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INSTRUCTION TO SERVICE ITS: 4792

SECTION: 260 Battery	MODEL: ☐ 30FT ☐ 35FT ☒ 40FT ☒ 60FT ☒ DSL ☐ CNG ☐ LNG ☒ ELEC	TYPE: ☒ XCELSIOR ☒ LOW FLOOR	WRITTEN BY: Mike Pearson
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OBJECTIVE/SUBJECT:

Inspect OK6 Rooftop Oil Cooler Harness for UV Damage prevention.

PROCEDURE:

1. Park the vehicle on a level ground.
2. Set the Battery Disconnect switch to the "OFF" position.
3. Inspect the exposed sections of the wire insulation on the rooftop oil cooler harness (Figure 1) for cracking or embrittlement of insulation (Figure 2). Insulation that is flexible without cracking but has faded is to be covered to prevent deterioration.



Figure 1: Rooftop Oil Cooler

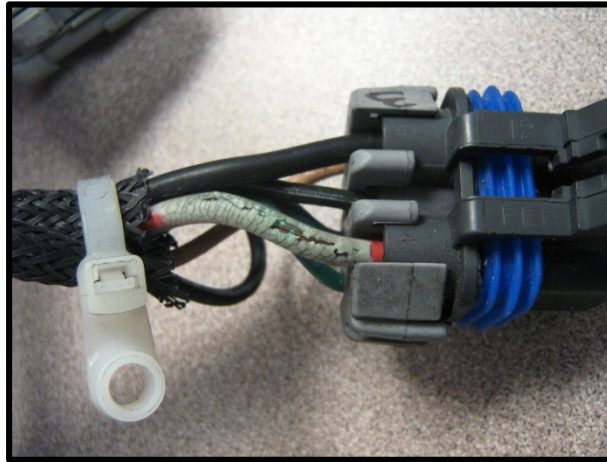


Figure 2: Main Harness Damage

4. Disconnect the harness at each fan and remove the fan connector from the shroud.
5. If the insulation is brittle, replace main harness. Request for replacement harness – NF P/N 6390444 (EMP P/N 3170025043). **See Appendix A – Harness Replacement** for instructions. If the wires on the fan side harness are brittle (Figure 3), request for fan assembly NF P/N 6406659 (EMP P/N 1050036047). **See Appendix B – Fan Replacement.** If there is no brittleness, install wire protection as follows:

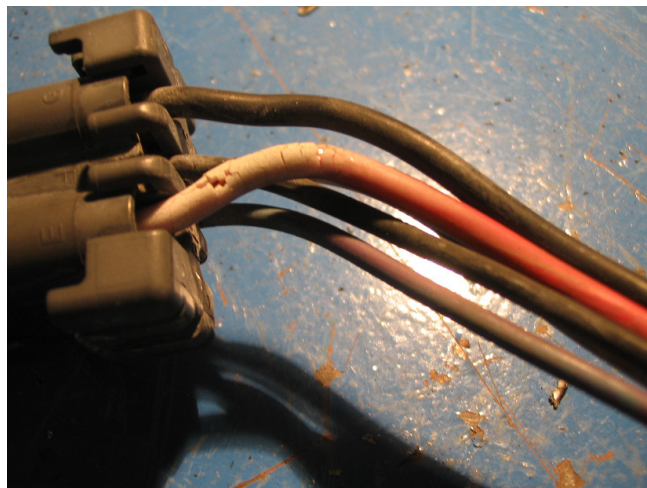


Figure 3: Fan Harness Damage

- a. Clip and remove zip tie on fan harness near the fan motor (Figures 4 through 7).



Figure 4: Clip Zip Tie



Figure 5: Removal of Zip Tie (1)



Figure 6: Removal of Zip Tie (2)



Figure 7: Zip Tie Removed

- b.** Slide wire sheathing away from fan to expose insulated wires (Figure 8).



Figure 8: Exposed Wires

- c.** Using Scotch Super 33+ electrical tape wrap wire bundle from header back a couple inches (Figures 9 and 10).



Figure 9: Scotch Super 33+ Tape



Figure 10: Fan Harness Taped

- d. Slide existing Braided Sleeve material over wire header (Figures 11 and 12). The Braided Sleeve will lock into place once over the “barb” of the header.



Figure 11: Sleeve Near Header



Figure 12: Sleeve Over Header

- e. Install new Fir Tree Zip Tie N/F P/N 6406889 (EMP P/N 3330010025) to secure harness to the fan guard (Figures 13 through 15).



Figure 13: New Zip Tie



Figure 14: Installing Zip Tie into Guard



Figure 15: Securing and Trim of Zip Tie

- f. Tape Connector Side of Fan Harness (Figures 16 and 17). After taping no wire should be exposed.



Figure 16: Exposed Wires on Fan Harness



Figure 17: Taped Harness

- g. Cut 9" to 10" of Braided Sleeve Material N/F P/N 6406657 (EMP P/N 3389158008) and slide it over the Main Harness (Figure 18).



Figure 18: Braided Material Over Main Harness

NOTE: If you are NOT replacing the harness then you will need to wrap the exposed wires on the Main Harness close to the connector. Use Scotch Super 33+. If you are replacing the Main Harness then this step is NOT necessary.

- h.** Use di-electric grease on connectors before assembly. Also, grease on the blue seal will aid installation and help ensure a proper fit/seal (Figures 19 and 20).



Figure 19: Di Electric Grease on Connector



Figure 20: Smear Grease Over all Pins

- i. Inspect blue seal on main harness to ensure it is oriented properly on the connector before installation and is not damaged. Rotate Seal as required. Applying a thin film of grease or lubricant to the seal will aid in the installation process (Figure 21 and 22). If the Seal is damaged it will need to be replaced N/F P/N 6406669 (EMP P/N EXP11110002).



Figure 21: Perfect Orientation



Figure 22: Improper Orientation

- j. Connect Main Harness to Fan Harness. When the connector is seated you will hear or feel a “click”. Make sure the seal is not visible. If there is blue seal visible after the connector is seated then the connection will not be sealed and be compromised (Figures 23 and 24).



Figure 23: No Seal Visible, Correct

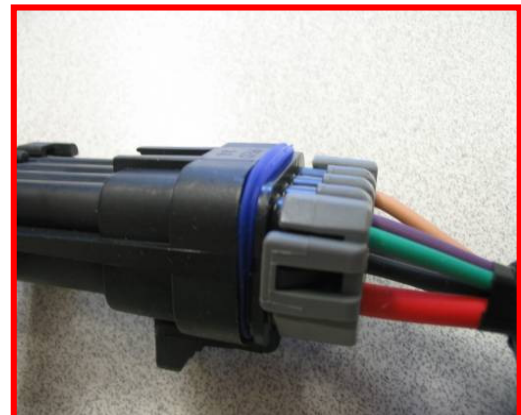


Figure 24: Seal Visible, Incorrect

- k. Once connected properly, insert Zip Tie N/F P/N 6406664 (EMP P/N 3330036029) through the wire bundle on the fan side and then through the harness side. Tighten zip tie to secure connector and trim excess (Figures 25 and 26).



Figure 25: Zip Tie Inserted



Figure 26: Zip Tie Secured and Trim

- l. After connector is secured with a zip tie then slide the Braided Sleeve over the connector and Main Harness side with Zip Tie N/F P/N 6406191 (EMP P/N 333022090). There needs to be approximately 1" overlap (Figures 27 and 28).



Figure 27: Two Zip Ties Needed



Figure 28: Zip Tie Protective Sleeve on Harness

NOTE: There is an existing zip tie on the Main Harness. When securing the zip tie for the protective cover make sure it is on the upstream side (away from the connector) of the existing zip tie. This will ensure a mechanical lock and prevent the cover from slipping off.

- m. Repeat same procedure on Fan Harness side of the connector. Make sure to extend the Braided Sleeves to their max length to ensure the maximum amount of overlap. Use Zip Tie N/F P/N 6406191 (EMP P/N 3330022090) to secure the Braided Sleeves and trim excess (Figures 29 through 32).



Figure 29: Braided Sleeve Before Extension

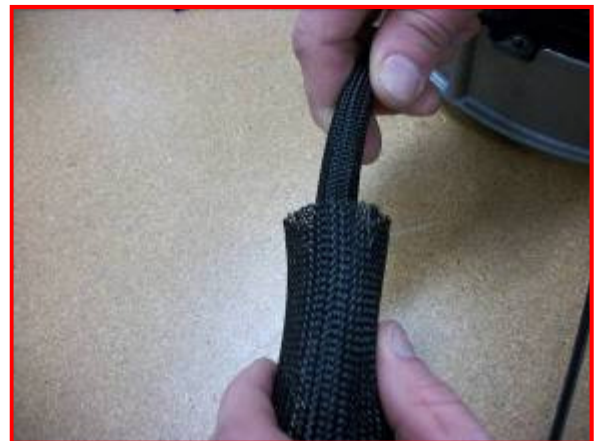


Figure 30: Braided Sleeve After Extension

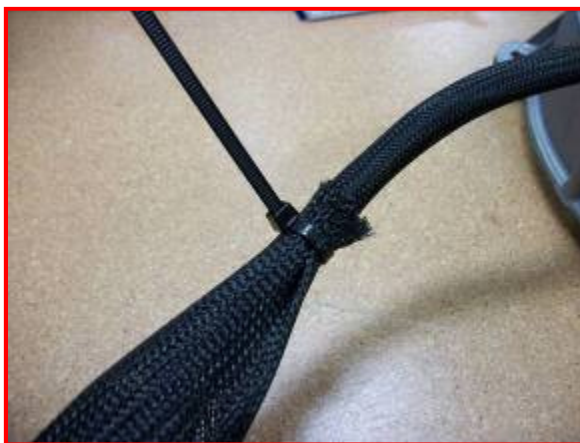


Figure 31: Secure with Zip Tie



Figure 32: Trim Zip Tie

- n. Confirm each of the fan connections looks like Figure 33.



Figure 33: Protective Sleeve for Fan Connection

- o. Next the TMC and vehicle communication leads need to be protected. Wrap Scotch Supper 33+ black tape around the exposed wires (Figures 34 through 37). Make sure the tape is up against the body of the connector and that it also covers the existing zip tie.



Figure 34: Wires exposed on TMC Connector



Figure 35: Wires exposed on J1939 Connector



Figure 36: Wires taped on TMC Connector



Figure 35: Wires taped on J1939 Connector

6. UV Protection completed, refer to **Appendix A** for harness installation.
7. Turn the main battery disconnect switch to the “ON” position.

Appendix A – Harness Replacement



Service Parts Replacement

Main Wire Harness

WARNING: To avoid serious personal injury, possible death, or damage to the vehicle, disconnect the main negative battery terminal and/or switch off the battery disconnect switch first before removing or installing any electrical components.

Harness Removal:

1. Locate the μ TMC System controller which is mounted on the front driver's side of the kit.
2. Disconnect the 12 pin connector at μ TMC by depressing the locking tab on the harness connectors and pulling back on the connector body. Wiggling the connector body will help in freeing the connection.
3. Remove the two M10 fasteners attaching the main harness P-clips to the oil cooler frame. These are on the driver's side of the kit.

4. Disconnect each of the fans from the main wire harness by depressing the locking tab and pulling back on the harness connector body.
5. Cut the cable ties attaching the harness to the shroud in each of the two locations.
6. Remove the main harness from each of the 9 J-clips by bending the J clips away from the fan shrouds they are attached to.
7. Disconnect the 16 pin Deutsch HD34 connector from the bulkhead connector on the driver's side of the bus. This requires a twisting motion in the counterclockwise direction.
8. Remove the 8 pin Deutsch DT series connector from the bulkhead connector by depressing the two locking tabs on the sides of the connector body and pulling the connector body back.

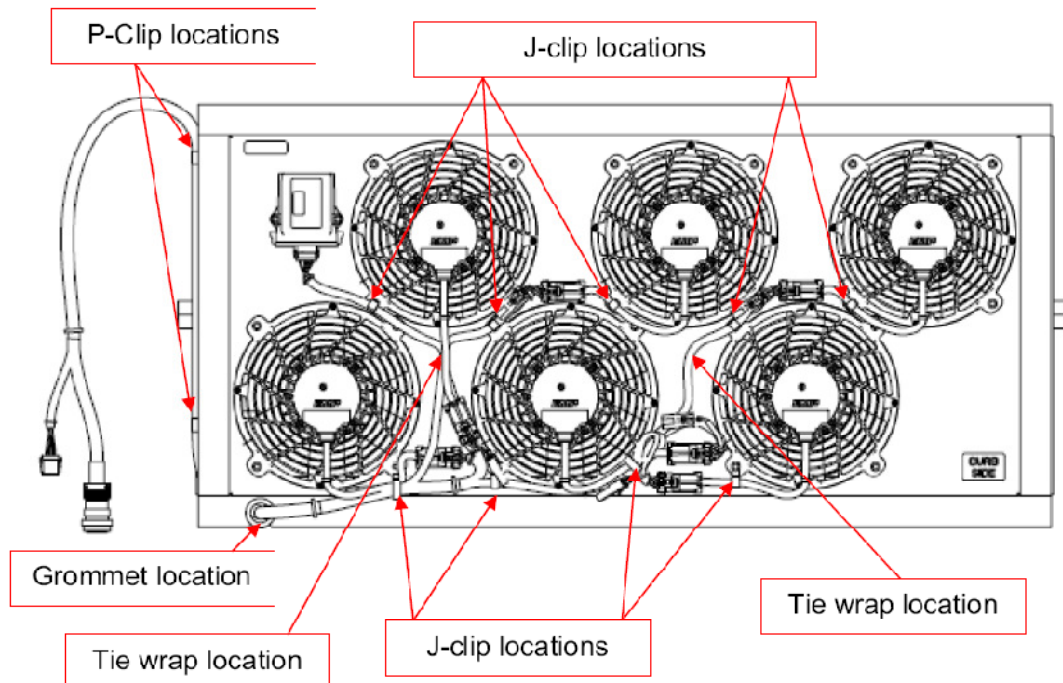


Figure 6 – OK6 Harness layout



Service Parts Replacement

Harness Installation

1. Lay harness assembly out across kit as shown in Figure 6 – OK6 Harness layout.
2. Install grommet attached to harness into the slot to protect the harness from abrasion. Take care not to damage harness on grommet installation.
3. Attach the harness branch with the 10.0Kohm E-link resistor to fan #6. This will help position the harness. Route the main wire harness through the J-clip on the upper LH fastener on fan #5 and lower LH of fan #6.
4. Attach the harness branch with the 6.65Kohm resistor to fan #5.
5. Attach the harness branch with the 2.49Kohm resistor to fan #3. Route the main harness through the 1" J-clip on the lower RH fastener of fan #3.
6. Attach the branch of the main harness that connects to fan #6 to the shroud using a new fir tree tie wrap in the hole located between fans #3, #4, #5.
7. Attach the harness branch with the 4.65Kohm resistor to fan #4. Route the harness through the J-clip attached the upper LH fastener of fan #3 and lower LH fastener of fan #4.
8. Attach the harness branch with the 1.1Kohm resistor to fan #2.
9. Attach the branch with no E-link resistor to fan #1. Route the harness through the 1" J-clip on the lower RH fastener of fan #1.
10. Attach the μ TMC branch of the main harness to the connector built into the μ TMC. Route the harness through the J-clip on the lower LH fastener of fan #2.
11. Route the branch of the harness attaching to the μ TMC, the branch attaching to fan #4, and the lead coming off fan #2 through the fir tree tie wrap located in the center of fans #1, #2 and #3.
12. Attach the harness assembly to the oil cooler frame using the two P-clips that are pre-assembled onto the harness. The torque requirement for these fasteners is 25 $\pm$ 4 ft-lbs.

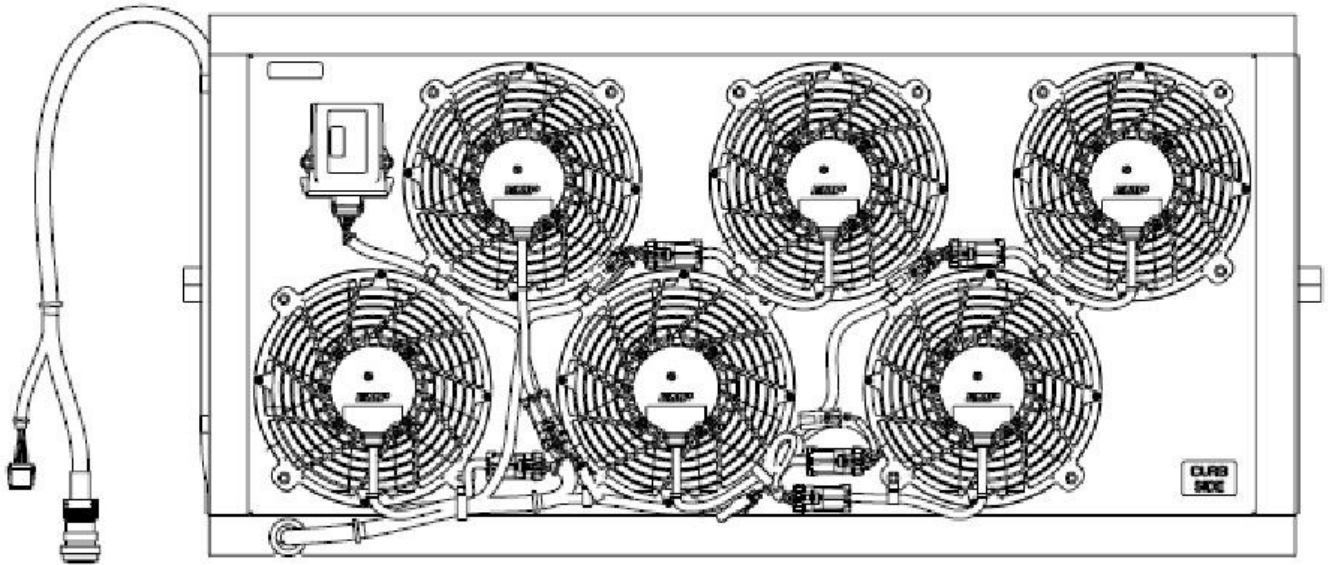
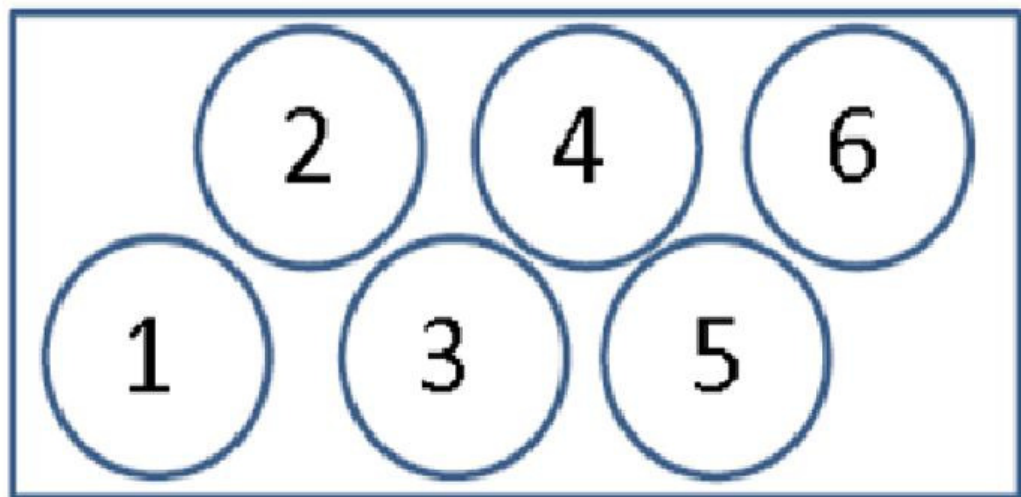


Figure 6 OK6 Harness Layout



Fan Numbers

Appendix B – Fan Replacement

SERVICE PARTS REPLACEMENT

FIL-11 Fan

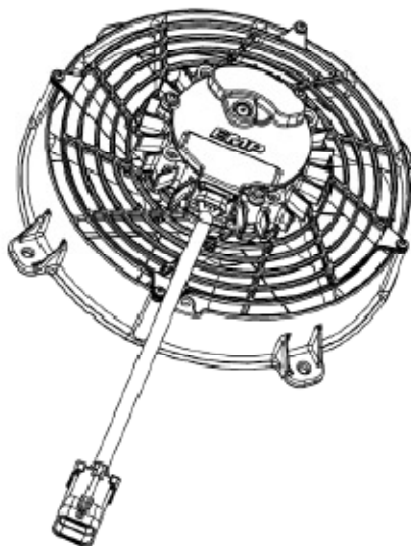


Figure 4 - FiL-11 Fan

WARNING: To avoid serious personal injury, possible death, or damage to the vehicle, disconnect the main negative battery terminal and/or switch off the battery disconnect switch first before removing or installing any electrical components.

1. Disconnect the fan's connector from the kit wire harness connector by depressing the locking tab on the harness connectors and pulling back on the connector body. Wiggling the connector body will help in freeing the connection but do not pull back using the wire harness since damage to the wires and/or pin connections could occur.
2. Detach the connector from the shroud by removing the connector from the mounting clip using a sliding motion.

3. Clip any tie wraps that are attaching the fan wire harness to the shroud.

NOTE: Make note of the fan orientation (all fans are oriented in the same direction) and location of tie straps attaching the fan harness to the shroud.

4. Remove all (4) M6 x 16mm fan mount bolts.
5. Place the replacement fan onto fan shroud and orient the same way as noted.
6. Clip the fan connector to the shroud using the mounting clip.

NOTE: Pre-coat the last few threads of the (4) mounting bolts with Loctite 242.

7. Torque the mounting bolts to 106±10 in-lbs using a criss-cross pattern for torque sequence.
8. Connect the fan's wire harness connector to the kit wire harness connector and insure that the locking tabs are fully engaged.
9. Tie strap main harness and if necessary the fan's wiring harness the same as it was prior to replacement.

LABOUR ESTIMATE				
	Operation	Men	Hours	Labour Time M X HR
1	Inspect OK6 Rooftop Oil Cooler Harness for UV Damage prevention.	1	1.5	1.5

PARTS REQUIRED					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	6390444	HARNESS ASSEMBLY	1	EA	ORDER AS REQUIRED
2	6406659	FIL-11 FAN ASSEMBLY	6	EA	ORDER AS REQUIRED
3	6406657	SLEEVE-BRAIDED	5.0	FT	ORDER AS REQUIRED
4	6406669	CONNECTOR SEAL, BLUE	6	EA	ORDER AS REQUIRED
5	6406191	ZIP TIE WRAP, 8"	12	EA	ORDER AS REQUIRED
6	6406664	ZIP TIE WRAP, 11"	6	EA	ORDER AS REQUIRED
7	6406889	FIR TREE TIE WRAP	6	EA	ORDER AS REQUIRED