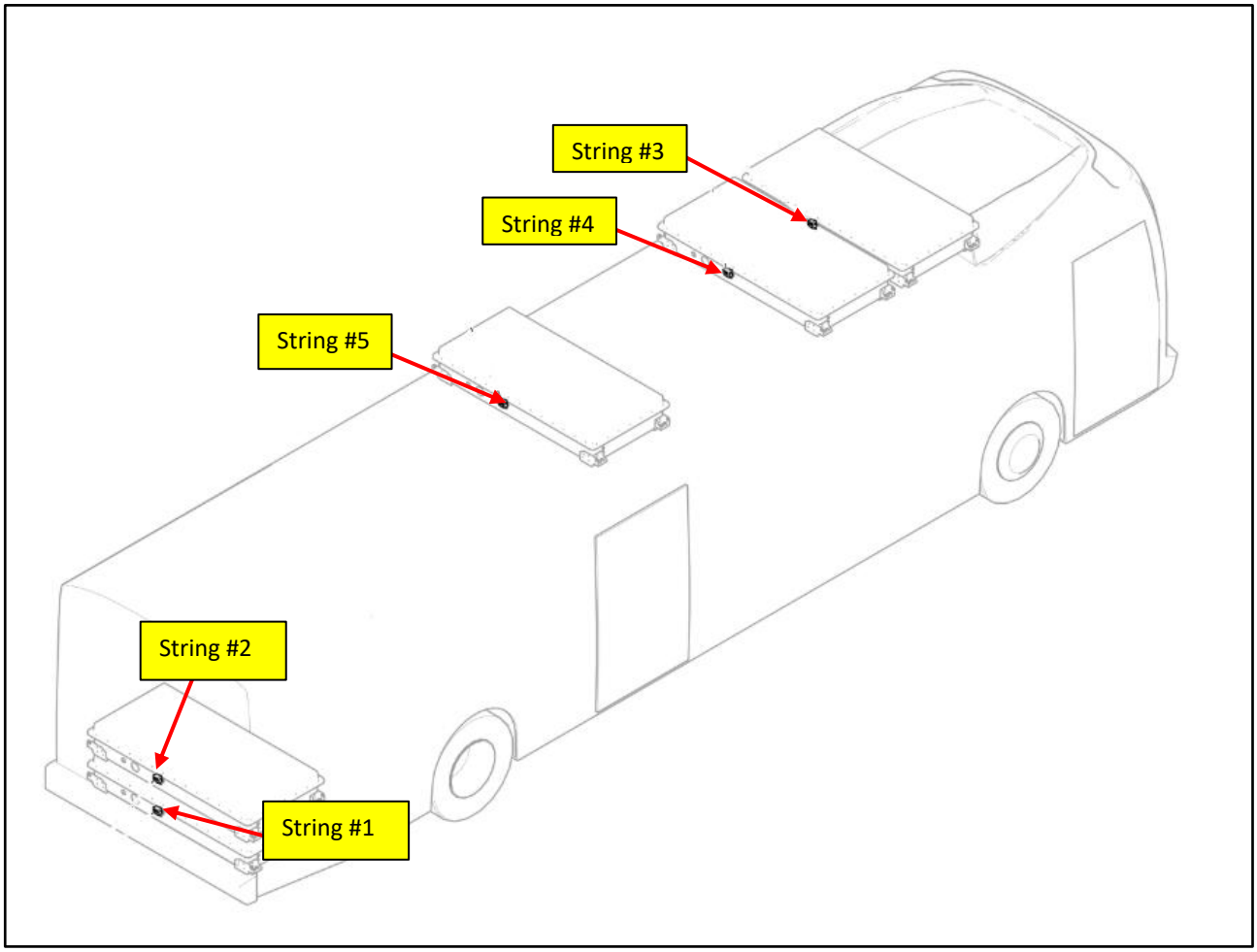


Figure 93: String Location # Reference

LABOUR ESTIMATE				
	Operation	Number of Technician(s)	Hours	Labor Time T X HR
1	Remove and Replace XALT Packs with ABS Packs XE40 ELFA2 5 str	3	40	120

PARTS REQUIRED					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	6508403	KIT-XALT TO ABS E2 XE40 5	1	ea	
2	1037316	ASSY-ESS STRING PACK, ABS	5	ea	
3	1090500	ASSY-DRAIN CARTRIDGE, GEN 2	20	ea	
4	055701	(OBS) SIKA 221 WHITE - FIELD USE ONLY	0.01	ea	Or 6504805
5	055702	AKTIVATOR-SIKA 205 1 LITRE	0.01	ea	
6	8111767	ANTI-CORROSION COMPOUND NYK-77	0.01	ea	New Orifice
7	081034	LOCTITE-243 MEDIUM 10ML	0.01	ea	New Orifice
8	5928660	NEVER SEIZE	0.01	ea	Or 20B04048
9	6504805	ANTISEIZE-P37 PASTE ULTRAPURE 500G	0.01	ea	
10	1163123	KIT-BTMS SURGE TANK MODINE	1	ea	
11	376119	ANTIFREEZE-FINAL CHARGE 50/50	55	gal	Or Source Locally
12	6702178	ANTIFREEZE-CASE(6X1 GAL) FINAL CHARGE CONCENT	1	ea	Or Source Locally
13	296-007U	DECAL-REAR PANEL	1	ea	Different per SR
14	296-060U	DECAL-SDS BOX 1	1	ea	Different per SR
15	296-060U	DECAL-SDS BOX 1	1	ea	Different per SR

PARTS IN KIT PN: 6508403					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	1167337	HRNS-JMPR ROOF XE40 5 STRING ELFA2	1	ea	
2	1167372	HRNS-JMPR RR COMPT ELFA2	1	ea	
3	14s04010	SCREW-MACH 1/4UNC X 5/8	4	ea	
4	14s04024	SCREW MC 1/4-20 x 1.50	13	ea	
5	50w04000	WASHER-FLAT 1/4 NOM	15	ea	
6	19-11-1010	BASE-CABLE MOUNT	4	ea	

7	351500	SPACER-DUAL SWIVEL SADDLE	1	ea	
8	608614	CLAMP-12MM DIA LN	13	ea	
9	5955945	TYRAP-14.0 BLACK	11	ea	
10	543632	CONN-9CCT SHR HD10 BK	5	ea	
11	525366	KIT-3CCT SHR DT BK	1	ea	
12	8110650	PLUG SEAL 16-12GA	48	ea	
13	182470	CAP-DUST 9CCT DIAG W/LANYARD	3	ea	
14	20b06016	BOLT SS 3/8 x 1 LG	1	ea	
15	50w06000	WASHER FLAT SS 3/8 NOM	2	ea	
16	42n06000	NUT-3/8-16 UNC NYLON LOCK SST	1	ea	
17	1166935	HRNS-JMPR XRFRHFRT TO XSDS ELFA2	1	ea	
18	1166937	HRNS-JMPR REPEATER TO XJBHRC	1	ea	
19	1150926	ASSY-SDS MINI PANEL	1	ea	
20	612394	DECAL-ESS DIAG	1	ea	
21	053084	TUBING-HEATSHRINK-4ID	1	ft	
22	14s96006	SCREW MACHINE 3/8	2	ea	
23	50w96000	WASHER FLAT SS NO. 6	1	ea	
24	291987	TIE-CABLE MOUNT	4	ea	
25	5958112	TYRAP-7.0 BLACK	4	ea	
26	8111672	END CAP .093BK-16PVC	18	ea	
27	22s00012	SCREW-MACH 10-24x0.75LG	1	ea	
28	500540	WASHER FLAT SST .205 ID	1	ea	
29	42N00000	NUT-NYLON LOCK #10 SST	1	ea	
30	54s00012	SCREW TP AB PAN 10 X .75	3	ea	
31	149833	PIN-18GA DEUTSCH	2	ea	
32	10b08036	BOLT-1/2 X 2.25	24	ea	
33	842568	PLATE-ESS SUPPORT	20	ea	
34	20W08000	WASHER FLAT HARDENED 1/2"	32	ea	
35	40N08000	NUT-HEX LOCK 1/2 NC	16	ea	
36	6492726	DESICCANT-MOL SIEVE 4-UNIT BAG	15	ea	
37	849968	GASKET-FRT ROOF CROWN BLKHD	1	ea	
38	10B08076	BOLT-HEX 1/2-13UNC X 4.75"	8	ea	
39	10B08068	BOLT HEX 1/2" 13UNC X 4.25" LG	8	ea	
40	1157818	BRKT-REINFORCEMENT SST	2	ea	

41	1157819	BRKT-REINFORCEMENT SST	2	ea	
42	1158424	BRKT-REINFORCEMENT SST	4	ea	
43	20B04040	BOLT-HEX 1/4-20X2.5 SST	2	ea	
44	1158306	ASSY-CLAMP W RUBBER 1.38 O.D. TUBE	1	ea	
45	1039321	SLEEVE-INSULATION DRAIN	10	ea	
46	1045605	SLEEVE-INSULATION DRAIN ABS	10	ea	
47	1074697	DECAL-WARNING LIFTING	20	ea	
48	6701871	CAP-ROUND END BLACK 1.0	10	ea	
49	6701875	CAP-ROUND END BLACK 0.625	70	ea	
50	902037	FILTER-DONALDSON	1	ea	
51	10B04048	BOLT HEX 1/4" 20 UNC X 3" LG	2	ea	
52	1084632	ORIFICE-ESS FLOW REDUCER 11.0 MM SPECIAL	2	ea	
53	1084631	ORIFICE-ESS FLOW REDUCER 12.0 MM SPECIAL	1	ea	
54	1168631	TAG-ESS PRESSURE FILL	1	ea	
55	1168788	TAG-SIGHT GLASS MOT/INV	1	ea	
56	1168790	TAG-CABIN COOLANT SIGHT GLASS	1	ea	
57	296-007U	DECAL-REAR PANEL	1	ea	Different per SR
58	296-060U	DECAL-SDS BOX 1	1	ea	Different per SR
59	296-060U	DECAL-SDS BOX 1	1	ea	Different per SR

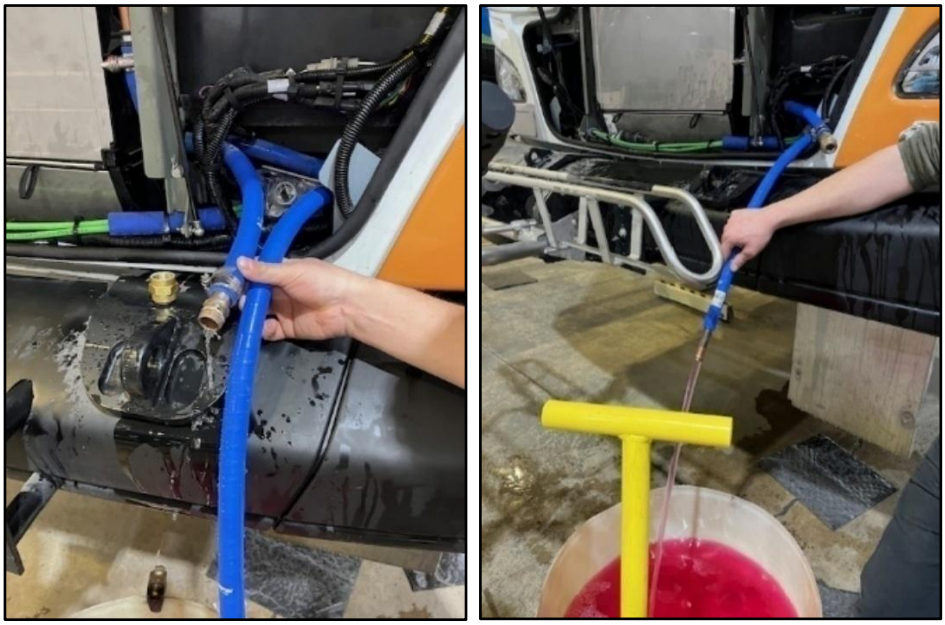
SPECIAL TOOLS REQUIRED

Item	Part Number	Description	Qty.	Units	Notes
1	N/A	FOAM-INSULATING SEALANT	1	ea	Source Locally
2	N/A	Distilled Water	90	GAL	Source Locally

Appendix A: Cabin and Motor/Inverter Cooling System Flush Procedure

Cabin Cooling System Draining Procedure

1. Open the cabin coolant reservoir access door located on the rear streetside of the vehicle.
2. Open the pressure cap to relieve the system pressure.
3. Attach a pressure drain hose to the coupler labeled Cabin drain fill connector.
4. Drain as much fluid out of the fill port using a pump.
5. Place a suitable container under the heater/defroster.
6. Disconnect a hose from the defroster and direct the hose into the container. You may need to connect an extra hose to direct flow to the container like shown below.

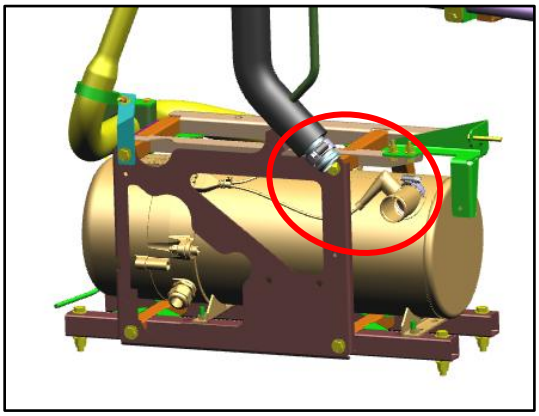


7. Connect shop air to the pressure fill port to push more fluid out of the system.
8. Install plugs with clamps into the defroster coolant hoses.

9. Lift the bus to gain access of the floor heater hoses. Place a suitable container under the hose.
10. If applicable, disconnect a floor heater coolant hose and direct hose into the container.
11. Connect shop air to the pressure fill port to push more fluid out of the system.
12. Install temporary plugs with clamps into the floor heater hoses.
    - Repeat step 10 and 11 for other floor heater hoses as required.
        - i.e. Some XE60s have floor heaters on front half of the bus and rear half of the bus. Drain both circuits independently.



13. If bus is not equipped with any floor heaters, disconnect a coolant hose from the coolant heater and direct hose into the container.
14. Connect shop air to the pressure fill port to push more fluid out of the system.
15. Reinstall coolant hose to the coolant heater.



16. After all coolant has drained, ensure any disconnected hoses have been reinstalled.

Cabin Cooling System Flush and Fill

17. Connect a battery charger to the 12/24V batteries.
18. Switch the 12/24V battery disconnect switch to ON.
19. On the Driver's Side Console, set the Master Run switch to DAY-RUN.
20. Set the defroster to HOT and the fan to LOW.
21. Open the surge tank access door.
22. Open the pressure relief lever and loosen the pressure cap on the "Cabin Coolant" reservoir fill neck.
23. Connect the pressure fill equipment to the coupler labeled Cabin Drain + Fill.

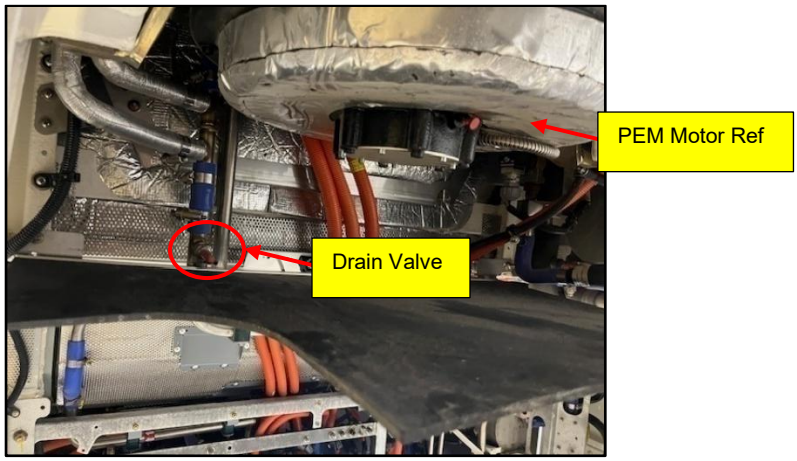


24. Fill the system with distilled water until the coolant level is at the full mark on the reservoir sight glass.
25. Locate the two coolant fill mode push buttons on the coolant reservoir fill switch panel and press the push button labeled CABIN.
26. Maintain the coolant level at the full mark on the sight glass. Record the total amount of water used to fill the system.
27. Run the fill mode for 20 minutes after the last coolant top up.
28. Turn off the cabin heating coolant fill mode.
29. Drain the water out of cabin coolant loop per outlined draining procedure
30. Inspect the color of water coming out of the system and ensure it's clear. Otherwise, pump more distilled water in until the system is clear then fully drain the system again.
    - Do this step through all drain hoses independently i.e. defroster, front floor heater, rear floor heater or coolant heater hose.
31. Use shop air to completely drain the system once system is flushed.
32. Reconnect the hose to defroster and torque breeze clamps to 40-45 in-lbs.
33. Perform pressure test before filling Cabin cooling system. See Appendix B.
34. Open the pressure relief lever and loosen the pressure cap on the "Cabin Coolant" reservoir fill neck.
35. Fill the system with 3 Gal of coolant Final Charge concentrate.
36. Fill the system with coolant mix Final Charge (NF PN: 376119).

37. Locate the two coolant fill mode push buttons on the coolant reservoir fill switch panel and press the push button labeled CABIN.
38. Maintain the coolant level at the full mark on the sight glass.
39. Run the fill mode for 20 minutes after the last top up.
40. Turn off the fill mode.
41. Tighten the fill cap and secure the pressure relief lever.

Motor/Inverter Cooling System Draining Procedure

42. Locate the motor/inverter coolant reservoir.
43. Operate the pressure relief valve on the pressure cap located on the reservoir.
44. Loosen the pressure cap.
45. Attach a pressure drain hose to the coupler labeled Motor/Inverter fill connector.
46. Drain as much fluid out of the fill port using a pump.
47. To completely drain the motor/inverter cooling system,
    - Locate the manual drain valve just upstream of the traction motor.
    - Open the drain valve and drain the coolant into a suitable container.
    - Connect shop air to the pressure fill port to push more fluid out of the system.
    - Close the drain valve.



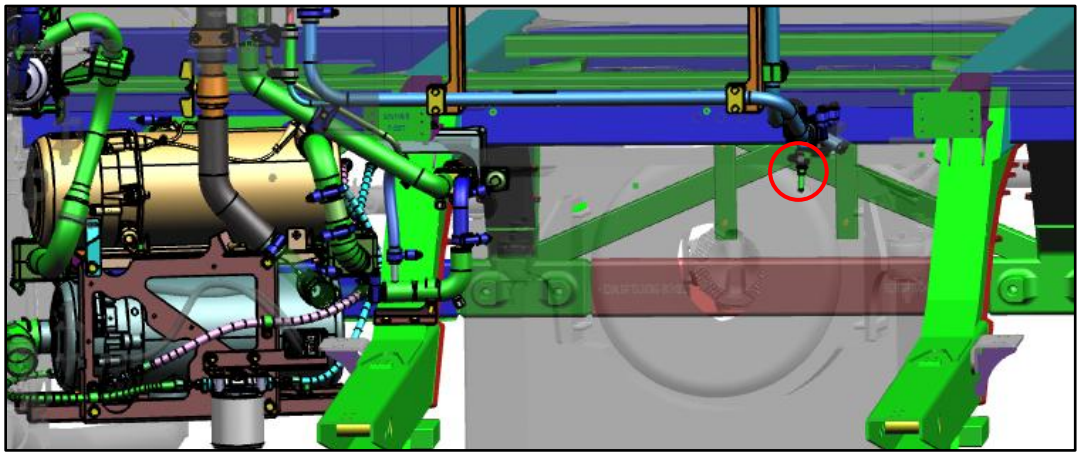
48. OR (if bus is equipped with VMAC compressor, use below procedure for draining).
    - Lift the bus to a reasonable height where you can access underneath the VMAC compressor.
    - Remove the drain plug and drain the coolant into a suitable container.
    - Connect shop air to the pressure fill port to push more fluid out of the system.
    - If drained via VMAC compressor, retorque per below after draining.
        - For the coolant drain extension, ensure the face seal O-ring is in place and apply fresh blue Loctite (242 or similar) to the threads of the extension. Torque to 10 N-m (90 in-lbs) with a ¾" socket.
        - The torque for the coolant drain plug (into the extension) is 7 N-m (60 in-lbs) with a 6mm hex bit.

Motor/Inverter Cooling System Flush and Fill

49. Connect a battery charger to the 12/24V batteries.
50. Switch the 12/24V battery disconnect switch to ON.
51. On the Driver's Side Console, set the Master Run switch to DAY-RUN.
52. Open the pressure relief lever and loosen the pressure cap on the "Motor & Inverter Coolant" reservoir fill neck.
53. Connect the pressure fill equipment to the coupler labeled Motor/Inverter fill drain.



54. Place the three-way valve in the fill position.
55. Fill the system with distilled water until the coolant level is at the full mark on the reservoir sight glass.
56. Locate the two coolant fill mode push buttons on the coolant reservoir fill switch panel and press the push button labeled CABIN.
57. Maintain the coolant level with distilled water at the full mark on the sight glass.
58. Run the fill mode for 20 minutes after the last coolant top up.
59. Turn off the motor/inverter coolant fill mode.
60. Drain the motor/inverter cooling system. Place a suitable container beneath the drain port.
    - Manual Drain Valve – No lifting required but may not fully drain the system.



- Drain via VMAC Compressor – Lift the bus to a reasonable height and remove the drain plug underneath the VMAC Compressor.



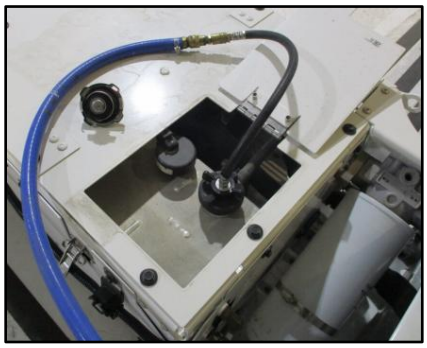
61. Inspect the color of water coming out of the system and ensure it's clear. Otherwise, pump more distilled water in until the system is clear then fully drain the system again.
62. Connect shop air to the pressure fill port to push more fluid out of the system.
63. If drained via VMAC compressor, retorque per below.
    - For the coolant drain extension, ensure the face seal O-ring is in place and apply fresh blue Loctite (242 or similar) to the threads of the extension. Torque to 10 N-m (90 in-lbs) with a ¾" socket.
    - The torque for the coolant drain plug (into the extension) is 7 N-m (60 in-lbs) with a 6mm hex bit.
64. Perform pressure test before filling Motor/Inverter cooling system. See Appendix B.
65. Open the pressure relief lever and loosen the pressure cap on the "Motor/INV Coolant" reservoir fill neck.
66. Fill the system with 1 Gal of Final Charge coolant concentrate first.
67. Fill the system with Final Charge coolant mix (NF PN: 376119).
68. Locate the two coolant fill mode push buttons on the coolant reservoir fill switch panel and press the push button labeled MOTOR/INVERTER.
69. Maintain the coolant level at the full mark on the sight glass.

70. Run the fill mode for 20 minutes after the last top up.
71. Turn off the fill mode.
72. Tighten the fill cap and secure the pressure relief lever.

Appendix B: Cooling System Pressure Test (Ref: 298-304U)

Pressure Test Setup

1. Access the roof of the bus, open the curbside access cover on the BTMS (Battery Thermal Management System) box and locate the cooling system pressure cap.
   Note: The cooling system is under pressure and contains hot fluids that can spill or spray and cause serious scalding injuries. Allow an appropriate amount of time for the cooling system to cool down below 120°F (49°C) before working on the cooling system unless otherwise noted.



2. Ensure the pressure relief cap on the coolant fill neck is tight and the pressure relief lever on the cap is closed. The BTMS cover must be removed and the 4 psi pressure relief cap replaced with the high pressure test rad cap (NF PN: 590112).
3. Ensure all drain cocks are closed and all drain plugs are installed.
4. Ensure all shutoff valves are open.
5. Remove the cap on the pressure fill port and set aside.
6. Remove the cap on the overflow tank (if applicable).
7. Connect the leak down tester (NF PN: 594400 or 660817) to the system pressure test/fill port and close the 1/4 turn shutoff valve on the test tool.
8. Secure test apparatus and hose to prevent personal injury or damage to coach while conducting the pressure test.



9. Attach a shop air line to the quick coupler on the pressure tester.

Cooling System Pressure Test Procedure

10. Completely close the manual regulator knob.
11. Open ¼ turn valve.
12. Check & record the pressure rating listed on the rad cap.
13. Slowly introduce pressured from 0 psi to the rad cap rated pressure, by holding the down the tester valve. Allow pressure to rise until it reaches above the surge tank pressure cap setting. Adjust pressure tester regulator setting if necessary to increase the pressure.

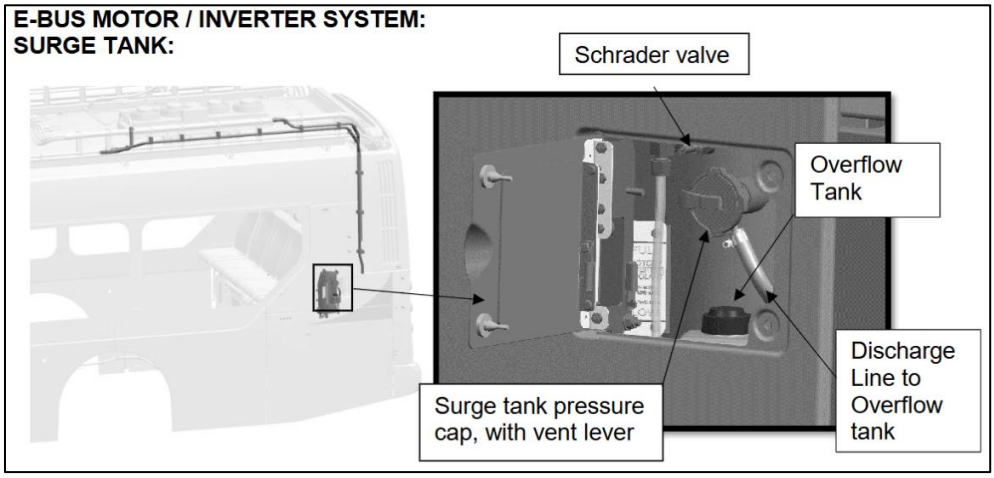
    NOTE: DO NOT EXCEED 25 PSI TEST PRESSURE
14. Record the pressure that all surge tank relieves at. Verify surge tank pressure cap relieves between 10 – 16 psi for a 16 psi rated cap, 12-18 psi for a 18 psi rated cap. Air will vent out through the coolant overflow line. Record relief pressure (PSI) on all applicable systems:

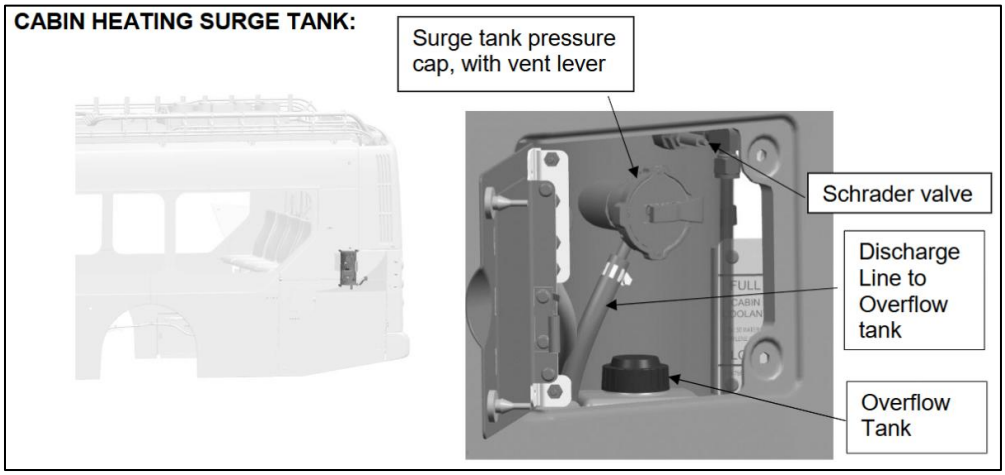
    a. **MOTOR / INVERTER TANK RELIEF PRESSURE: _____ psi**
    b. **CABIN SURGE TANK RELIEF PRESSURE: _____ psi**
    c. **CENTER AXLE SURGE TANK* RELIEF PRESSURE: _____ psi**
    d. **ESS SURGE TANK* RELIEF PRESSURE: _____ psi**
    e. **PASS_____ FAIL_____**
15. Ensure hose between surge tank and discharge outlet is free of leaks, kinks, or debris.
16. Collect the extra coolant in the catch bucket at the curbside rear of the bus. When coolant stops draining, the 15 psi air can be disconnected.
17. Stop pressurizing and allow system pressure to stabilize for 5 minutes. For a 16 psi rated cap, the system should stabilize around 14 psi however as low as 10 psi is acceptable. For a 18 psi cap, the system should stabilize around 16 psi however as low as 12 psi is acceptable. Air will vent out through the coolant overflow line. Record stabilization pressure (PSI) on all applicable systems:

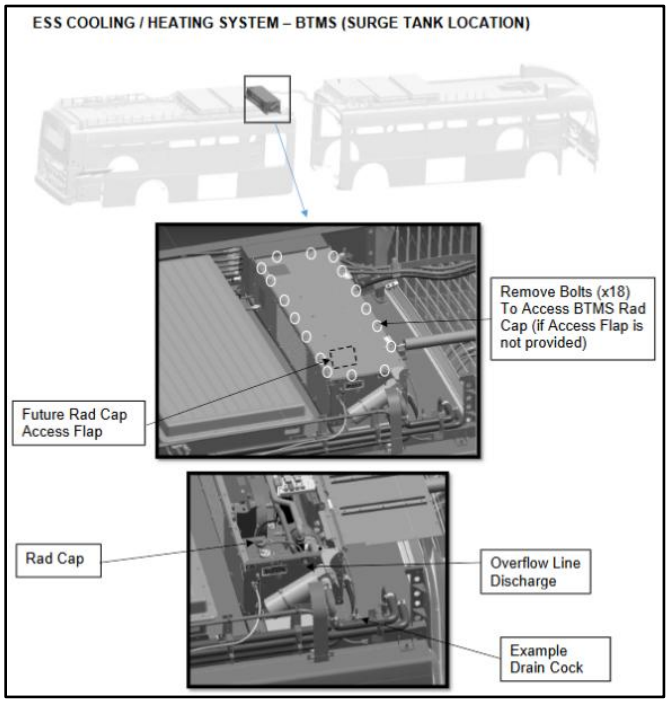
    a. **MOTOR / INVERTER TANK STABILIZATION PRESSURE: _____**
    b. **CABIN SURGE TANK STABILIZATION PRESSURE: _____**
    c. **CENTER AXLE SURGE TANK* STABILIZATION PRESSURE: _____**
    d. **ESS SURGE TANK* STABILIZATION PRESSURE: _____**
    e. **PASS_____ FAIL_____**
18. Allow to stand for another 10 minutes. If pressure drops more than 0.5 psi during that time, troubleshoot for system leaks. Record final pressure on all applicable systems:

    a. **MOTOR / INVERTER TANK FINAL PRESSURE: _____ psi**
    b. **CABIN SURGE TANK FINAL PRESSURE: _____ psi**
    c. **CENTER AXLE SURGE TANK* FINAL PRESSURE: _____ psi**
    d. **ESS SURGE TANK* FINAL PRESSURE: _____ psi**
    e. **PASS_____ FAIL_____**
19. If test passes, close ¼ turn valve and disconnect shop air. Disconnect test apparatus from bus and reattach Schrader valve or pressure fill port cap. Vent surge tank pressure using pressure cap relief lever and proceed with antifreeze/coolant fill (304-090u).

20. If pressure loss is detected, using shop air, maintain maximum air charge (between 10 and 18) and physically inspect all possible leak points at hose clamps, motor connections, front defroster connections, A/C unit, floor heaters, booster pump, surge tank, battery pack connections, etc. Use soapy water spray to help detect leak. Repeat step 30 until no pressure loss is detected.
21. If surge tank pressure cap is venting below specified range, relieve system pressure. Remove cap and inspect for defects. Replace cap if defective, then repeat step 13-21.



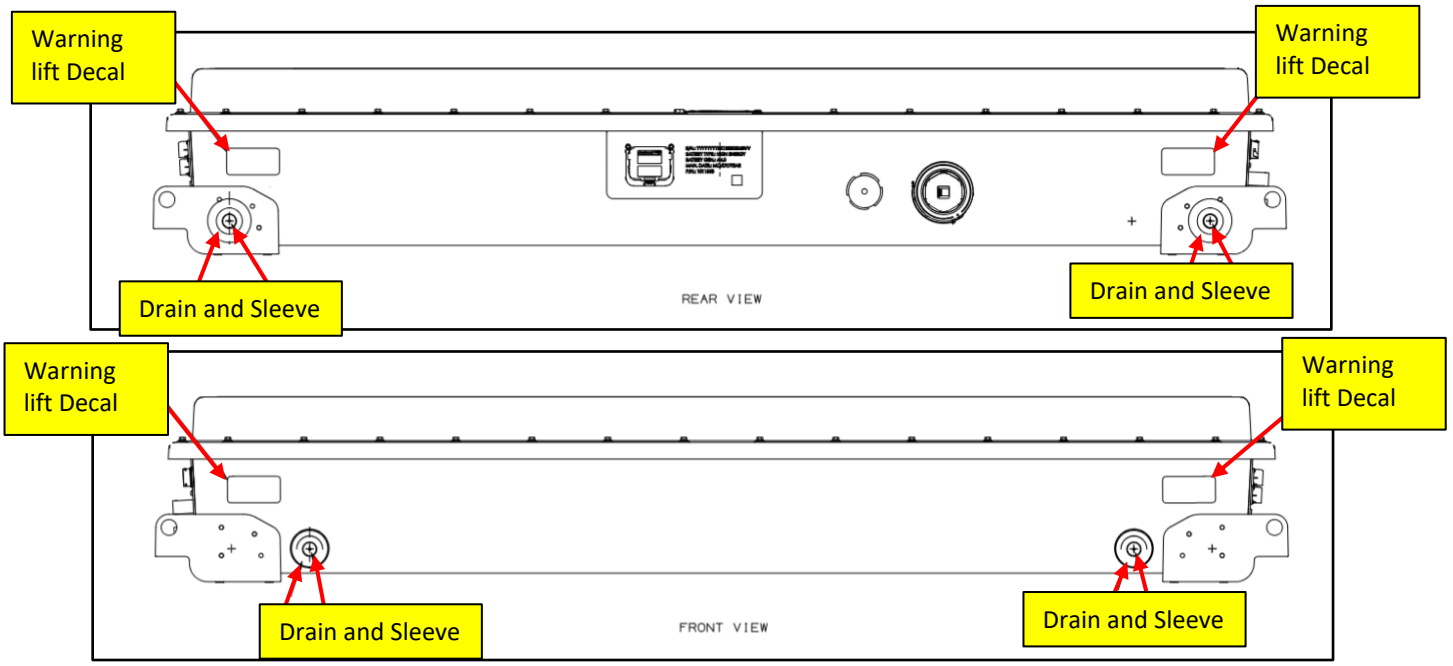


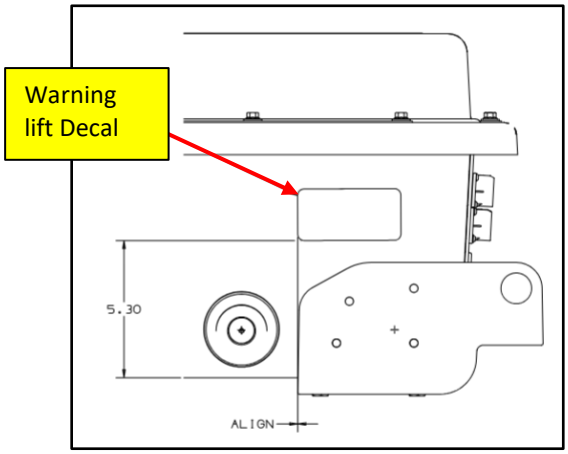

ESS COOLING / HEATING SYSTEM – BTMS (SURGE TANK LOCATION)
Remove Bolts (x18) To Access BTMS Rad Cap (if Access Flap is not provided)
Future Rad Cap Access Flap
Rad Cap
Overflow Line Discharge
Example Drain Cock

Appendix C: ABS String Pack Assembly

ABS String Pack Assembly

1. Install all four drain cartridges (NF PN: 1090500) on ABS string pack (NF PN: 1037316). Torque drain cartridge to 40 ft-lbs.
2. Snap fit insulation sleeves on drains.
   - Install sleeve (NF PN: 1039321) on drains located at the front of ESS enclosure.
   - Use sleeve (NF PN: 1045605) on drains located at the rear of ESS enclosure.
3. Install warning lifts decals (NF PN: 1074697) as shown below.
4. Perform pressure test and checkout procedure on each ABS pack. Refer to Appendix D and E of this ITS.

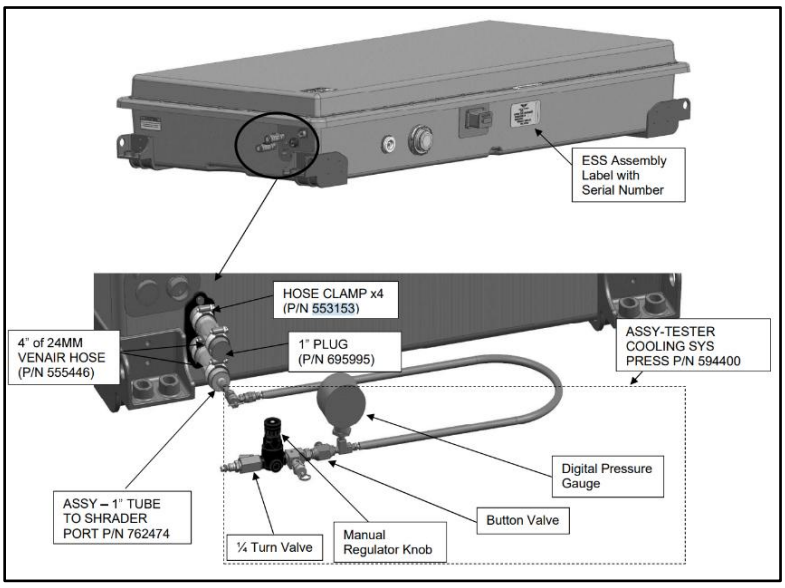




Appendix D: ESS Pressure Leak Test (NF PN: 1032616)

ESS Leak Test

1. Ensure all hose clamps are torqued to spec (70 in-lbs) and all coolant connections are complete.
2. Install test equipment on inlet and outlet per Figure X.
3. Completely close the manual regulator knob.
4. Connect shop air to the pressure tester.



5. Open ¼ turn valve.
6. Slowly introduce pressure from 0-35 psi.

   Note: DO NOT EXCEED 40 PSI TEST PRESSURE
7. Once 35 psi is reached, allow system pressure to stabilize for 5 minutes.
8. Record the stabilization pressure: _____ psi & time _____.

ESS ASSY SERIAL NUMBER: _____

LOCATION COMPLETED: _____

COMPLETED BY: _____

COMPLETION DATE: _____

Stabilization Pressure: (PSI)	Time: (mm:ss)	Final Pressure: (PSI)	Pass/Fail:
	5:00		
	10:00		
	15:00		

Note:
A drop of more than 0.2 psi between 5:00 & 15:00 would be noted as a fail. After trouble shooting to find & repair the leak, the test will be repeated.

9. Allow to stand for 14:20 minutes.
10. If the pressure drops by more than 0.4 psi during that time, troubleshoot for leaks.

    Note: DO NOT EXCEED 40 PSI TEST PRESSURE.HIGH VOLTAGE SAFETY GUIDELINES & PROCEDURES P/N 532295 MUST BE FOLLOWED WHEN CHECKING FOR LEAKS NEAR HIGH VOLTAGE CONNECTIONS.

    a. Using shop air, maintain maximum air charge (35 psi) and physically inspect all possible leak points at hose clamps, battery pack connections, etc. Visual and audible inspection methods for leaks is the preferred method for detecting leaks near high voltage battery connections.
    b. Correct any defect and repeat testing until no pressure loss is detected.
11. Record the final pressure: _____ psi & time _____. Connect shop air to the pressure tester.

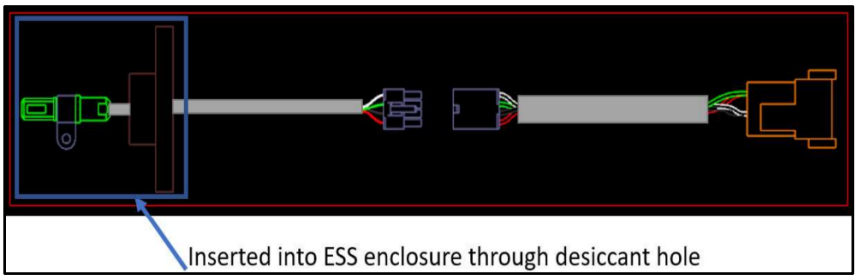
Appendix E: ESS Checkout Procedure (NF PN: 956187)

Section A: Initial Setup

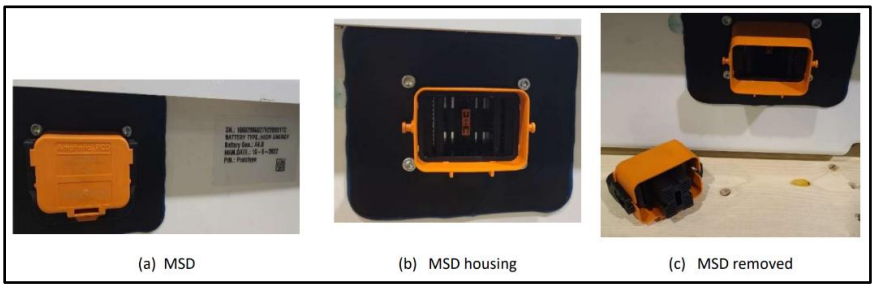
1. Proper PPE must be worn when near the batteries.
2. No voltage higher than the 120 VAC/24 VDC supply is present in the NG ESS Checkout Tool v2.
3. Equipment needed to perform the checkout procedure:
    a. NEXIQ USB Link 2
    b. Laptop with VMMS installed
    c. VN1630 logger with an active live logging license
    d. ESS Checkout tool v2 kit (NF PN: 853831)
4. PROC and CHECKOUT procedures on ESS Units before installation

    Note 1: The CM0711 and VMM programs are installed only once when the NG ESS Checkout Tool v2 is first assembled. They should never be loaded again unless there are updates to these programs. To interface a laptop with the CM0711 or VMM connect a NEXIQ to channel 1 of the PROP DIAG connector.
5. Remove the desiccant basket from the ESS enclosure and insert ASSY-HUMID/TEMP SENSOR P/N 1016121. Use HRNS-REL HMD/TEMP JUMPER P/N 1016080 to connect P/N 1016121 to the NG ESS Checkout Tool REL HMD/TEMP port. Completing this step first will allow the sensor to stabilize to the ambient conditions of the ESS enclosure while the other steps of the checkout are performed. The checkout tool temp/humidity sensor must have at least 10 min to stabilize or the Sensor LED may flash purple or blue.

    Note: Once the checkout is complete, remove 1016121 and re-insert the desiccant.

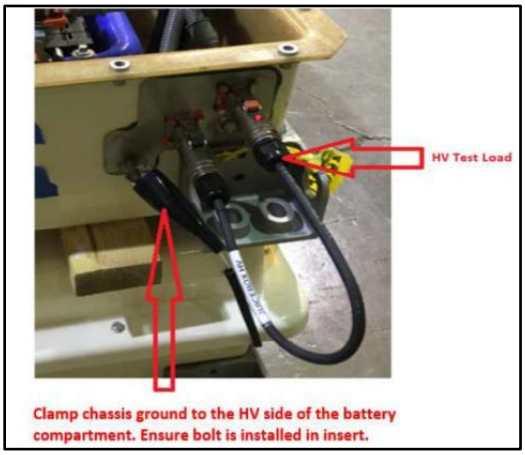


6. Replace the cap with the MSD in the battery compartment that is being checked.



7. Plug in HRNS- N port of the NG ESS Checkout Tool and plug the other end to the ESS compartment under test.

   Note: Ensure that a threaded bolt is temporarily fastened to the ABS pack. This will be the location for clamping the chassis ground. See Figure 6 below.

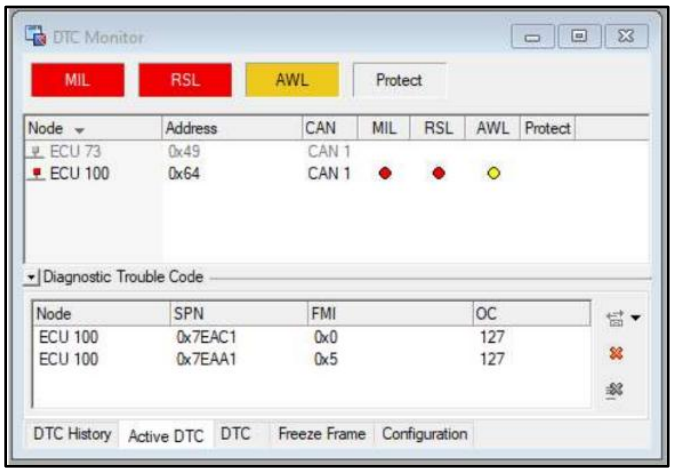




8. Plug the NG ESS Checkout Tool into 120 VAC.
9. Ensure the ESS SELECTOR switch on the NG ESS Checkout Tool is set to ABS. **Do not adjust this switch when the LV SYSTEM POWER is ON.**
10. Connect a computer running CANalyzer to the test box using the 9-pin diagnostic port via the VN1630 or VN1640 logger with an active live logging license installed. Once connected, enable live logging and pull up the DTC Monitor window.
11. Insert the key into the LV SYSTEM POWER switch and turn 90 degrees to the right to activate. The LV SYSTEM POWER OK green LED should turn ON. This indicates that the Checkout Tool has power.

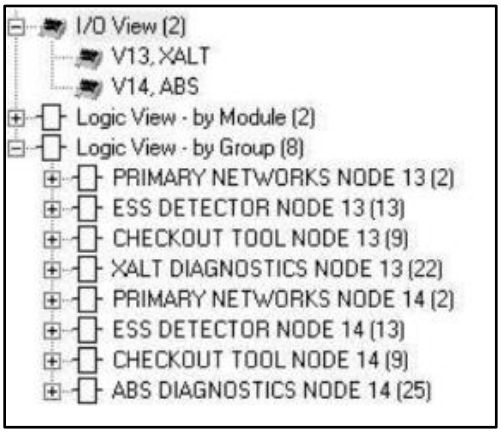
Section B: ESS Pack Level Testing via NG ESS Checkout Tool

12. Confirm Section A has been completed either for at least 10 min, OR the green LED illuminates, otherwise the ESS SENSOR check may not work.
13. Turn the MRS switch to ON to provide power to the BDU within the pack. The NG ESS Checkout Tool is designed to work with pack 1 (speaker) and will communicate to the battery management system (BMS) over CAN. At this stage, wait 2 minutes for internal isolation and maturation to occur. A flashing green STRING LED means that the pack is fault-free with its contactors open. After the 120 second wait, push up on the START switch to close pack contactors. The STRING LED will go steady green when contactors are closed and the red light on the HV test load should illuminate. If the SENSOR LED is steady green, remain in this state for 2 minutes, while waiting, observe the DTC Monitor in CANalyzer to confirm no faults occur (see image below).



14. If the LED remains green, that means that all sensors are connected and reporting valid ranges. Otherwise, refer to Table 1 to investigate which sensor is not working. The SENSOR LED indicates only one sensor in prioritized order.
    a. The STRING LED may flash red if the HVIL circuit is broken or there is no program in the BMS. Double check that the ASSY-HV TEST LOAD P/N 853639 was installed in Section A step 4. The SENSOR LED may also flash blue or purple if there is no program in the BMS since the average battery cell temperature signal must be available over CAN to validate the ESS enclosure temperature and humidity sensor. If necessary, consult the troubleshooting guide P/N 854770 Section 2.2 for viewing information through Vansco Diagnostics.
    b. A steady red STRING LED indicates that the pack has a fault. A NEXIQ can be connected to channel 1 of the PROP DIAG port to look for additional battery and ESS sensor information through Vansco Diagnostics. Alternatively, a CAN log can be taken on the EBUS DIAG (ch1:500k; ch2:500k) port for detailed analysis of the fault(s) in CANalyzer. EBUS DIAG provides propulsion CAN and internal battery CAN. Vansco Diagnostics provides numeric readings of the ESS enclosure sensors and checkout tool reference sensor. It also provides pack

application/calibration software versions, min/max SOC, min/max SOH, min/max cell temp, min/max cell voltage, and pack voltages on both sides of the contactors. See P/N 854770 for full details and refer to the Node 14 groups for ABS batteries. Note any useful information in the comments section of point 5.



15. STRING LED and SENSOR LED status are shown in Figure 9 below. Descriptions of the various LED statuses are given in Table 1 and Table 2.



Table 1 SENSOR LED Descriptions. Numeric readings of sensors can be checked in Vansco Diagnostics.

SENSOR LED	Description
Green	All sensors are working
Red	Fire Detection sensor
Amber	Leak Detection sensor
Purple	Relative Humidity sensor
Blue	Temperature sensor
Slow Flash	Open/shorted.
Fast Flash	Alarm. Indicates that the sensor is reading erratically, or the checkout tool temp/humidity reference sensor may not be plugged in or stabilized to the ambient conditions of the ESS enclosure (confirm Section A step 1 was completed).

Table 2 STRING LED descriptions.

SENSOR LED	Description
Steady Green	Contactors closed
Flashing Green	Pack awake and fault free; contactors open
Steady Red	Pack faulted. Connect NEXIQ to PROP DIAG ch1 to view battery information in Vansco Diagnostics. Connect CAN logger to EBUS DIAG port (ch1: 500k; ch2:500k) to log propulsion CAN and internal battery CAN. Refer to Checkout Tool TOO/Troubleshooting Guide (NF PN: 854770) as needed.
Flashing Red	Break in HVIL circuit or no program in the BMS
Steady Amber	Pack initializing, pack shutting down (cooldown)
OFF	Pack Off

16. Turn the MRS switch OFF. The SENSOR LED will turn off. The STRING LED may turn amber while the pack is shutting down. Once the STRING LED is off, **wait for 10 seconds.**
17. Turn the MRS switch to ON to provide power to the BDU within the pack again, **then wait another 10 seconds.** This repeat step verifies no contactor faults are present after the initial power cycle. To verify this, confirm no faults are present at this time using the DTC Monitor in CANalyzer.
18. Turn the MRS switch OFF. The SENSOR LED will turn off. The STRING LED may turn amber while the pack is shutting down. Once the STRING LED is off, **wait for 10 seconds**, then it is safe to turn OFF the LV SYSTEM POWER switch.
19. When the LV SYSTEM POWER OK green LED is OFF, it is safe to unplug the power to the NG ESS Checkout Tool and remove the HV Test Load. **NOTE: The RED LED must be off on HV Test Load before unplugging!** Disconnect the ESSCONNBOX harness from the battery compartment.

20. Once the BDU has properly shut down, remove the MSD and replace the cap.
21. Provide the following information:

		INCOMPLETE CODES: P Parts Shortage, I Incomplete Installation, C Component Failure, D Design Problem	Pass ✓/NR	Incomplete	Comments/Notes
		Inspection			
1	.01				
		NG ESS Checkout Tool SENSOR LED **Steady Green** Status			
1	.02	NG ESS Checkout Tool STRING LED **Steady Green** Status			
1	.03	ASSY-HUMID/TEMP SENSOR P/N 1016121 removed from ESS enclosure and desiccant re-installed.			

Appendix F: Electrical Checkouts

Please perform the following checkouts below.

298-003U CHECKOUT-CRITICAL ELECTRICAL

- BTMS System sections 8.01 to 8.10 need to be executed
- ESS Detectors (Juicebox System) sections 9.01 to 9.04 need to be executed.

298-049U CHECKOUT-DC DEPOT SHOP CHARGER

298-065U or 298-068U CHECKOUT-EV DRIVE MODE

298-070U CHECKOUT-LOW VOLTAGE ELEC

- You are required to complete these steps: Sheet 5, Step 8; Sheet 9, Step 4; Sheet 11, Steps 5 and 6; Sheet 13, Step 13; Sheet 15, Step 13.

298-080U CHECKOUT-HIGH VOLTAGE ELEC

- Only Part 6, Section 12 (ESS Checks) should be performed. - **ENSURE COMPLIANCE WITH ALL SAFETY PROTOCOLS**

298-146U CHECKOUT-ESS BATTERY FINAL

Appendix G: QA Road Test Requirements

Functional Test

FUNCTIONS	OK	SNAG	EMP #	NG	Insp
ENGINE AREA:					
* Fuel Cell Coolant Level					
* ESS Coolant Level					
* Motor / Inverter Coolant Level					
* BTMS Coolant Level					
* Center Axle Motor Coolant Level (if applicable)					
* Radiator Fan Reverse Function Is Operational					
HVAC:					
Heat at Defroster When Knob Turned to "Hot"					
Floor Heaters Work at All Speeds and Produce Heat					
Auxiliary Heater Fires					
A/C Works in High and Low					
A/C Works in "Vent" Mode High and Low					
A/C Works in "Heat" Mode High and Low					
Drivers A/C Functions Correctly (if equipped)					
Wheelchair Ramp Heater Functions Correctly (if equipped)					

Road Test Requirements

The bus needs to be driven until SOC gets to 25%.

Checkout:

☐ Record SR#, Bus# and initial odometer reading (before the vehicle goes on road-test):

SR#	
Bus#	
Odometer	

☐ Active diagnostic fault codes have been cleared and/or no other diagnostic fault codes/ threshold events are continually reporting from the latest "Trip Events Log" of the vehicle

☐ Record final odometer reading:

Odometer	

I confirm I...

- Performed shake down procedure each route loop:
  - ☐ Hard Brake (x5)
  - ☐ Hard Throttle (x5)
  - ☐ Hard "throttle off" at high speed (x5)
  - ☐ Stop and Go (x10)
  - ☐ Door cycle (x10)
  - ☐ Kneel (x10)
  - ☐ Ramp Cycle (x1)
- Performed at least once during RT
  - ☐ 1st initial charge to be completed on Depot (Full Charge)
  - ☐ OVHD charge from <50% SOC and Error free (if equipped)
  - ☐ Depot Charging from <60% SOC and error free

*** unless otherwise specified in customer specific charging requirements***

Signed By:	Date & Time: