



INSTRUCTION TO SERVICE

ITS60283		November 3, 2021
SECTION:	294-Power Cables	
WRITTEN BY:	Hugo Freire	
SUBJECT:	MCI D-Legacy MDP Replacement with Fuse Holders	
ISSUE:	This is to inform you that your vehicle may contain a defect that could affect the safety of a person. The Main Distribution Panel (MDP) in the battery compartment has experienced failures that may result in thermal events and/or uncommanded vehicle shutdown.	
SUMMARY:	Due to the Main Distribution Panel failures resulting from supplier quality and environmental issues, it is recommended the MDP be replaced with a fuse holders.	

ITS60283

Ref. NHTSA Recall No.	Ref. Transport Canada Recall No.
21V-748	2021-595

THIS ITS DOCUMENT SHOULD BE RETAINED AND REFERRED TO FOR FUTURE MAINTENANCE UNTIL THE 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.

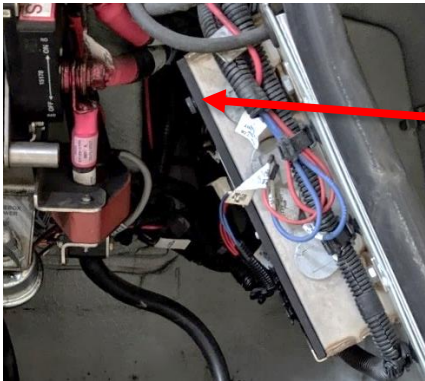


PROCEDURE:

1. Set park brake and chock wheels.
2. Turn the main battery disconnect switch to the "OFF" position.
3. Disconnect all the studs from the battery and take the batteries off the tray and save them for later use.

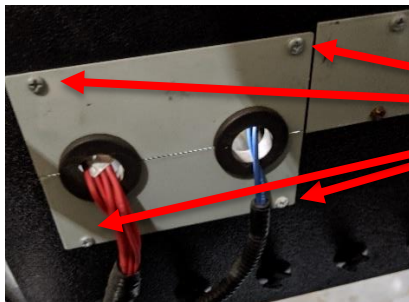


4. Remove and discard the two thumbscrews from the MDP cover.



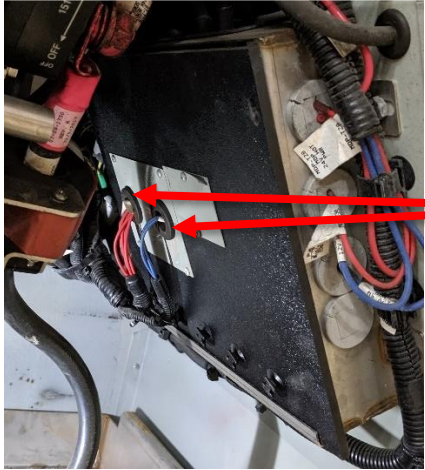
Remove the
thumb screws

5. Remove and discard 4 screws holding the MDP cut-out part to the MDP cover.



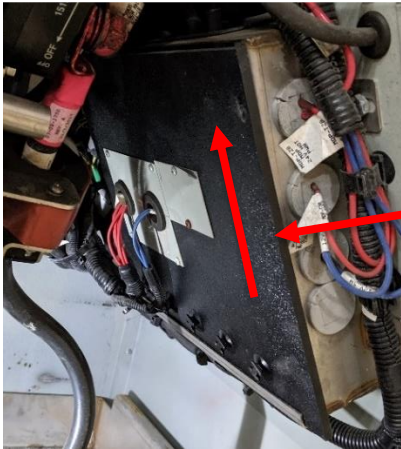
Remove and
discard the screws

6. Disconnect the two connectors, BT-P162 and BT-P161, from the main distribution panel.



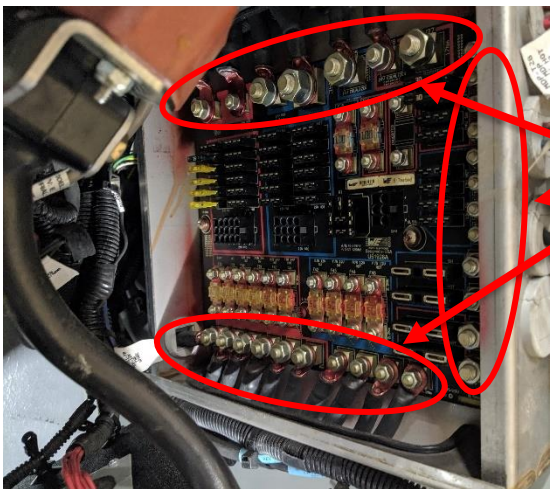
Disconnect the wires

7. Slide out and discard the battery compartment cover out of the bracket.



Slide the cover out

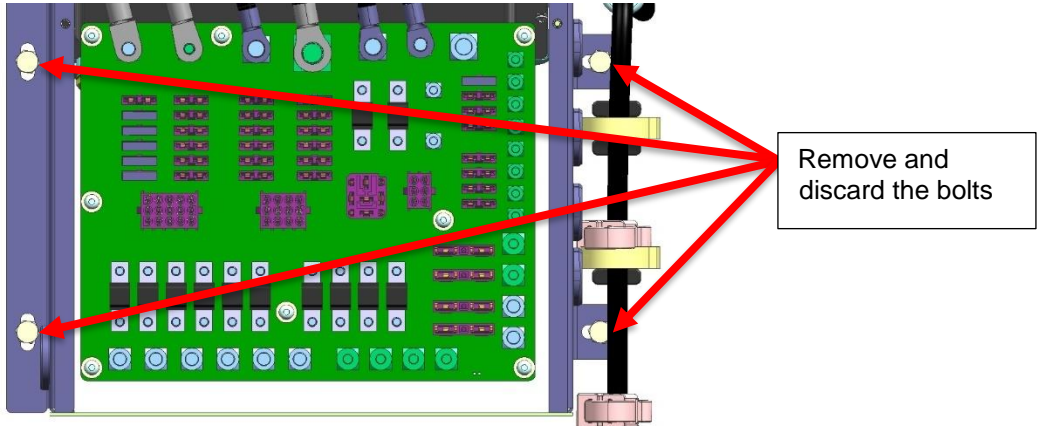
8. Disconnect all the cables connected to the studs on the MDP and pull them out of the bracket. Discard the nuts and washers.



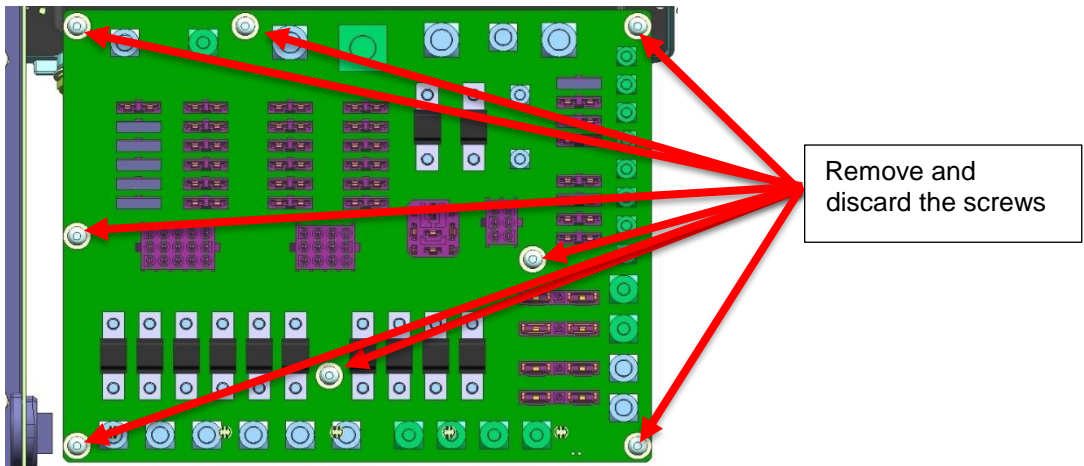
Remove the cables

NOTE: Labeling cable MDP stud locations will make it easier to connect cables to the fuse holders.

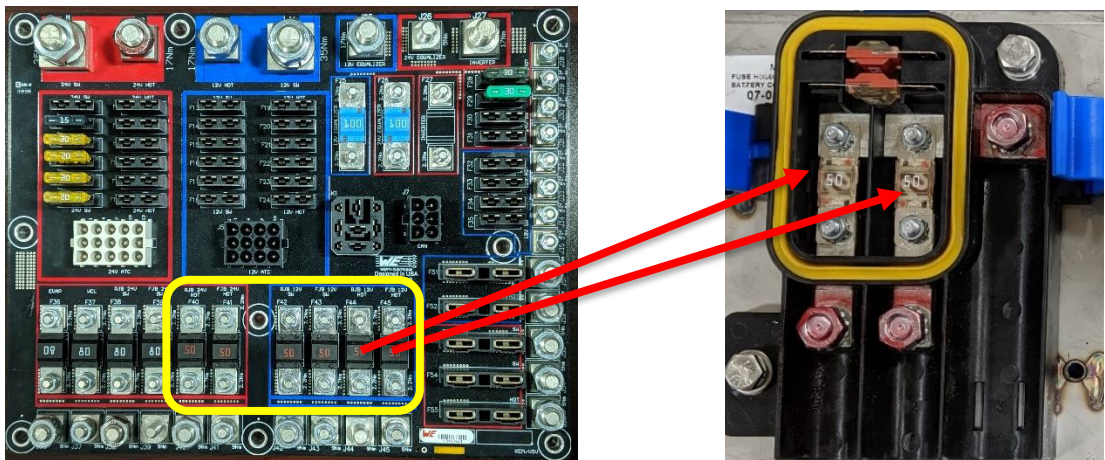
9. Remove & discard the four bolts on the bracket and discard the bracket.



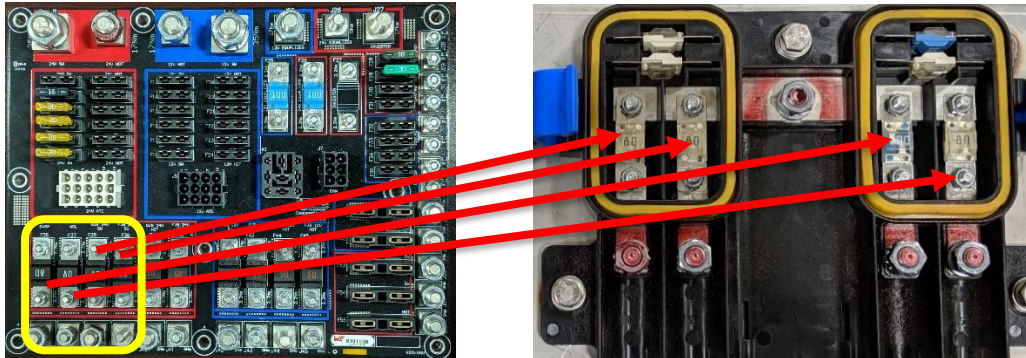
10. Remove and discard the 8 screws holding the MDP to the divider panel. Retain the MDP for the next step.



11. Remove all 50A fuses from the MDP and install two each on the three 2AMI fuse holders, MCI P/N: T07-3274, as shown below, and torque the nuts to 13 In-Lbs.

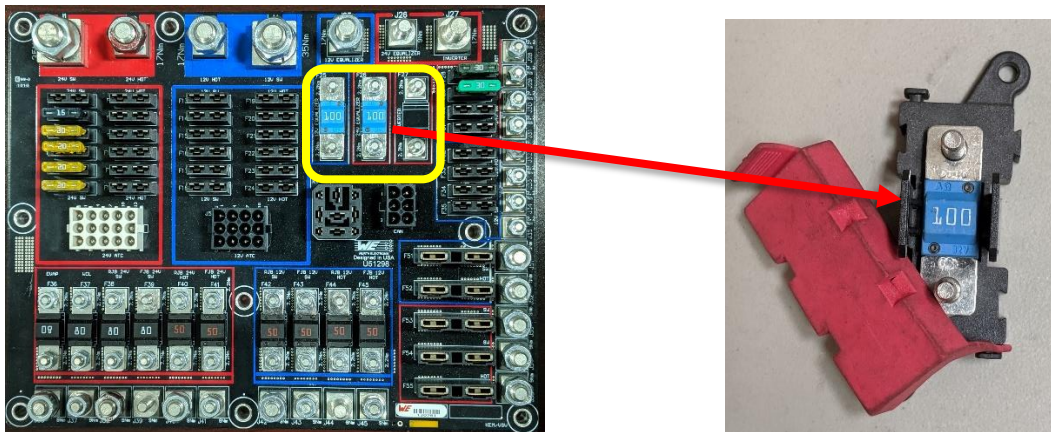


12. Remove all 80A fuses from the MDP and install them on the 4AMI fuse holder, MCI P/N: T07-3723, at the locations shown below. Torque the nuts to 13 In-Lbs.

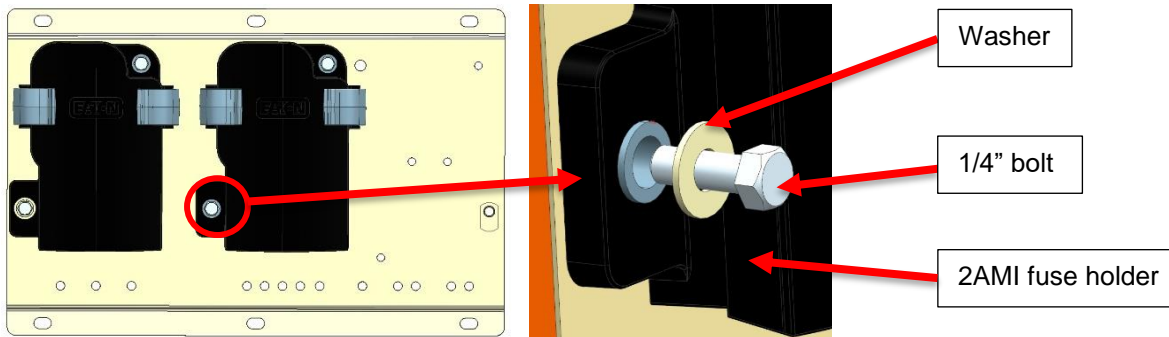


NOTE: Install a 200A fuse, MCI P/N: 19-11-4046, on the third fuse holder position, BT-PDM4-F3, for coaches with evaporator AMI fuse holders in the HVAC compartment.

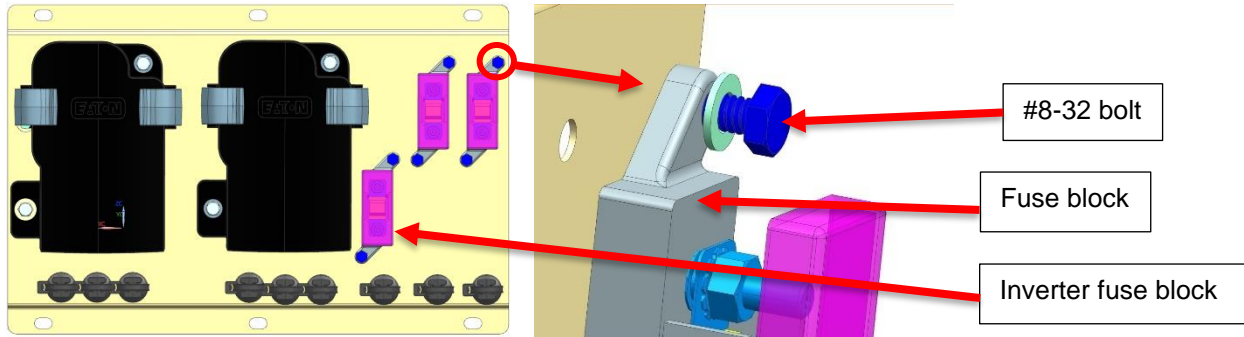
13. Remove two 100A and 150A fuses (if an inverter is installed, MCI P/N: 19-11-4011) from the MDP and install the fuses on the fuse blocks, MCI P/N: T07-3726. Torque the nuts to 39.8 In-Lbs.



14. Using 1/4-20 bolts, MCI P/N: 19-1-387, 1/4" washers, MCI P/N: 19-2-23, install two 2AMI fuse holders, MCI P/N: T07-3724, to the fuse block mounting bracket, MCI P/N: 935529. Torque the bolts to 75 In-Lbs.

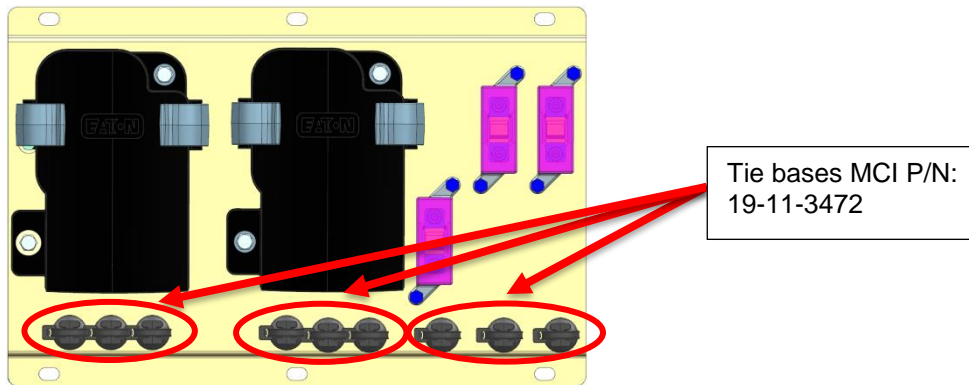


15. Install the 3 populated fuse blocks, MCI P/N: T07-3726, as shown below using #8-32 bolt, MCI P/N: 6460364. Torque the bolts to 24 In-Lbs.

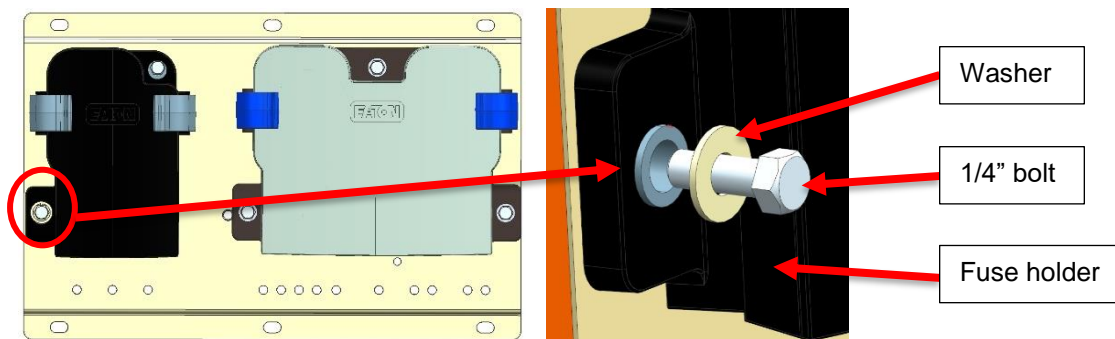


NOTE: Install the fuse block with the 150A inverter fuse in the 1st position on the left.

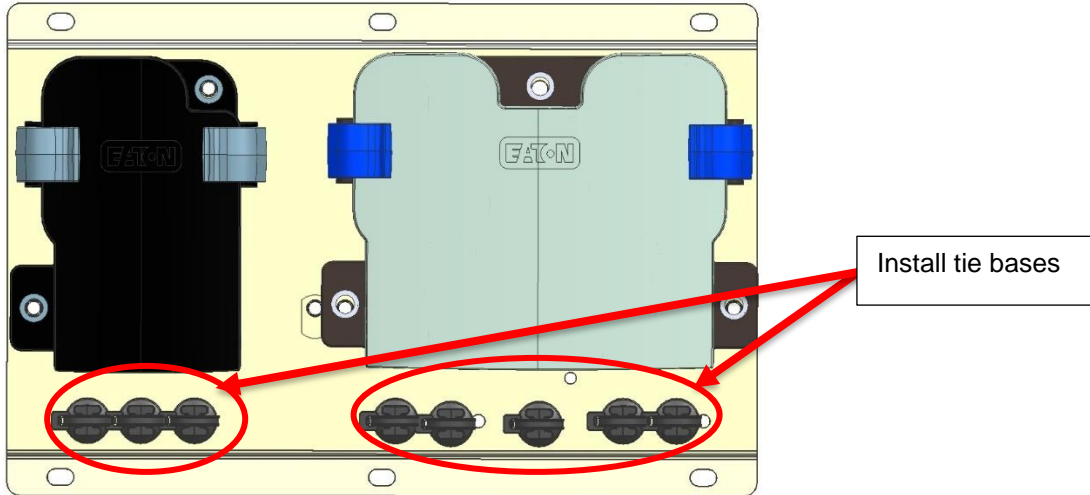
16. Install 9 tie bases, MCI P/N: 19-11-3472, at the locations shown below.



17. Using 1/4-20 bolts, MCI P/N: 19-1-387, 1/4" washers, MCI P/N: 19-2-23, install one 2AMI fuse holder, MCI P/N: T07-3724, and one 4AMI fuse holder, MCI P/N: T07-3723, to the fuse block mounting bracket, MCI P/N: T07-3720. Torque the bolts to 75 In-Lbs.



18. Install 8 tie bases, MCI P/N: 19-11-3472, at the locations shown below.



19. Reworking power cables involve the following steps:



Cut



Strip



Crimp and solder



Apply adhesive black 3/4:" dia heat shrink, MCI P/N: 19-11-67

20. Apply colored heat shrink on top of the black heat shrink if the existing colored heat shrink was removed during the rework of the cable. Red heat shrink, MCI P/N: 19-11-2371, blue heat shrink, MCI P/N: 21-7406-50.

21. Carry out the above-mentioned steps on the following cables with respective ring terminals:

Cable P/N	MDP Location	Ring terminal P/N	Description	Heat Shrink Color
07-09-1822	J2	19-11-3999	Term-ring, non-insulated, 5/16in,1/0 AWG	Red
07-09-1823	J4	19-11-2328	Term – ring, non-insulated, 5/16in, 2 AWG	Blue
07-09-1824	J3	19-11-41	Term-ring, non-insulated,5/16in, 4 AWG	Blue
07-09-1862	J42	19-11-41	Term-ring, non-insulated,5/16in, 4 AWG	Blue
07-09-1863	J43	19-11-41	Term-ring, non-insulated,5/16in, 4 AWG	Blue
07-09-1864	J44	5944917	Term-ring, non-insulated,5/16in, 6 AWG	Blue
07-09-1865	J45	5944917	Term-ring, non-insulated,5/16in, 6 AWG	Blue

22. Identify the 12V equalizer cable, MCI P/N: 07-09-2012, and cut the cable 7" from the center of the ring terminal.



Cut the cable 7" from the center of ring terminal

23. Identify the 24V equalizer cable, MCI P/N: 07-09-2011, and cut the cable 3" from the center of the ring terminal.



Cut the cable 3" from the center of ring terminal

24. Perform the following steps on the 12V equalizer and 24V equalizer cables:



Strip



Crimp and solder



Apply black 3/4:" dia heat shrink MCI P/N: 19-11-67

25. Apply colored heat shrink on top of the black heat shrink if the existing colored heat shrink is removed during the rework of the cable.

Cable P/N	MDP Location	Ring terminal P/N	Description	Heat Shrink Color
07-09-2011	J26	19-11-3763	Term -ring, non-insulated, #10,4 AWG	Red
07-09-2012	J25	19-11-3763	Term -ring, non-insulated, #10,4 AWG	Blue

26. If the coach is equipped with an inverter, remove and replace the inverter power cable ring terminal, MCI P/N:19-11-4539, and add red heat shrink, MCI P/N: 19-11-2371.



Strip

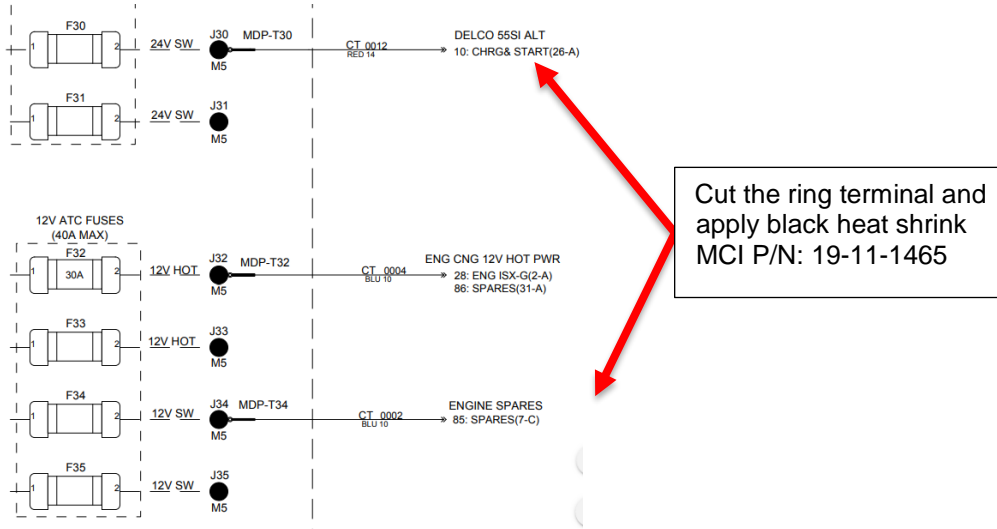


Crimp and solder

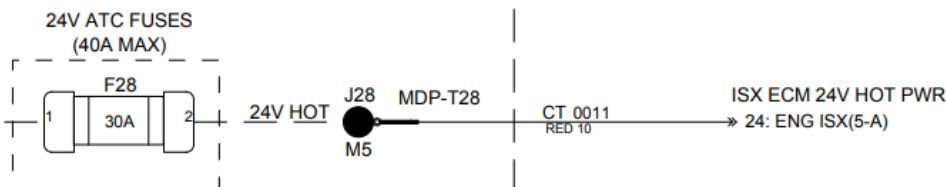


Apply black 3/4:" dia heat shrink MCI P/N: 19-11-67

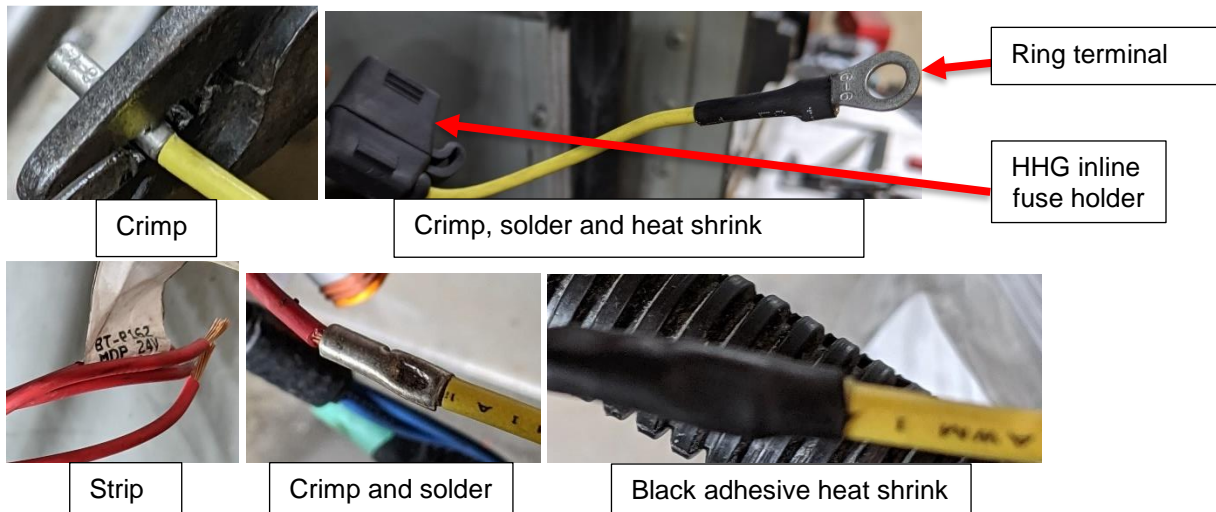
27. Identify the wires CT0002 and CT0012 in the battery compartment. Cut and discard the ring terminal and apply 2.3" black heat shrink, MCI P/N: 19-11-1465, to the wires.



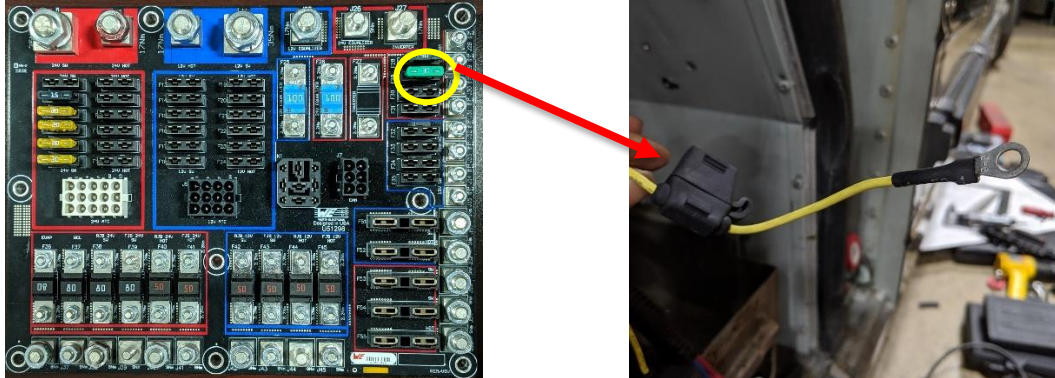
28. Identify CT 0011, ISX ECM, wire in the battery compartment. Cut and discard the ring terminal.



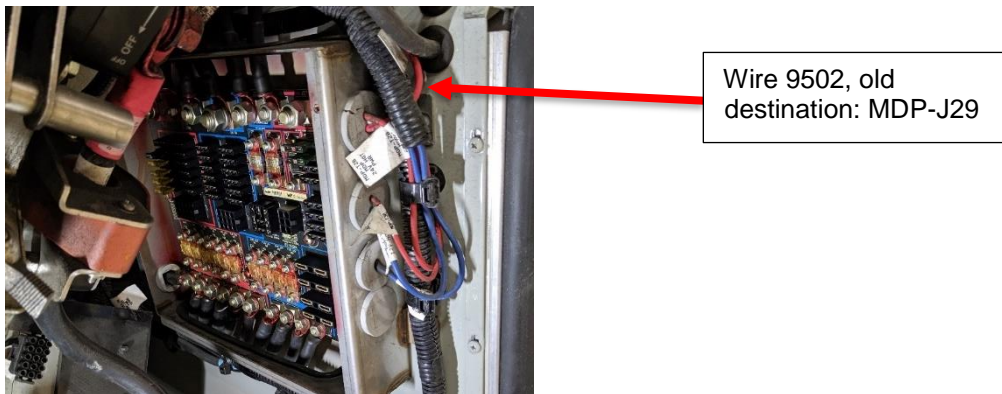
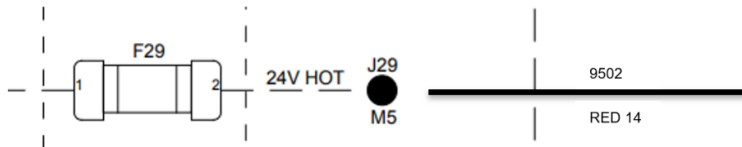
29. Perform the following steps on the ISX ECM wire, CT 0011, using 12 AWG 1/4" ring terminal, MCI P/N: 19-11-46, 10-12 AWG butt splice connector, MCI P/N: 19-11-431, HHG inline fuse holder, MCI P/N: T19-1168, and 2.3" black heat shrink, MCI P/N: 19-11-1465.



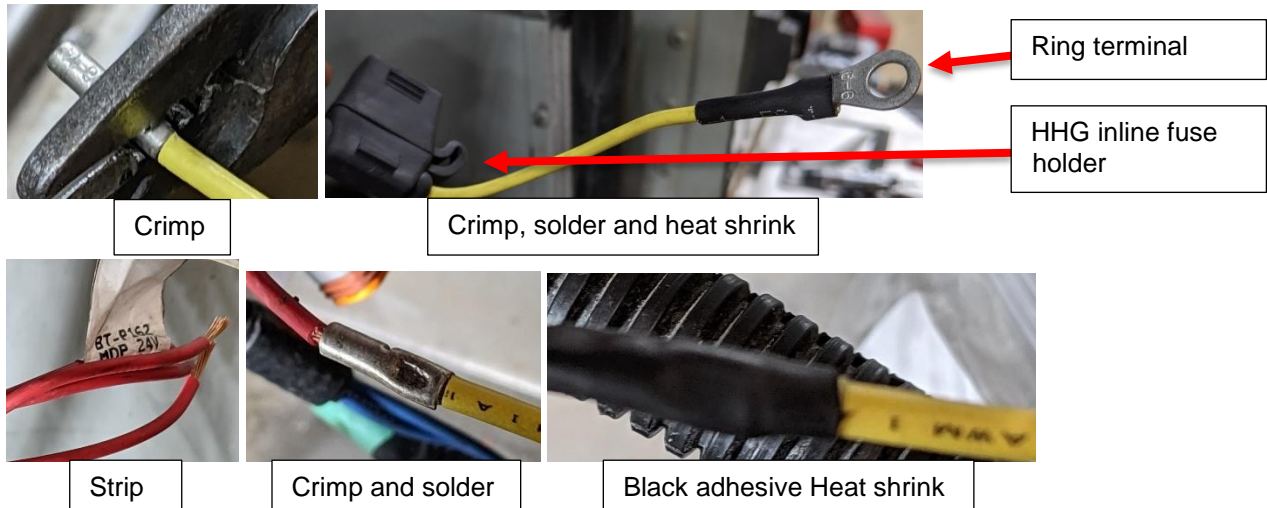
30. Remove 30A fuse from the MDP and install it in the HHG inline fuse.



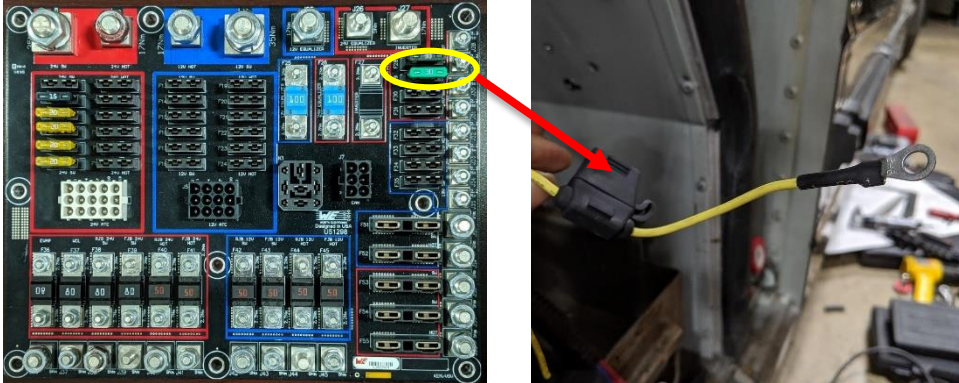
31. If farebox is installed, perform the steps 31-33, otherwise skip to step 34. Identify wire 9502 in the battery compartment, previously connected to J29 of the MDP, and cut the ring terminal.



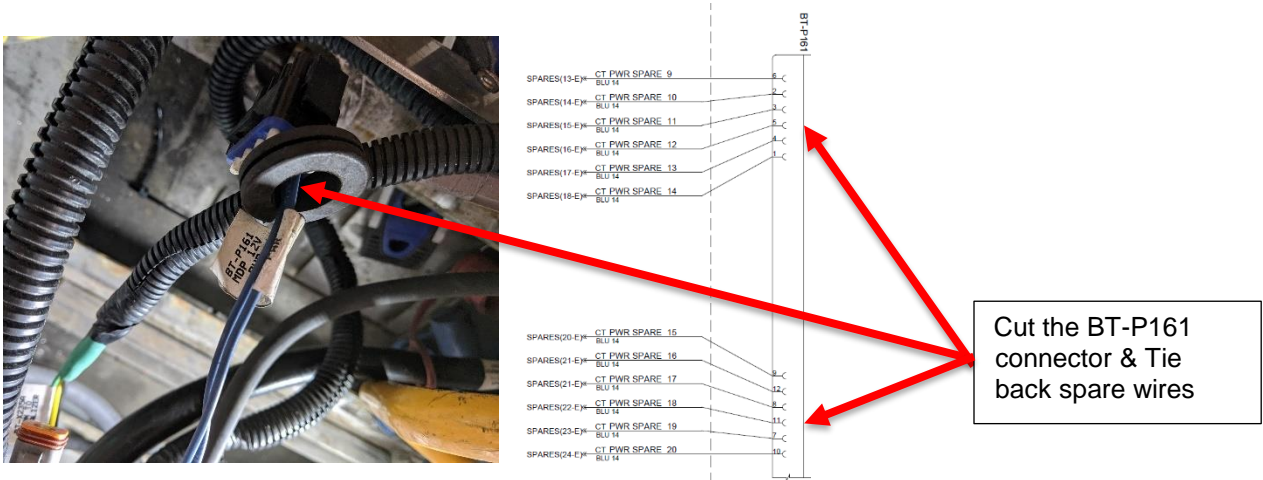
32. Rework farebox wire 9502, using ring terminal, MCI P/N: 19-11-46, butt splice connector, MCI P/N: T19-1166, HHG inline fuse holder, MCI P/N: T19-1168, and 2.3" black heat shrink, MCI P/N: 19-11-1465.



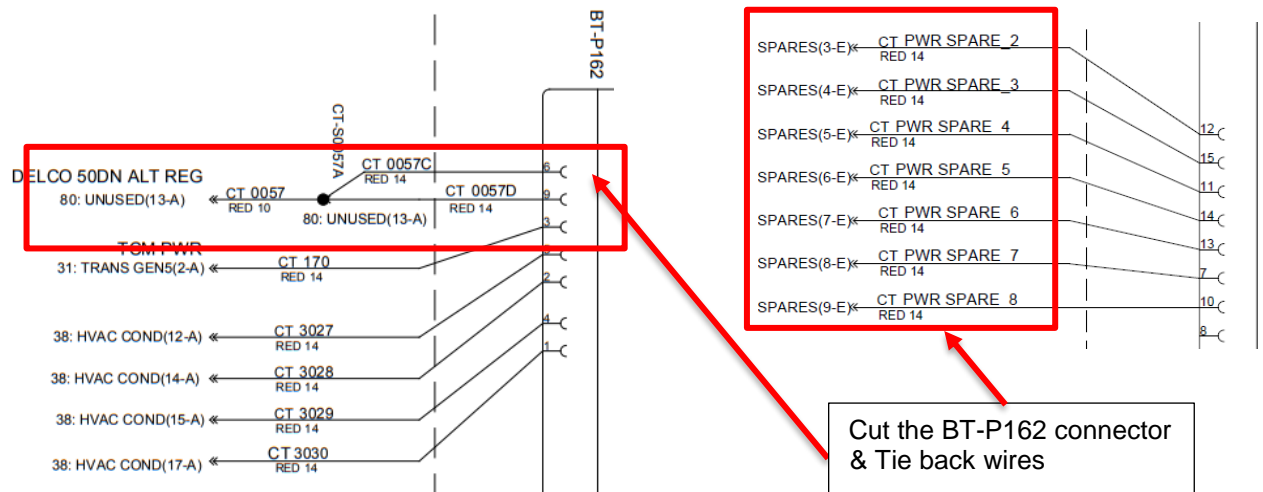
33. Remove 30A fuse from the MDP and install it in the HHG inline fuse.



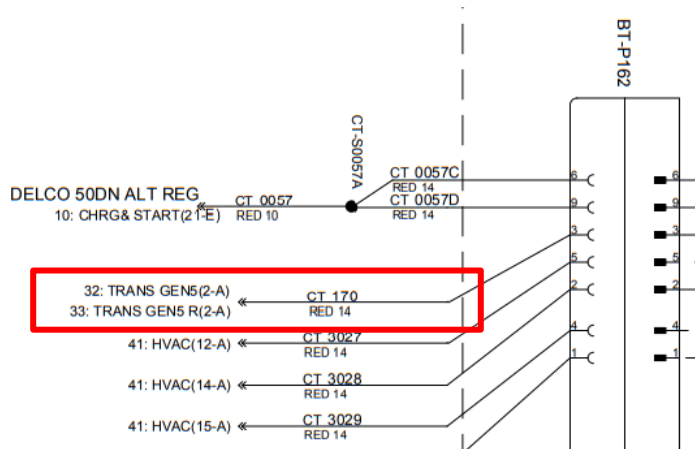
34. Identify the MDP 12V BT-P161 connector in the battery compartment. Cut and discard the connector and apply 2.3" black heat shrink, MCI P/N: 19-11-1465, to all spare wire PWR SPARE 9 through PWR SPARE 20.



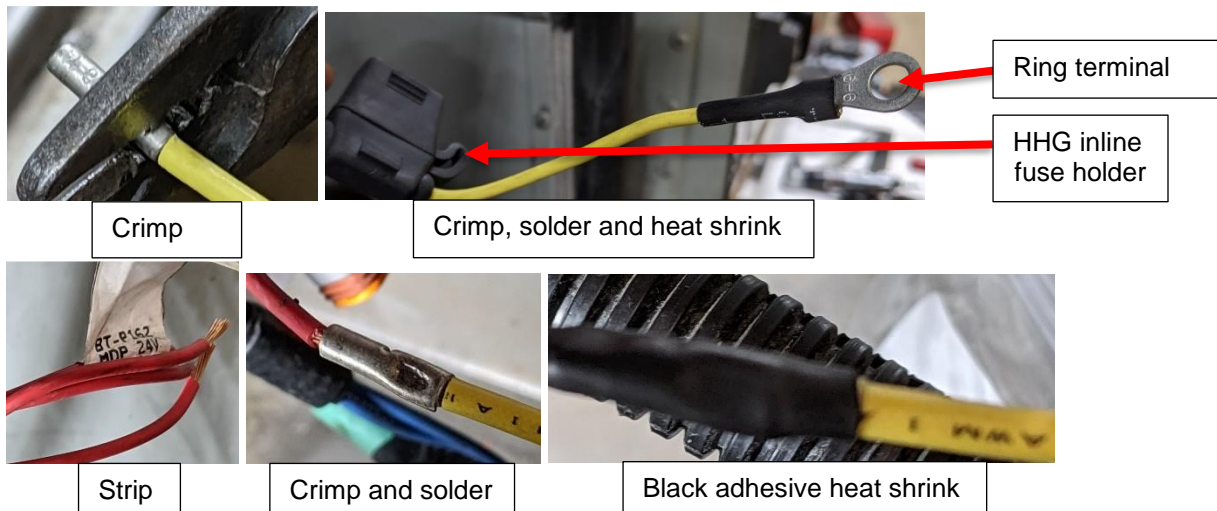
35. Identify the MDP 24V PWR BT-P162 connector in the battery compartment. Cut and discard the connector and apply 2.3" black heat shrink, MCI P/N: 19-11-1465, to CT0057C, CT0057D, PWR SPARE 2 through PWR SPARE 8 wires.



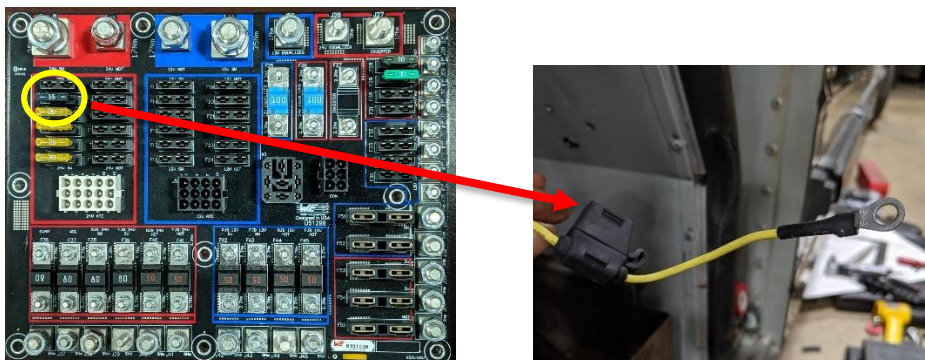
36. Identify CT170 wire in the BT-162 center tunnel harness.



37. Perform the following steps on the TCM wire, CT 170, using ring terminal, MCI P/N: 19-11-46, butt splice connector, MCI P/N: T19-1166, HHG inline fuse holder, MCI P/N: T19-1168, and 2.3" black heat shrink, MCI P/N: 19-11-1465.



38. Remove 15A fuse from the MDP and install it in the HHG inline fuse.



39. Connect HVAC condenser wires of the coach, part of BT-P162, to jumper harness, MCI P/N: T07-3722, using 12-14 AWG butt splice connector, MCI P/N: T19-1167, 2.3" black heat shrink, MCI P/N: 19-11-1465, and performing following steps:

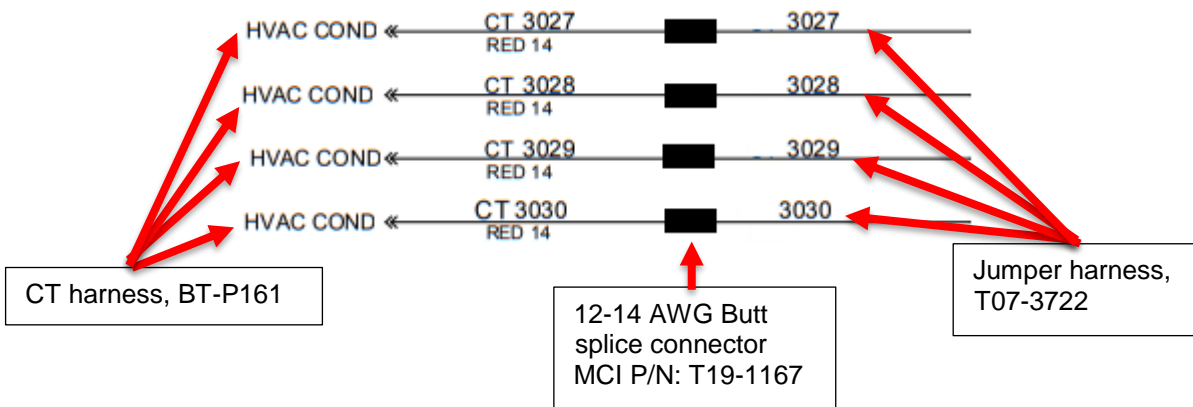


Crimp butt splice

Strip wire on the coach

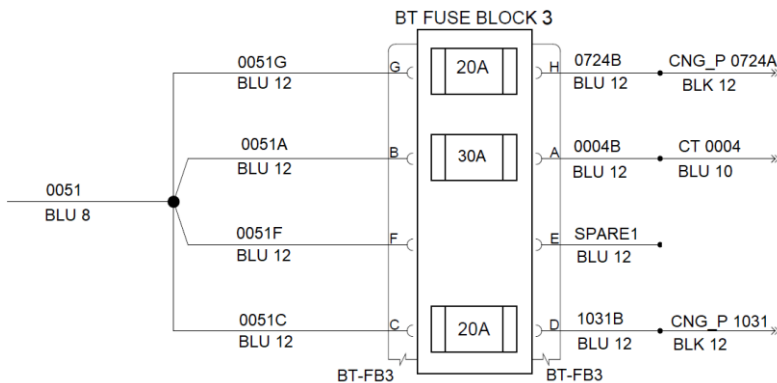
Crimp and solder

Black adhesive heat shrink

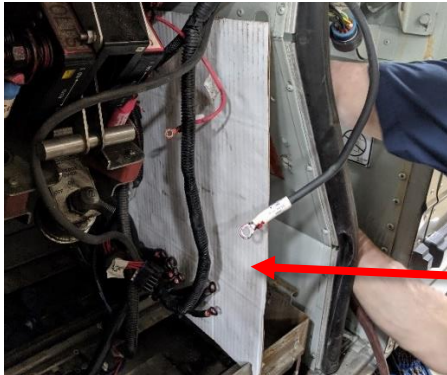


40. Install four 20A mini fuses in the BT-FB connector, part of the jumper harness, MCI P/N: T07-3722.

41. Connect 12V Hot jumper harness, MCI P/N: 933856, to CNG power wires using 12-14 AWG butt splice connector, MCI P/N: T19-1167, 2.3" black heat shrink, MCI P/N: 19-11-1465. Also, install 20A and a 30A fuse on the BT-FB3 connector as shown below.



42. Push all the power cables away from the divider panel and place a 16"x24" plywood in the battery compartment between all the cables and the divider panel.

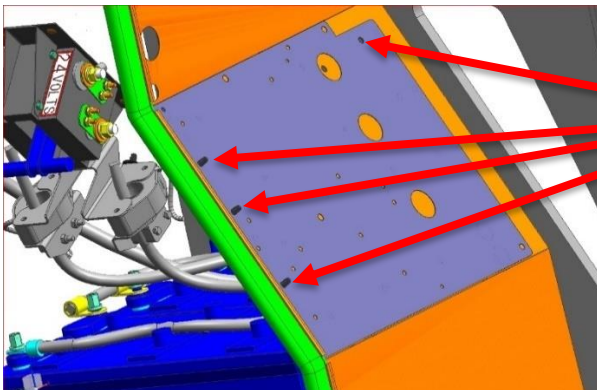


16"x24" plywood

43. Using a chisel remove the weld nuts and tie bases on the divider panel.

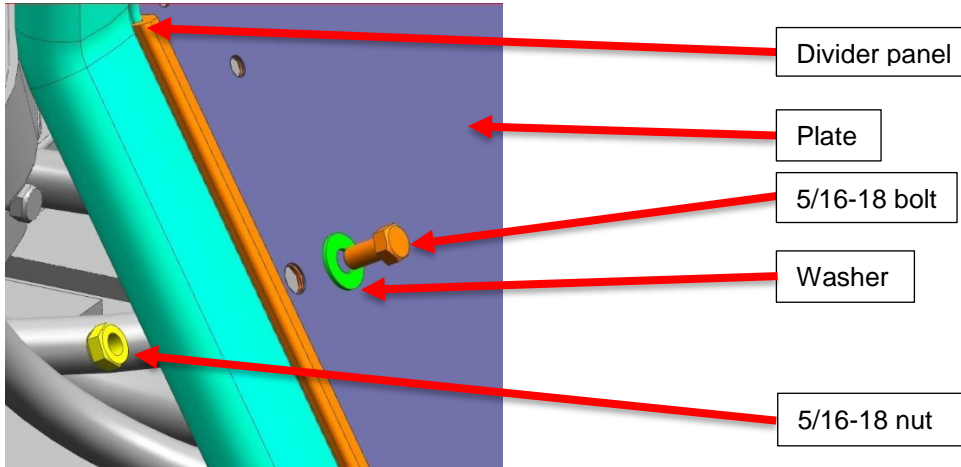


44. Place the plate, MCI P/N: T03-3050, on the divider panel such that the holes shown below align with the divider panel.

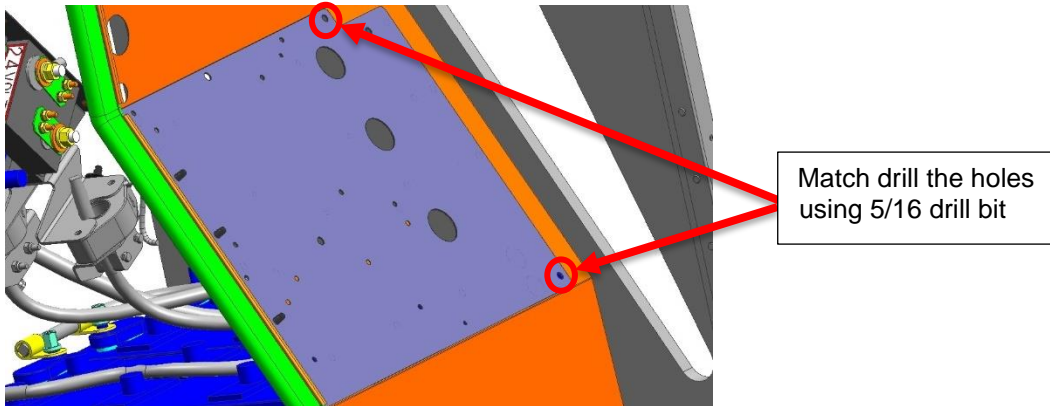


Align these holes of plate with holes on divider panel

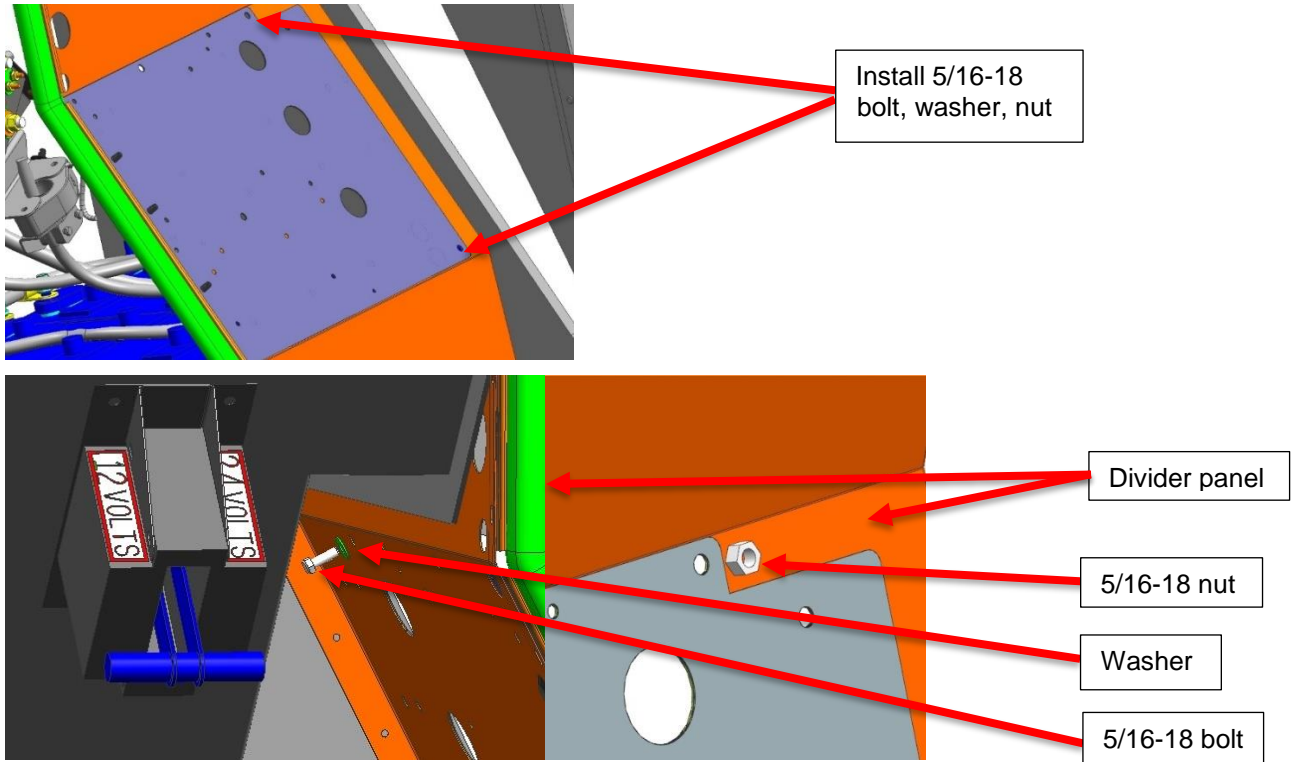
45. Secure the plate to the divider panel at the four holes shown in the previous picture using 5/16-18 bolt, MCI P/N: T19-1164, 5/16 washer, MCI P/N: T19-1162, and 5/16-18 nut, MCI P/N: 19-3-314. Torque the bolt to 132 In-Lbs.



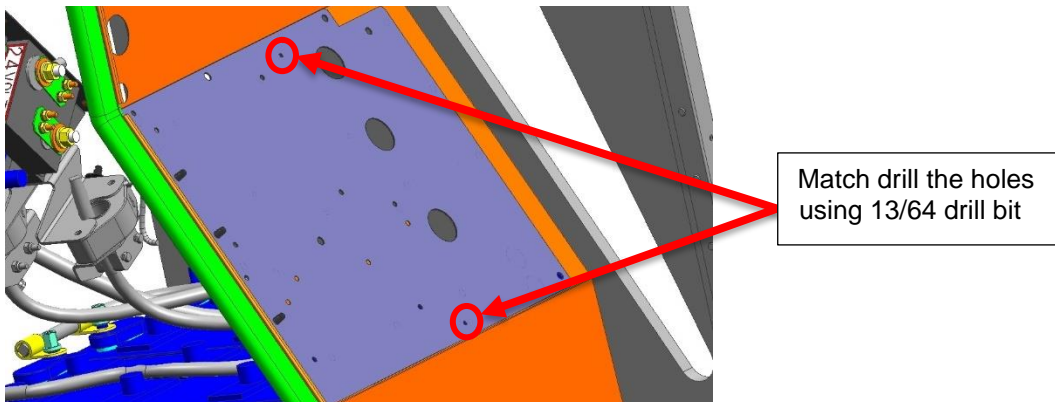
46. Match drill the holes shown below in the divider panel using a 5/16 drill bit.



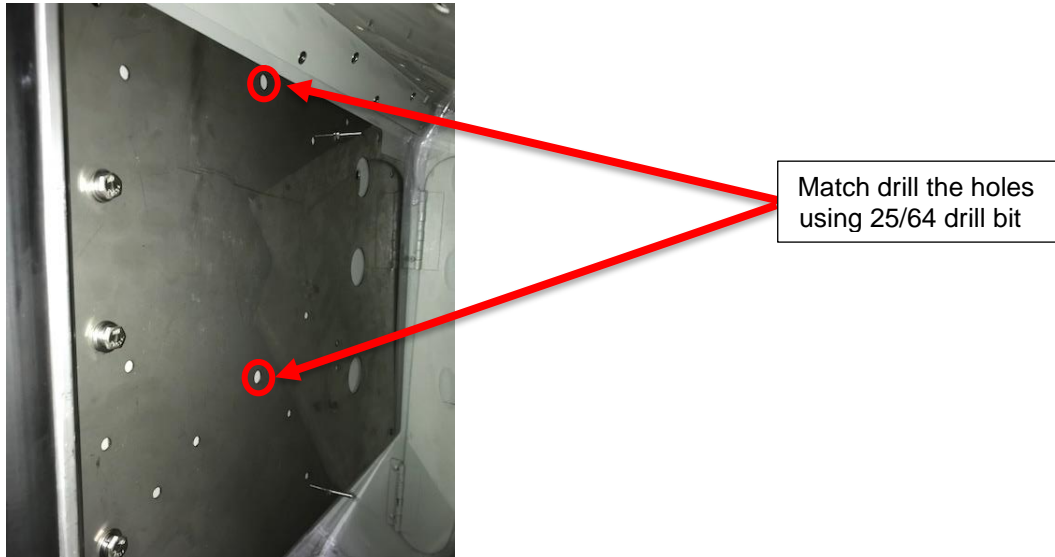
47. Secure the plate to the divider panel at the below-shown holes using 5/16-18 bolt, MCI P/N: T19-1164, 5/16 washer, MCI P/N: T19-1162, and 5/16-18 nut, MCI P/N: 19-3-314. Torque the bolt to 132 In-Lbs.



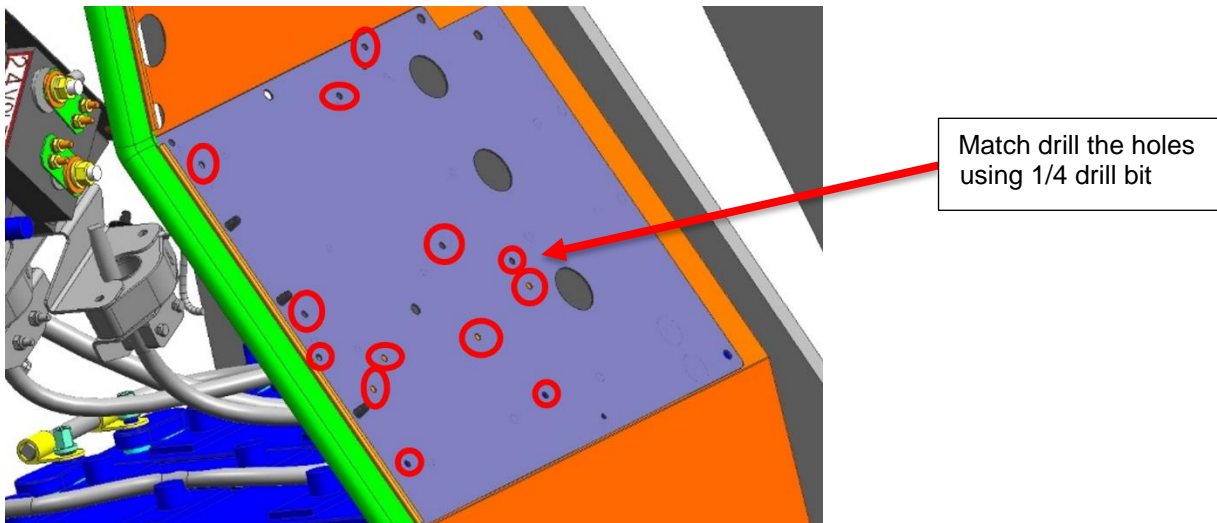
48. Match drill the holes shown below in the divider panel using a 13/64 drill bit.



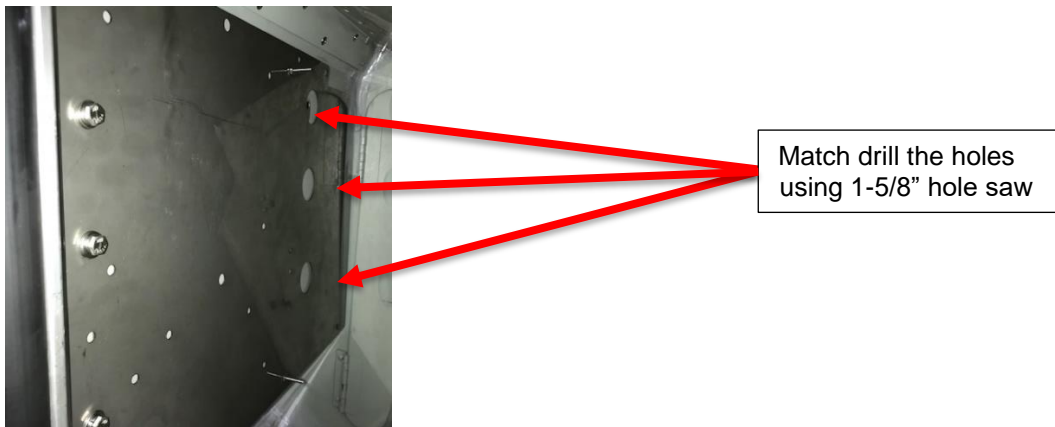
49. Match drill the holes shown below in the divider panel using a 25/64 drill bit.



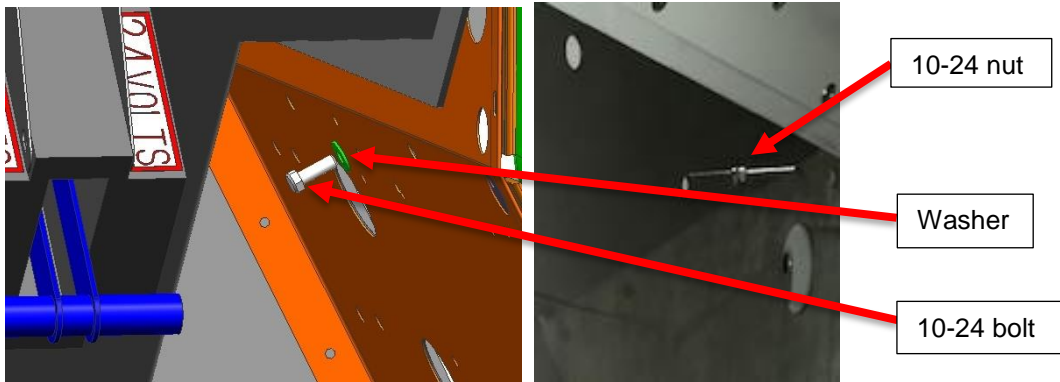
50. Match drill the remaining 13 holes in the divider panel using a 1/4 drill bit.



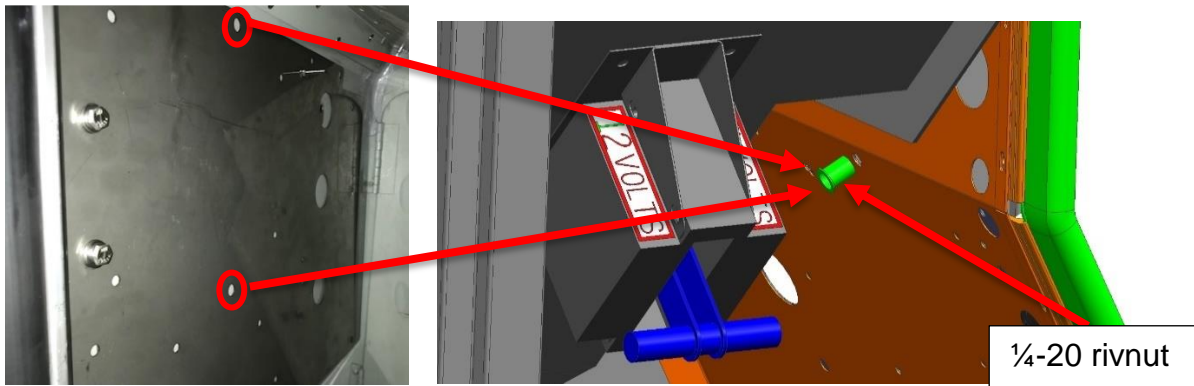
51. Match drill the below-shown holes in the divider panel using a 1-5/8" hole saw.



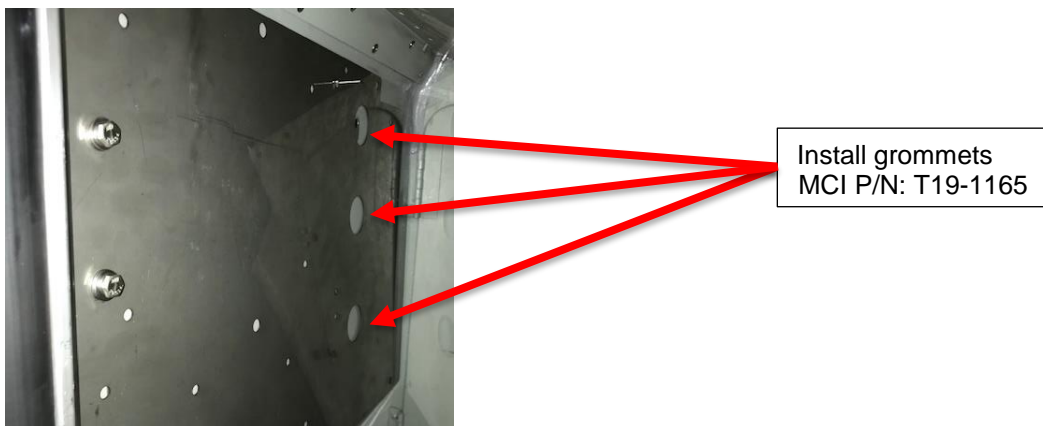
52. Install 10-24 bolt, MCI P/N: T19-1160, washer, MCI P/N: 19-02-6047, and nut, MCI P/N: T19-1159, in the two 13/64 holes. Torque the bolt to 23 In-Lbs.



53. Install two 1/4-20 rivnuts, MCI P/N: T19-1161, in the 25/64 holes shown below.



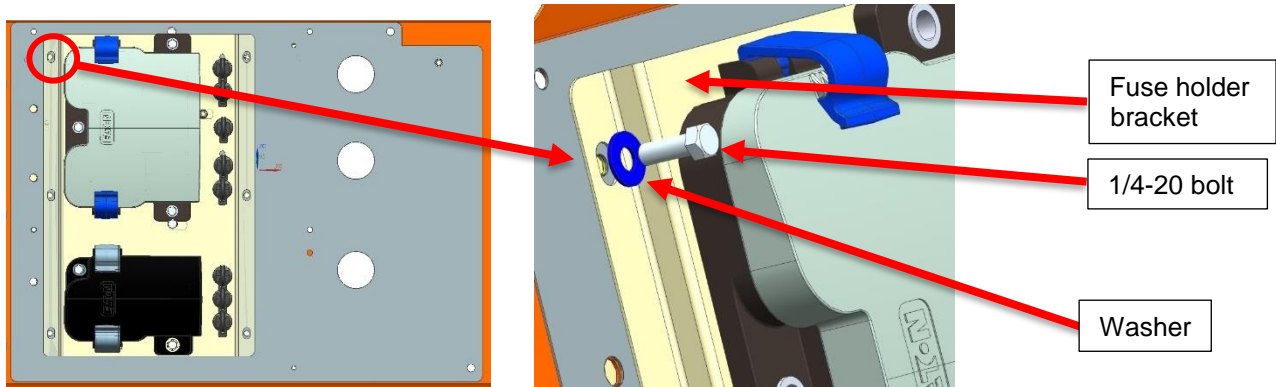
54. Install grommets, MCI P/N: T19-1165, in the big holes of the plate.



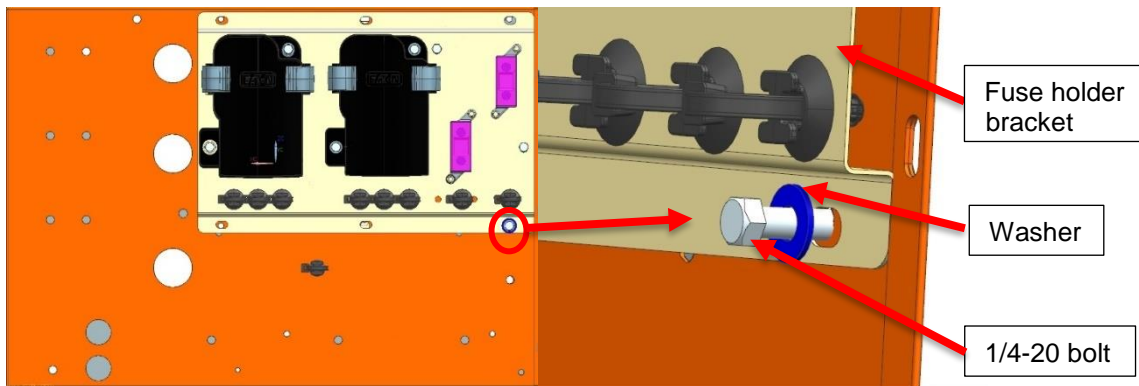
55. Identify the switch power cables by following the table below and separate them from the rest of the cables and route them into the filter side compartment through the respective grommet.

Cable P/N	Old Destination	Heat Shrink Color	Grommet
07-09-1866	MDP-J36	Red	Top
07-09-1871	MDP-J37	Red	Top
07-09-1858	MDP-J38	Red	Middle
07-09-1859	MDP-J39	Red	Middle
07-09-1821	MDP-J1	Red	Middle
07-09-1823	MDP-J4	Blue	Bottom
07-09-1863	MDP-J43	Blue	Bottom
07-09-1862	MDP-J42	Blue	Bottom

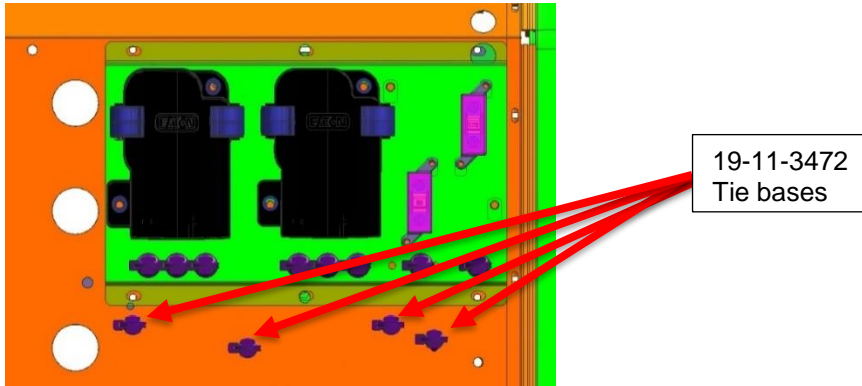
56. Install the air filter side fuse block assembly in the position shown below using 1/4-20 nut, MCI P/N: 19-3-32, 1/4-20 bolt, MCI P/N: 19-1-387, 1/4" washer, MCI P/N: 19-2-23. Torque the nuts to 75 In-Lbs.



57. Install battery side fuse holder bracket in the battery compartment using 1/4-20 nut, MCI P/N: 19-3-32, 1/4-20 bolt, MCI P/N: 19-1-387, 1/4" washer, MCI P/N: 19-2-23. Torque the nuts to 75 In-Lbs.

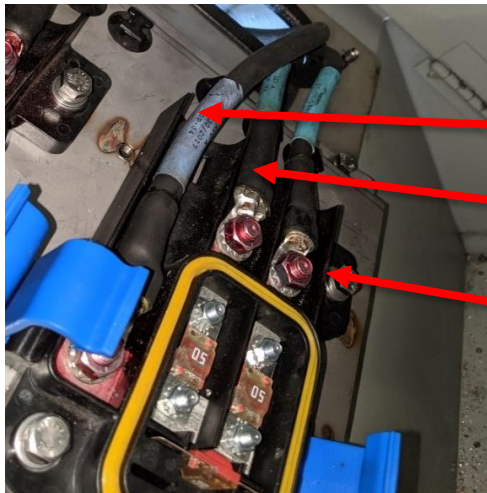


58. Install 4 tie bases, MCI P/N: 19-11-3472, in the holes below the bracket.



19-11-3472
Tie bases

59. Connect the free ends of the 07-09-1823, 07-09-1863, and 07-09-1862 cables to the small fuse block on the AC filter side as shown below.



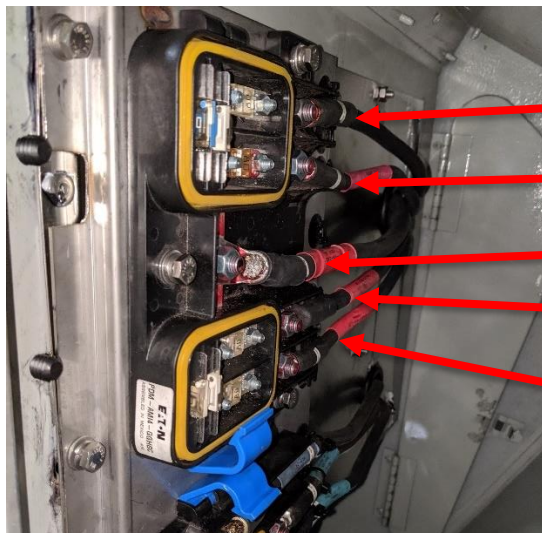
07-09-1823, old destination: MDP-J4

07-09-1863, old destination: MDP-J43

07-09-1862, old destination: MDP-J42

Torque all the nuts to 50 In-Lbs.

60. Connect the free ends of the 07-09-1871, 07-09-1866, 07-09-1821, 07-09-1858, and 07-09-1859 cables to the big small fuse holder studs from the top respectively on the big fuse block behind the divider panel.



07-09-1871, old destination: MDP-J37

07-09-1866, old destination: MDP-J36

07-09-1821, old destination: MDP-J1

07-09-1859, old destination: MDP-J39

07-09-1858, old destination: MDP-J38

Torque all the nuts to 50 In-Lbs.

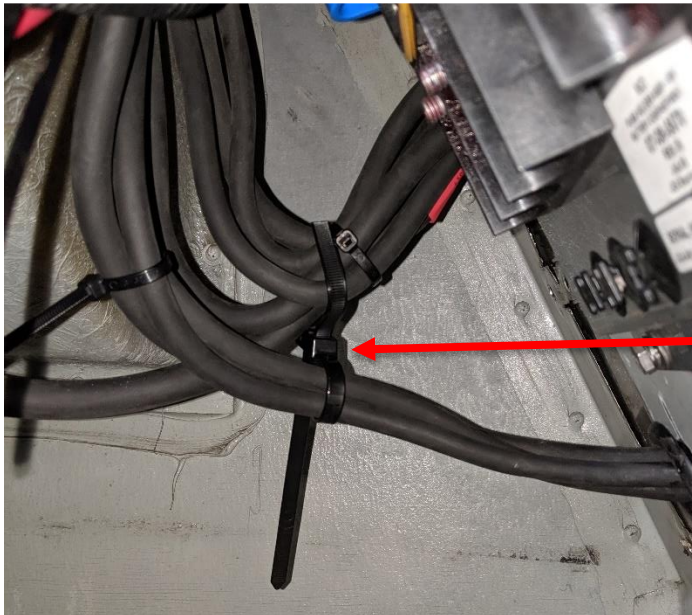
61. Using the zip ties, part of the tie bases, MCI P/N: 19-11-3472, tie the cables to the mount bases.



62. Spray the corrosion inhibitor, CRC SP400 or similar, on all the studs and close the caps of the fuse blocks.

63. In the battery compartment side tie all the five 24V SW cables using tryraps, MCI P/N: 19-11-3472, and three 12V SW cables using a tyraps.

64. Tie the 24V SW cables and 12V cables together using a double loop zip tie, P/N: 19-11-3078.



Double loop zip tie,
19-11-3078

65. Identify the below-mentioned cables and separate them from the rest:

Cable P/N	Old destination	Heat Shrink color
07-09-1824	MDP-J3	Blue
07-09-1865	MDP-J45	Blue
07-09-1864	MDP-J44	Blue
07-09-1822	MDP-J2	Red
07-09-1861	MDP-J41	Red
07-09-1860	MDP-J40	Red

66. Install the free ends of the 07-09-1865, 07-09-1864, and 07-09-1824 cables to the innermost fuse block in the battery compartment as shown below.



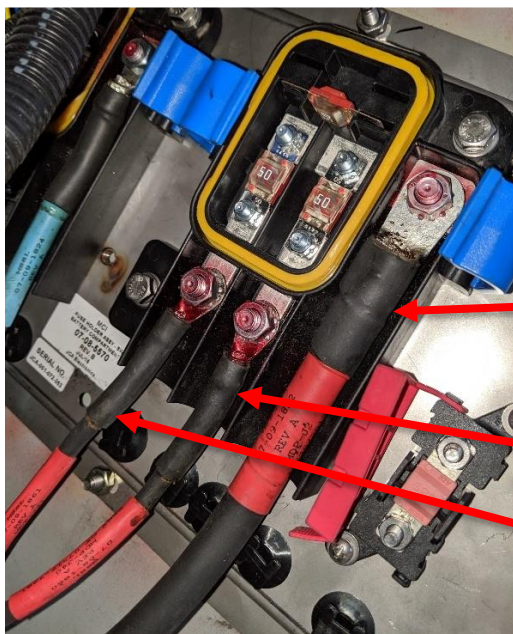
Torque all the nuts to 50 In-Lbs.

07-09-1824, old destination: MDP-J3

07-09-1865, old destination: MDP-J45

07-09-1864, old destination: MDP-J44

67. Install the free ends of the 07-09-1861, 07-09-1860, and 07-09-1822 cables to the outer fuse block in the battery compartment as shown below.



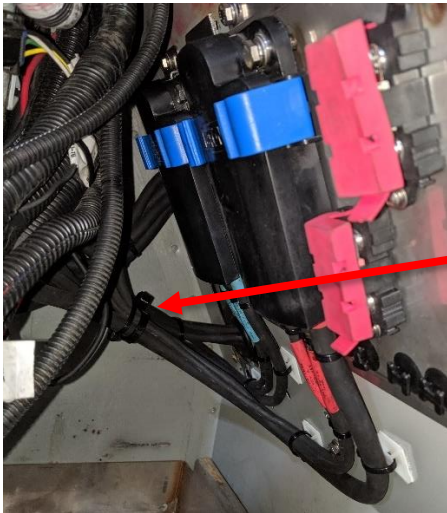
Torque all the nuts to 50 In-Lbs.

07-09-1822, old destination: MDP-J2

07-09-1861, old destination: MDP-J41

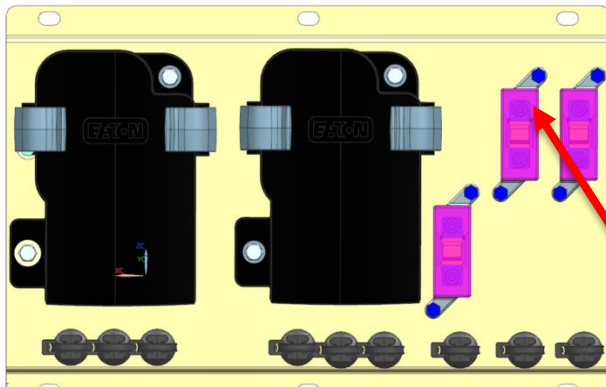
07-09-1860, old destination: MDP-J40

- 68. Spray corrosion inhibitor, CRC SP400 or similar, on the fuse block and close the lid.
- 69. Tie the cables to the existing tie mounts using zip ties.
- 70. Tie the three 12V cables using a zip tie to the tie base.
- 71. Tie the three 24V cables using a zip tie to the tie base.
- 72. Pull all the cables up and tie the 12V hot and 24V hot cables using a double-loop zip tie, MCI P/N:19-11-3078.
Try to keep the cables as high as possible from the battery tray.



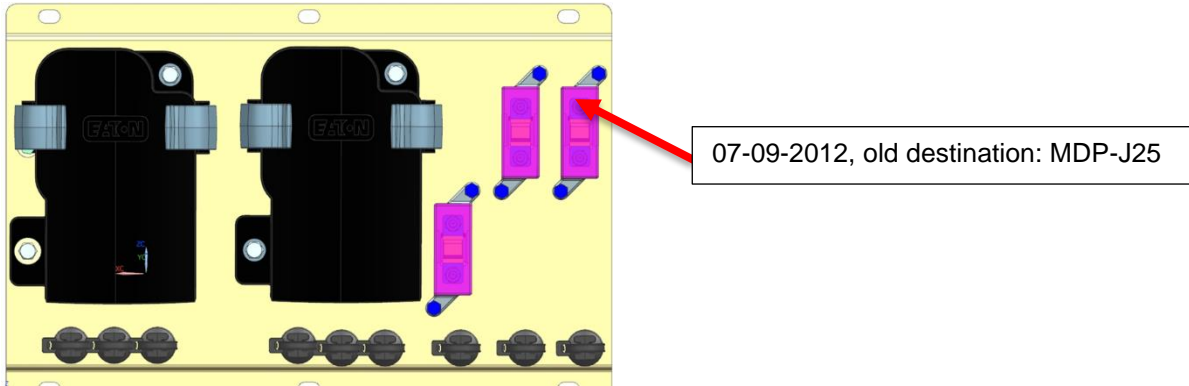
Double loop zip tie

- 73. Tie the SW cables and HOT cables using a double-loop zip tie.
- 74. Install free end of the 24V equalizer cable, MCI P/N:07-09-2011, to the top stud of the center LMI fuse block and torque the nut to 39.8 In-Lbs.

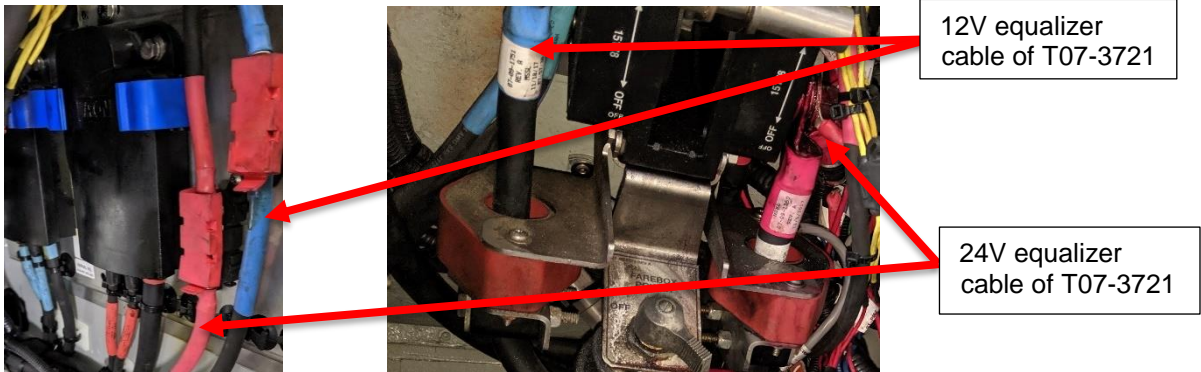


07-09-2011, old destination: MDP-J26

75. Install free end of the 12V equalizer cable, MCI P/N: 07-09-2012, to the top stud of the outer LMI fuse block and torque the nut to 39.8 In-Lbs.

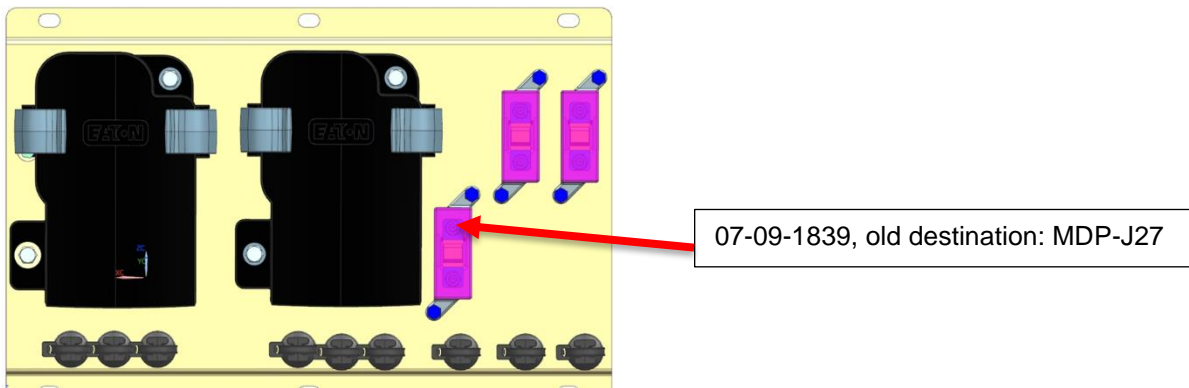


76. Route the equalizer cables, MCI P/N: T07-3721, and connect them to the equalizer fuse holders and MDS switch side as shown below.

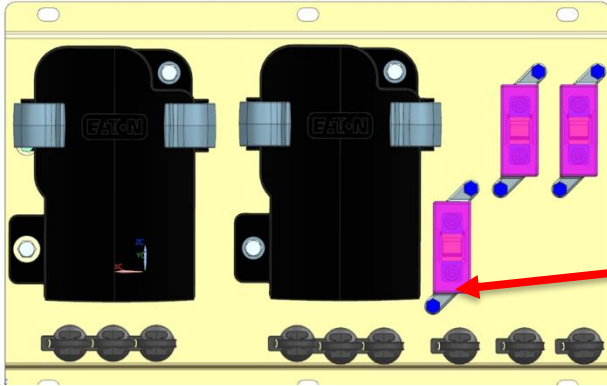


77. Torque the nuts on the equalizer fuse block to 39.8 In-Lbs and nuts on the MDS to 300 In-Lbs.

78. Connect the reworked inverter cable to the top stud of the left fuse block and torque the nut to 39.8 In-Lbs.

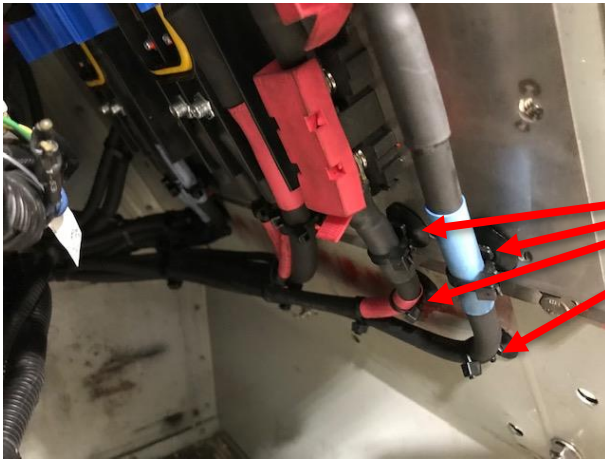


79. Connect the MDS 24V HOT to inverter cable, MCI P/N: 920456, to the bottom stud of the left LMI fuse block and torque the nut to 39.8 In-Lbs. Connect the other end to 24V Hot MDS stud.



Install cable 920456

80. Tie the equalizer and inverter cables to the tie bases using zip ties.



Zip tie

81. Tie the 12V and 24V equalizer cables using a double loop zip tie, MCI P/N: 19-11-3078.



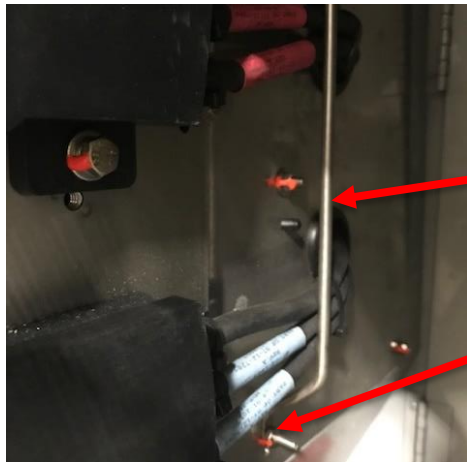
Double loop zip tie

82. Tie the equalizer harness, ground together using zip ties, and route it as shown below.



Equalizer harness and ground

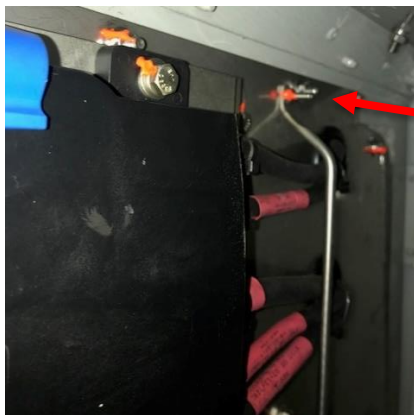
83. Install the guard, MCI P/N: T07-3725, as shown below using two 10-24 nuts, MCI P/N: T19-1159, and torque to 23 In-Lbs.



Guard

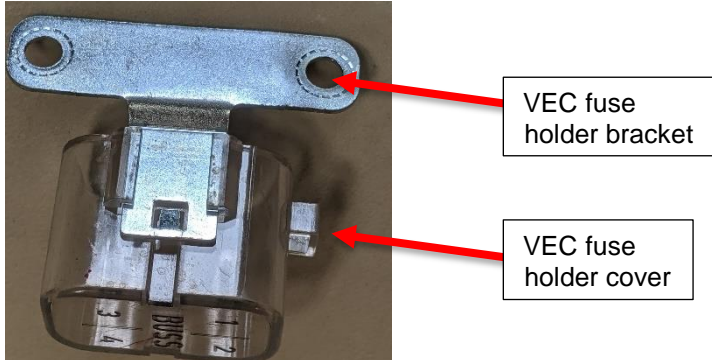
10-24 nut

84. Apply torque seal to all the newly installed nuts and bolts.

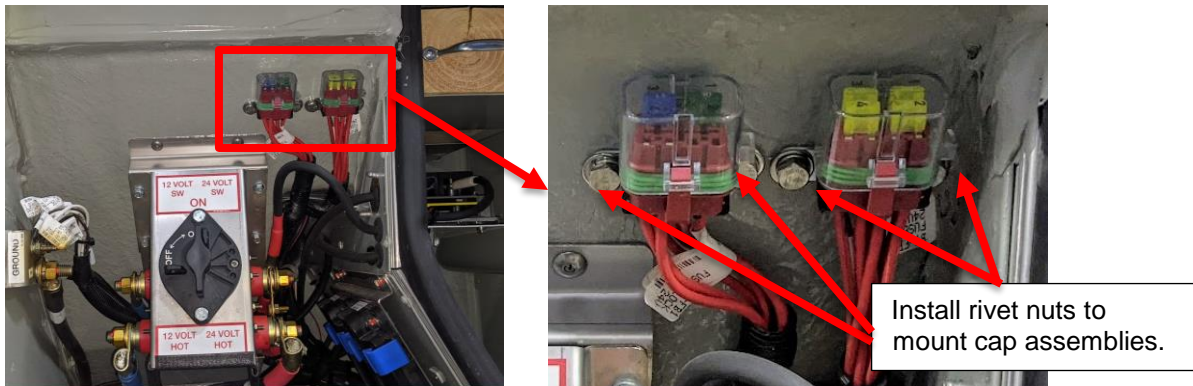


Apply torque seal

85. From the kit, locate the 2 VEC fuse holder covers, MCI P/N: 07-08-5651, 2 brackets, MCI P/N: 07-08-5652, and assemble them as shown below.

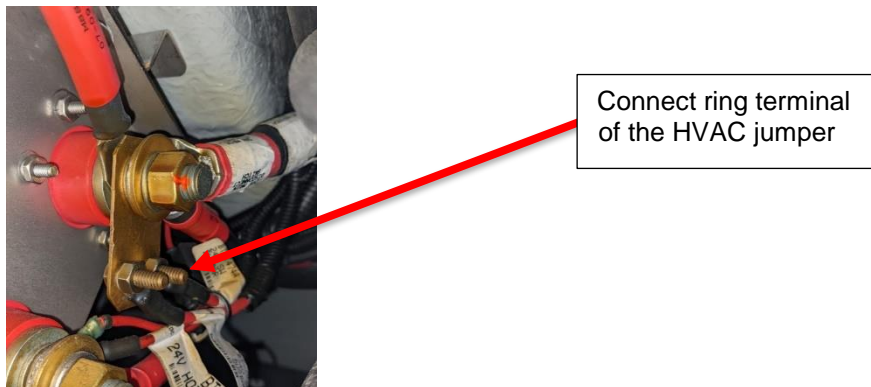


86. Position brackets, MCI P/N: 07-08-5652, in the top right of the battery compartment. Drill four 0.391" holes using the brackets as templates. Install 1/4" rivet nut, MCI P/N: 19-13-156, on the drilled holes. Secure the bracket using 1/4" screw, MCI P/N: 19-1-386, and washer, MCI P/N: 19-2-23.



87. Secure the connector from the jumper harness to the VEC fuse holder cover.

88. Using washer, MCI P/N:19-2-23, and nut, MCI P/N: 19-3-32, connect the ring terminals of the HVAC jumper harness to the 24V switch busbar, on the MDS as shown below. Torque stud to 65 IN-LBS.



89. Using washer, MCI P/N:19-2-23, and nut, MCI P/N: 19-3-32, Connect the ring terminal of the TCM (wire CT170) inline fuse to the 24V switch busbar on the MDS as shown below and Torque stud to 65 IN-LBS.



Connect ring terminal of wire 170

90. Using washer, MCI P/N:19-2-23, and nut, MCI P/N: 19-3-32, connect the ring terminals of the ECM (wire CT 0011) and farebox (wire 9502) to the 24V Hot busbar, MCI P/N: 7L-8-5055, on the MDS as shown below. Torque stud to 65 IN-LBS.



Connect ring terminal of wire 0011

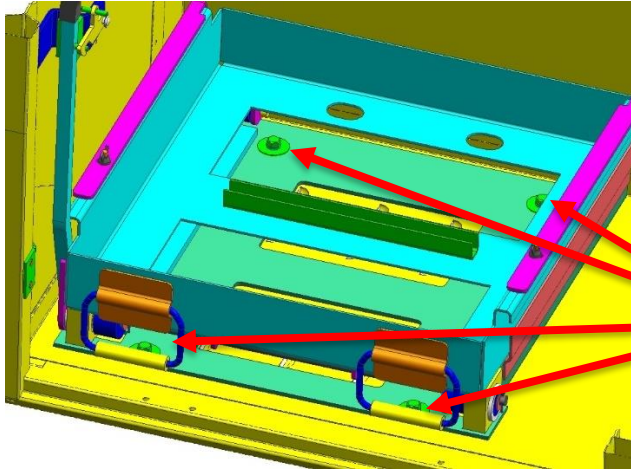
91. Clean the battery compartment and allow 5min flash off time after applying isopropyl alcohol. Install the decal, MCI P/N: 920762, on the battery compartment door.



Decal 920762

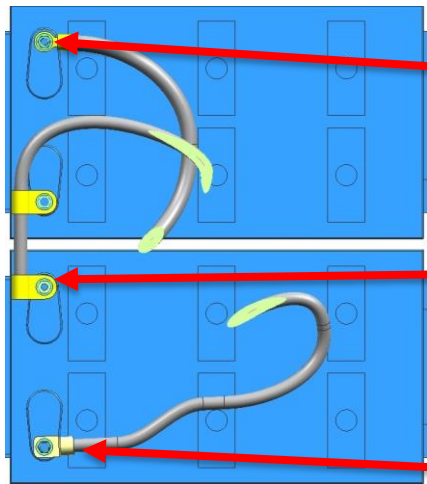
NOTE: If a coach has evaporator AMI fuse holders in the HVAC compartment, install decal 933516 instead of decal 920762.

92. Clean the battery compartment for all dirt and debris. Install the steam-washed battery tray using the existing hardware.



Install the tray using the bolts, lock washers, flat washers.

93. Put the batteries back on the battery tray and install the cables as shown below.



GND cable

12V cable

24V cable

94. Completed battery compartment rework for reference.





LABOUR ESTIMATE				
	Operation	Number of Technician(s)	Hours	Labor Time T X HR
1	MDP Replacement with Fuse Holders	1	11	11

PARTS REQUIRED					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	6490291	KIT – D-LEGACY MDP REPLACEMENT	1	EA	

SPECIAL TOOLS REQUIRED					
Item	Part Number	Description	Qty.	Units	Notes
1	NA	Flat air chisel with 1" wide bit	1	EA	
2	23-02-0119	CRC SP-400 Corrosive Inhibitor	1	EA	
3	5023844	TORQUE SEAL, ORANGE, 5 OZ.	1	EA	
4	NA	Metal hole saw 1-5/8"	1	EA	
5	NA	Wire Crimp tool	1	EA	
6	NA	Heavy Duty Terminal Crimp tool	1	EA	
7	NA	Rivet Nut Gun	1	EA	
8	NA	Various Drill Bit Sizes	1	EA	
9	NA	Heat Gun	1	EA	
10	NA	IN-LBS Torque Wrench	1	EA	
11	NA	FT-LBS Torque Wrench	1	EA	