ISSUE DATE:	11/7/2018
SERVICE BULLETIN SUBJECT:	EMI Filter Retrofit
VINs or MODELS AFFECTED:	Service Specified Catalyst Buses (Pre-Catbus)
COMPLETE BY:	Next Service Opportunity
SERVICE BULLETIN #:	SB-18-86

EMI FILTER RETROFIT

NOTICE! It is expected that this process will require 2 hours per bus. Please schedule appropriately to minimize vehicle downtime.

Description:

This procedure will replace current Air Compressor and Power Steering Variable Frequency Drive EMI Filter with one of more robust design.

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Tools/Parts Required

Tools and Supplies Required:

- 4mm Allen Wrench
- Permanent Marker
- 5/16-Inch Nut Driver
- Flat Blade Screwdriver
- Pliers
- Label Maker
- Heat Gun or Torch
- Wire Strippers
- Side Cutting Pliers
- Insulated Ring Terminal Crimper
- Ratchet
- Calibrated Torque Wrench
- 13mm Socket
- 10mm Socket
- 13mm Combination Wrench
- Orange Torque Stripe Paint
- Cannon Plug Pin Removal Tool

Parts Required:

• 039658	FILTER, EMI, 400VDC, 30A@60C	1 EA	
• 039699	PLATE, ADAPTER, EMI FILTER, PRE-CATBUS	1 EA	
• 026472	FUSE, ATMR, 30 AMP, 600VAC	1 EA	
• 015482	RING TERMINAL, 12-10AWG, #8 STUD	5 EA	
• 002324	RING TERMINAL, #16-14 AWG, BLUE, #8 STUD, VINYL		1 EA
• 014058-006	SCREW, CTSK, FLH, SS, M4-0.7X16X16, PHI	2 EA	
• 016329-001	SCREW: SHC: M5-0.8X8X8	2 EA	
• 001911	CABLE TIE, 7.5", BLACK	10 EA	
• 040109	HARNESS, HVJB OVERLAY (HVJBOL)	1 EA	

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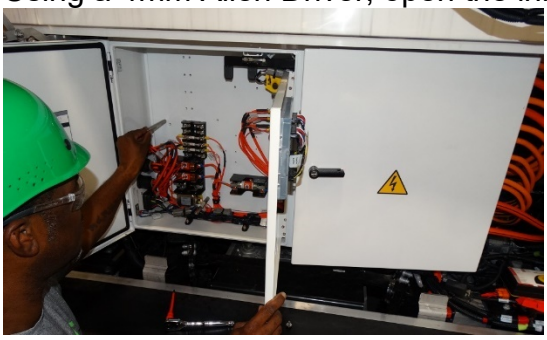
Procedure

1. Perform the Proterra approved Lockout/Tagout procedure for safety. Refer to the Proterra Catalyst LOTO Safety Guide if you are unsure of the proper procedure.

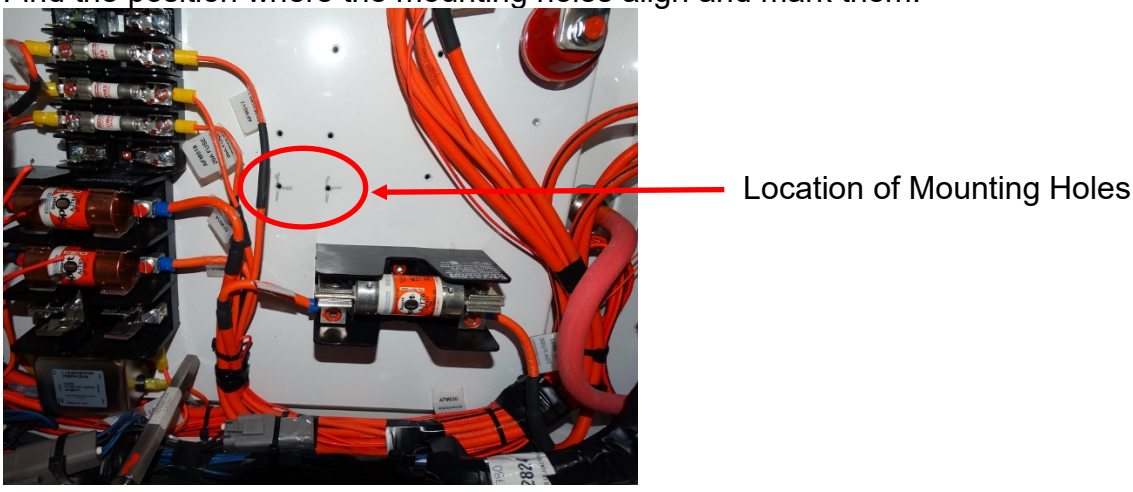
2. Open the Trunk Panel to access the High Voltage Junction Box.

3. Open both doors to access the high Voltage Junction Box.

4. Using a 4mm Allen Driver, open the inner panel on the Streetside of the box.



5. Position the Adapter Plate (039669) above the large fuse holder on the Streetside of the box. Find the position where the mounting holes align and mark them.



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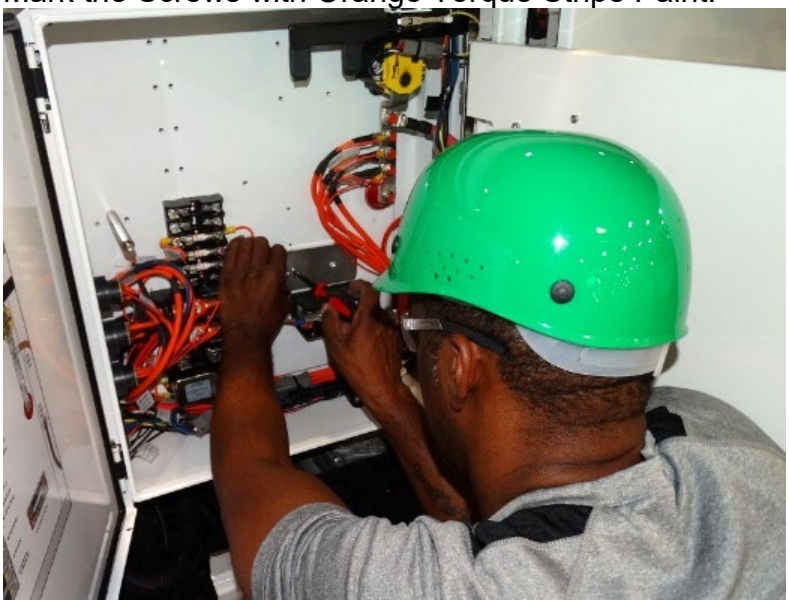
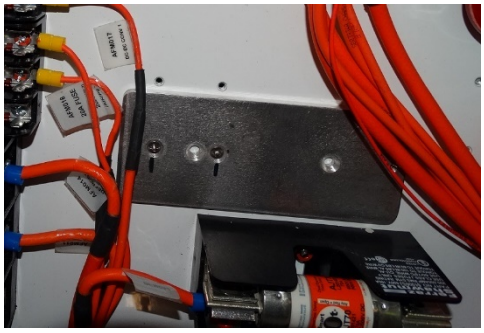
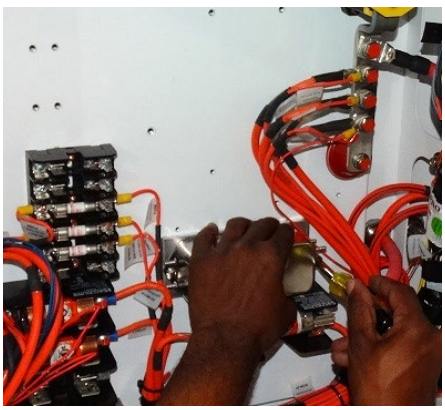
6. Position the Adapter Plate (039669) over the holes and attach it to the back plate using two M4 Screws (014058-006) and a #2 Phillips Screwdriver. Torque the Screws to 44 Inch Pounds. Mark the Screws with Orange Torque Stripe Paint.

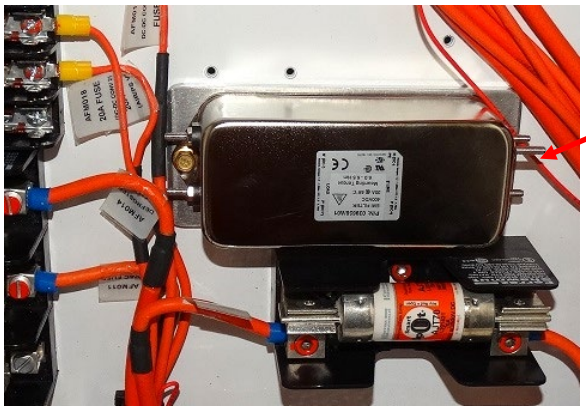




7. Using a 5/16-Inch Nut-driver, remove the hardware from the EMI Filter (039658) and set it aside for later use.

8. Using a 4mm Allen Driver, attach the Filter (039658) to the Adapter Plate (039699) with two Screws (016329-001), two flat washers, and two lock washers from the filter that was removed earlier. Torque the fasteners to 46 Inch Pounds. Mark the fasteners with Orange torque Stripe Paint.
   Note: Make sure that the end of the Filter with three terminals is facing the Curbside of the bus as shown.





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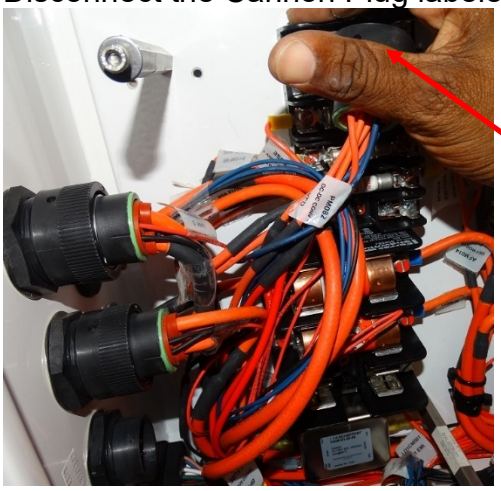
9. Disconnect the Cannon Plug labeled PM082 on the Streetside of the box.



10. Remove the 20 Amp fuse shown in the following photograph.

11. Replace the fuse with a 30 Amp fuse (026472).

12. Using a Flat Blade Screwdriver, remove the wire that is attached to the left side of the fuse holder where you replaced the fuse. This wire will be labeled BFM010.

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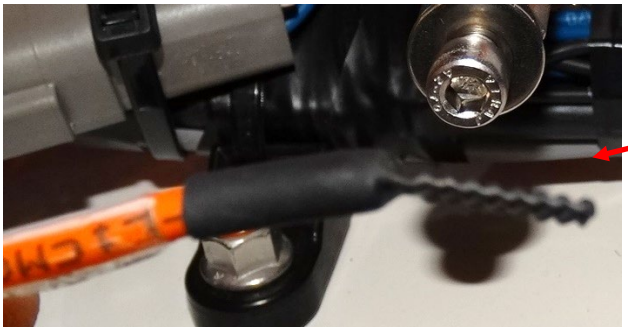
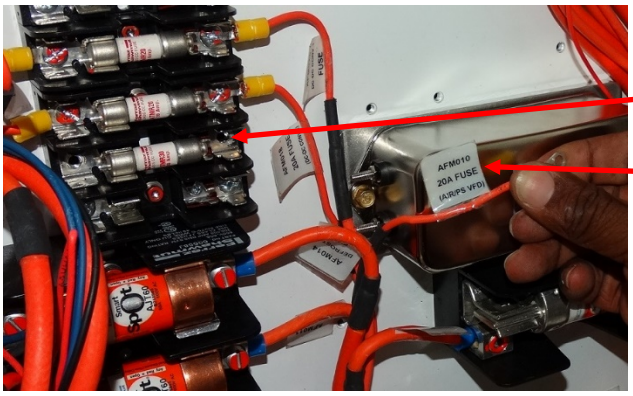
13. Using Side Cutting Pliers, remove the label and terminal end from this wire. Shrink a short section of Heat Shrink Tubing on the wires using a Heat Gun or Torch. Crimp the end of the Heat Shrink with a pair of pliers. The capped wire should appear as shown in the following photograph.
Note: We will be capping other wires during this procedure. All wires should be capped in the same fashion.



Wire Properly Capped with Heat Shrink

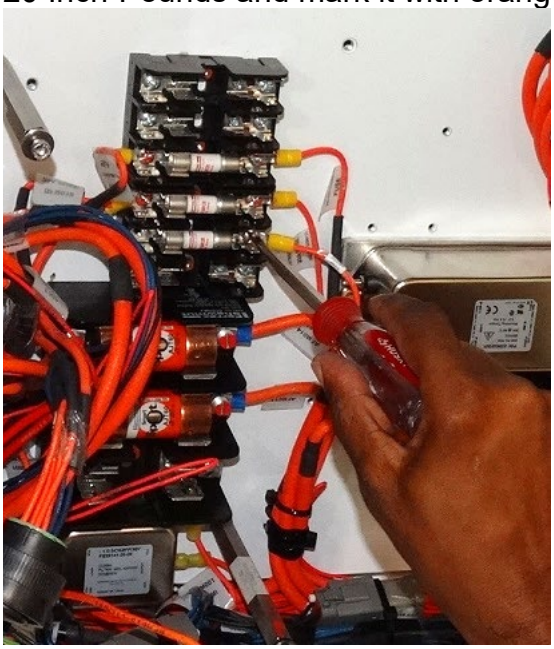
14. Using a Flat Blade Screwdriver, remove the wire that is attached to the right side of the fuse holder where you replaced the fuse. This wire will be labeled AFM010 20A Fuse. Remove the label.



Remove Wire from this Location

Wire Label AFM010

15. Create a new label for the wire that you just removed. The label should be identical to the one that you removed but should indicate a 30A Fuse. Using a Flat Blade Screwdriver, reconnect the newly labeled wire back to the right-side terminal of the fuse holder. Torque this screw to 20 Inch-Pounds and mark it with orange torque stripe paint.



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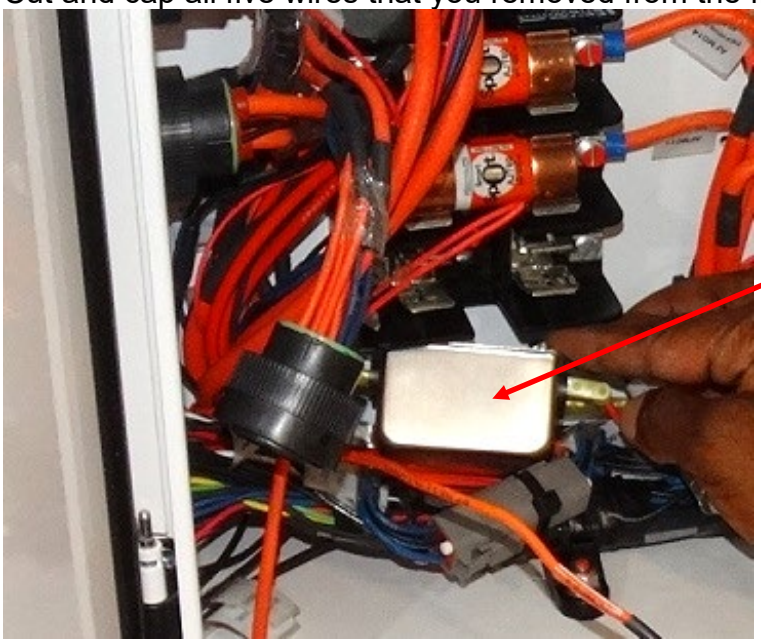
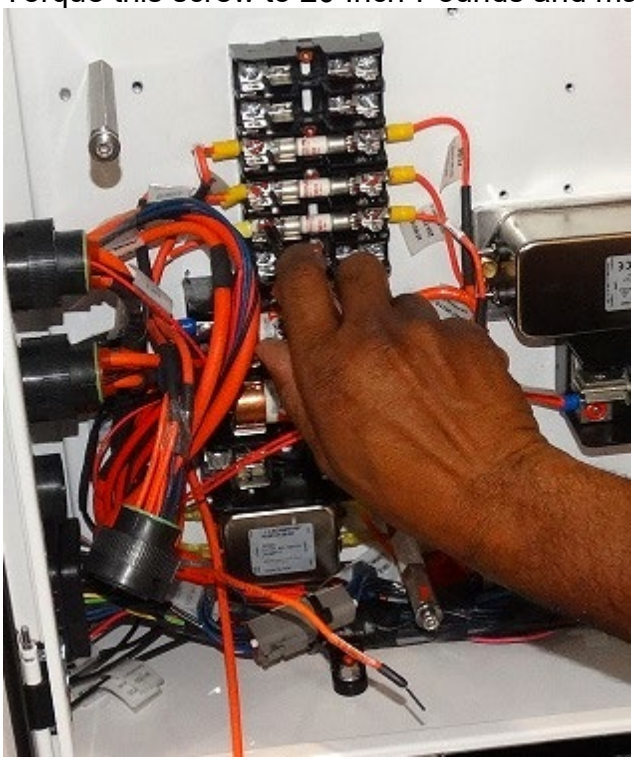
16. Using a 4mm Allen Driver, remove the old EMI Filter shown. Remove the wires from this filter. Cut and cap all five wires that you removed from the filter as shown previously.



17. Locate the 12 AWG Orange wire with a #10 stud ring terminal labeled BFM010 in the harness kit.

18. Using a Flat Blade Screwdriver, connect this ring terminal to the left side of the fuse holder. Torque this screw to 20 Inch-Pounds and mark it with orange torque stripe paint.



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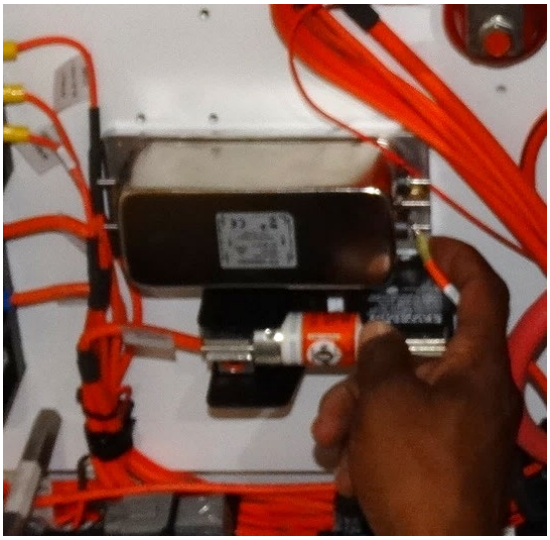
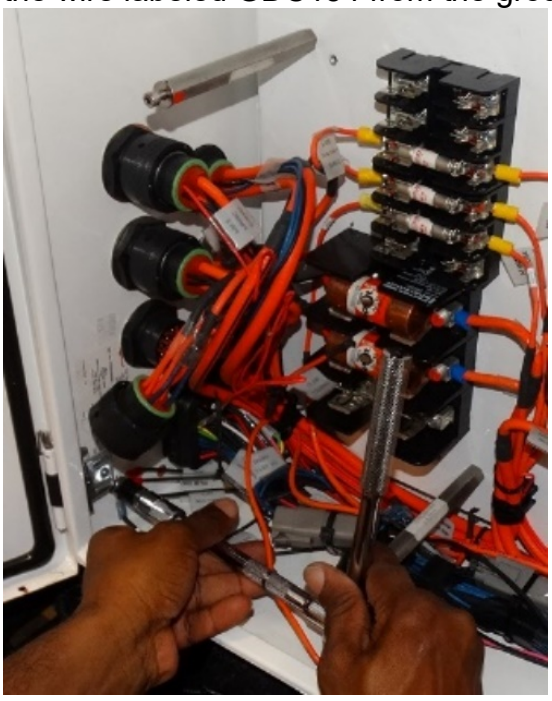
19. Route the remaining end of this wire with the other high voltage wiring in the bottom of the box to the right side of the new EMI Filter. The wire will connect to the lower terminal on the right side of the filter. This is the terminal labeled Input Positive. Cut the wire to length, leaving a 1.5-Inch service loop. Strip the wire and crimp a Ring Terminal (015482) onto the end. Attach this wire to the lower right terminal on the EMI Filter. Replace the nut and washer on the filter to secure the wire. Label this wire L1CM001.



20. Using a 10mm Ratchet/Socket, remove the nut on the HVJB Ground Stud as shown. Remove the wire labeled GDC154 from the ground stud. Cut the ring terminal off the wire and cap it.



21. Find the black 18 AWG wire from the HVJB overlay harness with the ¼-Inch stud ring terminal labeled GDC154.

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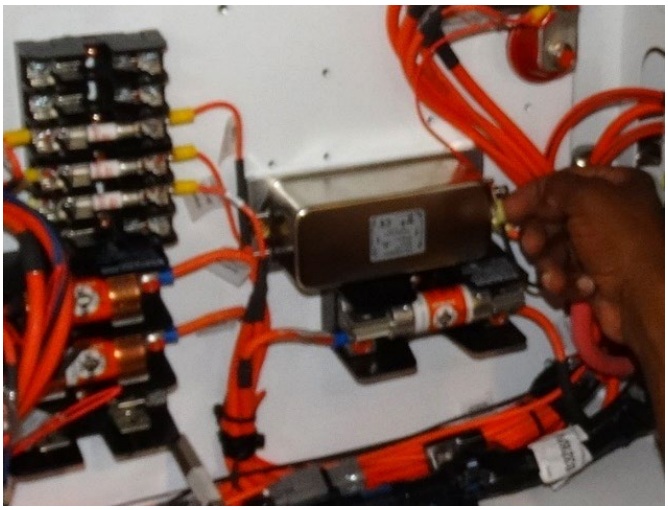
22. Place the ring terminal GDC154 on the HVJB ground stud. Replace the nut. Using a 10mm Ratchet/Socket, tighten the nut. Using a calibrated Torque Wrench with a 10mm Socket, Torque the nut to 44 Inch Pounds. Mark the properly torqued fastener with orange torque stripe paint.

23. Neatly route the black wire along the bottom of the box to the right side of the EMI Filter. Cut the wire to length to fit the front top terminal on the EMI Filter. Leave 1.5 inches of slack in the wire to form a service loop. This is the terminal labeled GND and is the top terminal farthest from the back plate. Strip the end of the wire. Using a crimping tool, crimp a ring terminal (002324) onto the wire. Connect the ring terminal to the GND terminal on the filter. Replace the nut and washer on the filter to secure the wire.



24. Label the wire on the PE terminal GCM001.

25. Locate the wire labeled 4QM013 in the harness kit. This wire will have a ring terminal attached to one end.

26. Using a 4mm Allen Driver, remove the clear Lexan cover from the Curbside of the High Voltage Junction Box.

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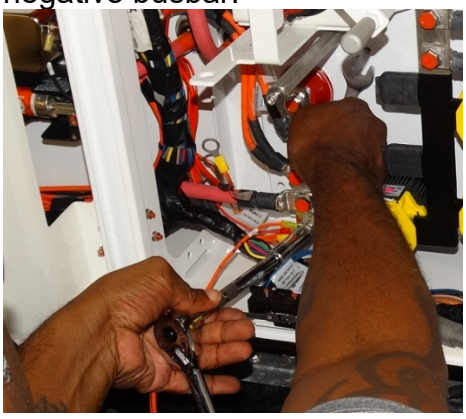
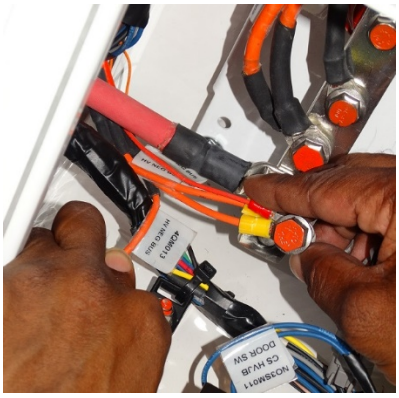
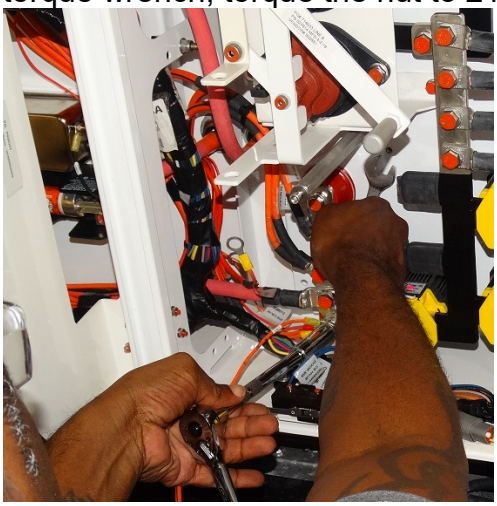
27. Using a 13mm Ratchet/Socket, remove the nut and bolt from bottom of the High Voltage negative busbar.

28. Remove the wire from the bolt that is labeled 4QM013. Cut and cap this wire as shown previously.

29. Place the ring terminal from the HVJB overlay harness kit labeled 4QM013 onto the bolt. Reattach the nut and bolt with the wires onto the High Voltage negative busbar. Using a 13mm Ratchet/Socket and a 13mm Combination Wrench, tighten the nut and bolt. Using a calibrated torque wrench, torque the nut to 21 Inch Pounds. Mark the nut with orange torque stripe paint.



30. Route the remaining end of the Orange/Black 12 AWG wire along with the other high voltage wiring at the bottom of the box to the right side of the EMI Filter. Cut the wire to length leaving 1.5 inches of slack for a service loop. Crimp a Ring Terminal (015482) to the end of the wire. Label the wire L2CM001. Attach this wire to the to the top rear terminal on the filter. This terminal is labeled Input Negative. Replace the nut and washer on the filter to secure the wire.

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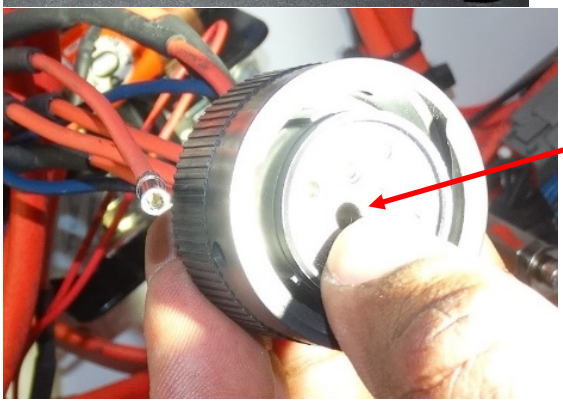
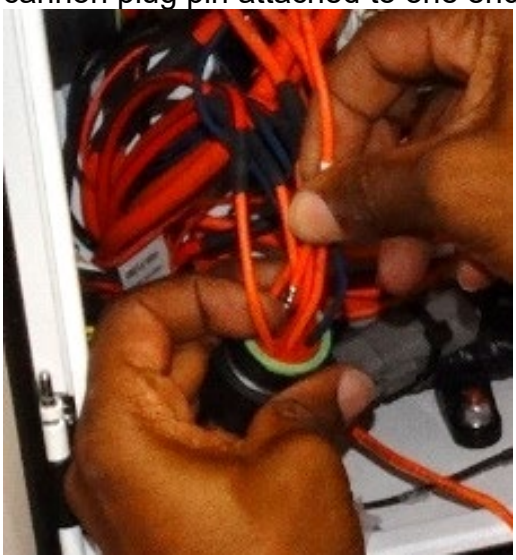
31. Using a Cannon Plug pin removal too, remove the pin from Position A on the Plug labeled PM082 that you disconnected earlier. Clip the Pin and label from this wire. Cap the wire as shown previously. Removing the connector label from the harness may make removing the pins easier.



32. Locate the Orange 12 AWG wire labeled APM082 in the harness kit. This wire will have a cannon plug pin attached to one end. Insert the pin into Position A on the cannon plug.



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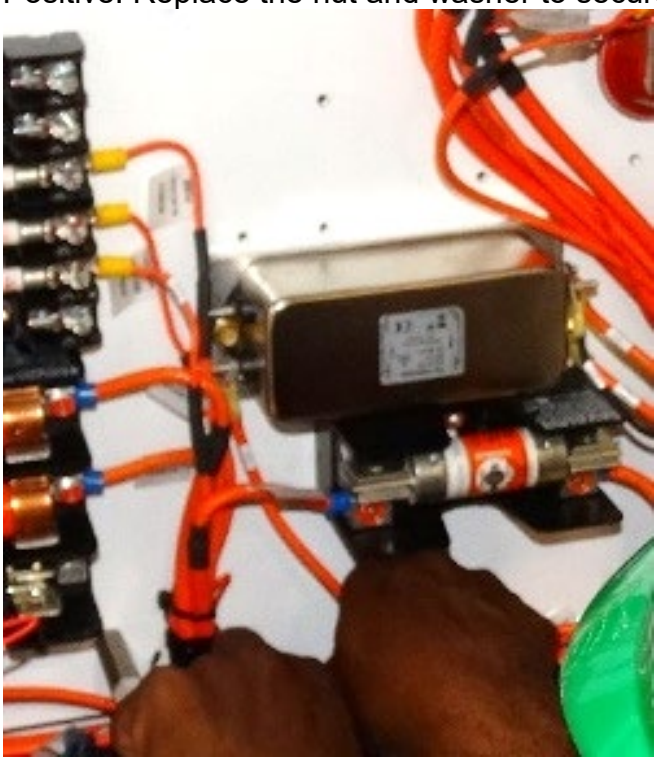
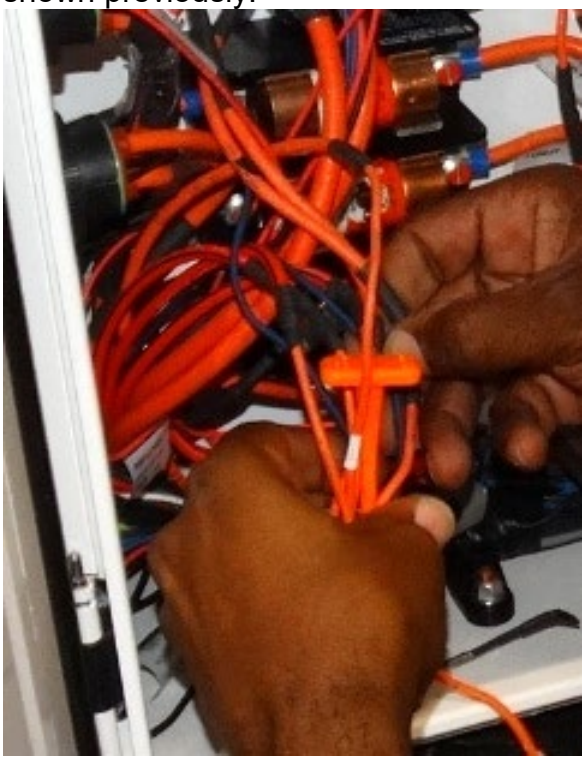
33. Route the other end of this wire along the bottom of the box to the bottom left terminal of the EMI Filter. This terminal will be labeled Output Positive. Cut the wire to length, leaving 1.5 inches for a service loop. Strip the wire and crimp a Ring Terminal (015482) onto the end. Connect the ring terminal to the bottom left terminal of the filter. This terminal is labeled Output Positive. Replace the nut and washer to secure the wire. Label this wire LD1CM001.



34. Using a Cannon Plug pin removal tool, remove the pin from Position B on the Plug labeled PM082 that you disconnected earlier. Clip the Pin and label from this wire. Cap the wire as shown previously.



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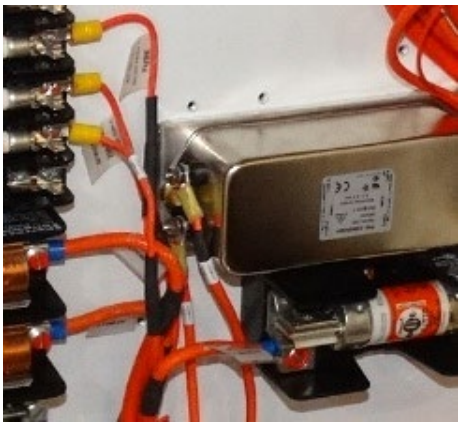
35. Locate the 12 AWG Orange/Black wire labeled BPM082 in the harness kit. This wire will have a cannon plug pin attached to one end. Insert the terminal into Position B of the cannon plug.

36. Replace the connector label on the cannon plug PM082 if you removed it earlier.

37. Reconnect the Cannon Plug to the Socket on the box.

38. Route the other end of this wire along the bottom of the box to the top left terminal of the EMI Filter. Cut the wire to length, leaving 1.5 inches for a service loop. Strip the wire and crimp a Ring Terminal (015482) onto the end. Connect the ring terminal to the bottom left terminal of the filter. This terminal is labeled Output Negative. Replace the nut and washer to secure the wire. Label this wire LD2CM001.



39. Using a 5/16-Inch Nutdriver, tighten the terminal nuts on the EMI Filter connections.

40. Using a calibrated Torque Wrench with a 5/16-Inch Socket, torque the GND Terminal to 14 Inch Pounds.

41. Using a calibrated Torque Wrench with a 5/16-Inch Socket, torque the remaining four terminals to 11 Inch Pounds.

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42. Mark the properly torqued fasteners with orange torque stripe paint.

43. Use Wire Ties (001911) to secure the new wiring to the existing harness.

44. Using a 4mm Allen Driver, replace the clear Lexan cover.

45. Using a 4mm Allen Driver, close the panel on the Streetside of the box.

46. Close the High Voltage Junction Box doors.

47. Close the Trunk.

48. Remove the Lockout/Tagout devices.

49. Power the bus on and ensure that the air compressor and power steering are function normally.

50. Return the bus to service after successfully testing the bus for proper operation.

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