



INSTRUCTION TO SERVICE

ITS: 5176	
SECTION:	219 Engine and Transmission
WRITTEN BY:	Troy Stutsky
SUBJECT:	UCAP Fire Bottle Relocation (Split)

ITS5176

DRAFT

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PROCEDURE:

1. Turn the main battery disconnect switch to the “OFF” position.

⚠ WARNING: ALWAYS discharge the Ultra Capacitors (UCAP) before performing high voltage system maintenance on this vehicle. Refer to Section 5 of the Service Manual under 2.17 *Discharging The Ultra Capacitors* for the discharge procedure.

⚠ WARNING: When working on the rooftop systems of the bus, be sure to use a safety tether and harness. If overhead tether system is not available, then follow your own facility’s safety procedure for working on vehicle rooftops.

2. RELOCATION

- a. Open the clam shell doors on top of the bus to access the UCAP assembly. See Fig 1.

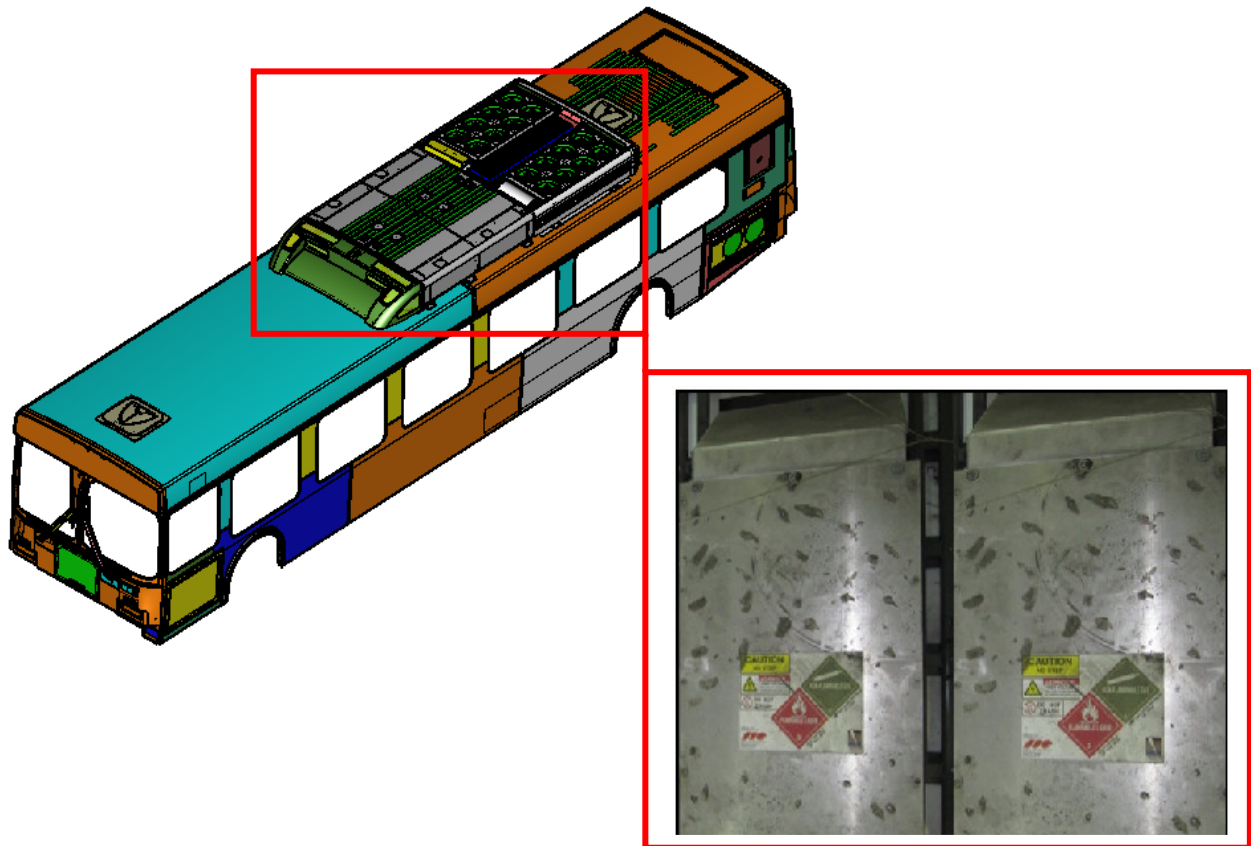


Fig 1 – SPLIT UCAP Location

- b. On both UCAPS remove cabinet cover and all existing perimeter hardware (16x screws, washers, and lock washers per UCAP) securing the UCAP cabinet covers to UCAP boxes and discard hardware. See Fig 2.

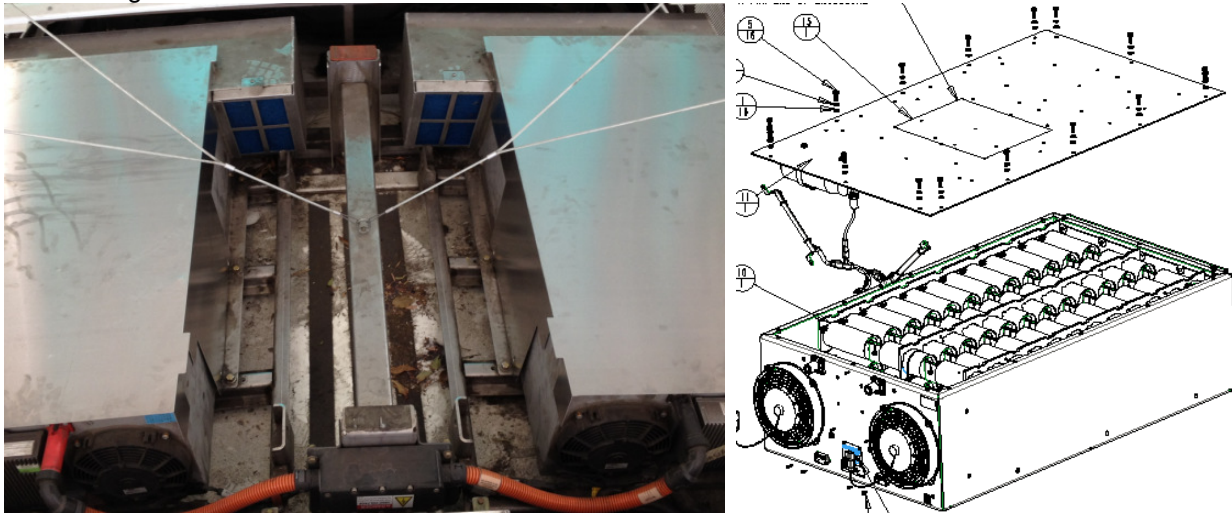


Fig 2 – UCAP Cabinet Cover

- c. Deactivate (refer to orientation sticker on bottle) the bottle valves on both bottles using a flat head screw driver and disconnect the fire bottle harness connection before fully opening cabinet covers and setting aside. See Fig 3.

☞ **NOTE: DO NOT disconnect fire suppression line from bottle.**

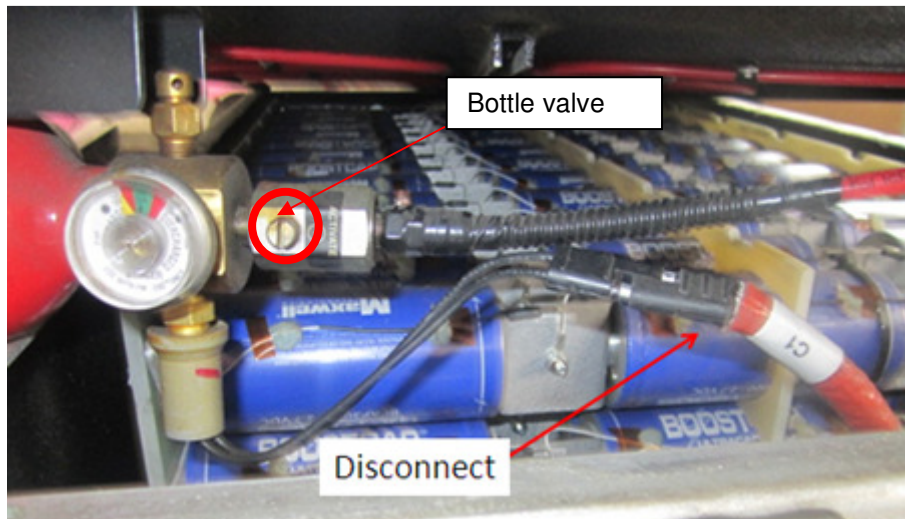


Fig 3 – Fire bottle harness

- d. Place both UCAP cabinet covers on bench to allow convenience during modifications.

NOTE: The Ultra Capacitors located on the curbside (master pack) require you to reroute the fire suppression line. Do not perform Step E on street side (slave pack) cabinet cover.

- e. Using a 1/8 drill bit, drill out all the rivets holding the P-clamps supporting the fire suppression hose under the UCAP cabinet cover on master pack. Discard the washers but save the P-clamps for re-use later. Fig 4

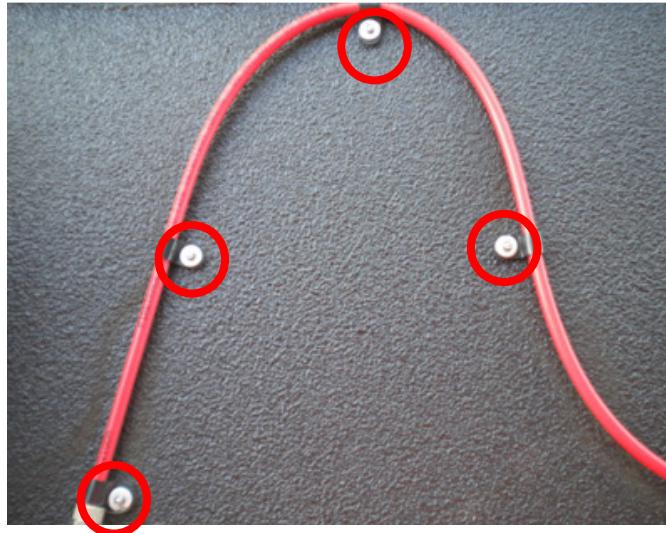


Fig 4 – Fire suppression hose

- f. On both cabinet covers, loosen clamp for fire suppression bottle and slide out of bracket. Remove hardware securing fire suppression bottle bracket to the cabinet cover. Set bracket, clamp and hardware aside for re-use later. See Fig 5.
- g. Drill out bottle bracket mounting holes in cabinet cover to 1/4" diameter, add caps (**NFI PN 6412101**) and silicone (**NFI PN 401722**) to the old holes to ensure they're sealed from any water intrusion.

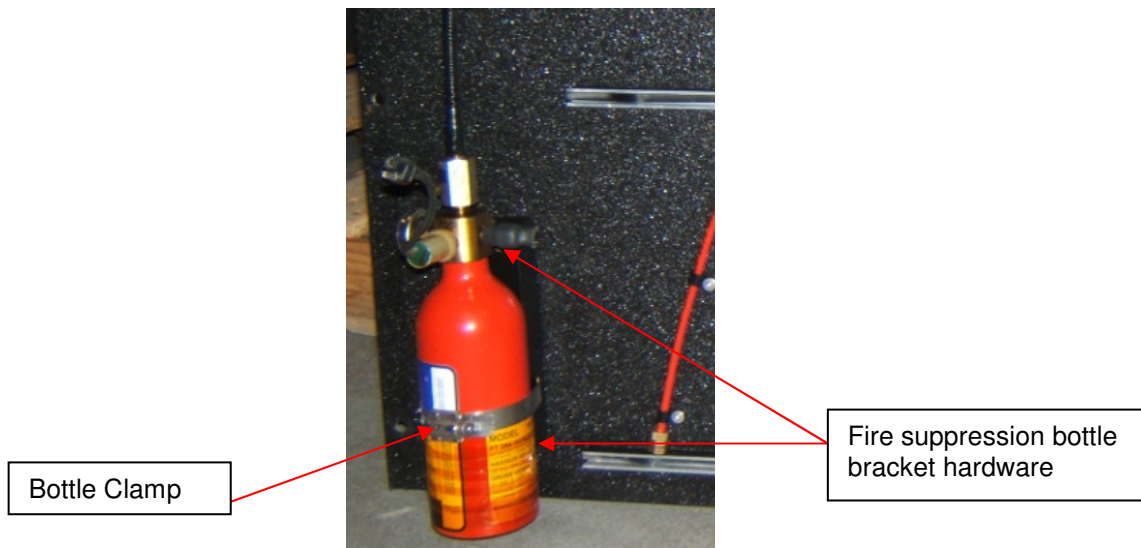


Fig 5 – Fire suppression bottle assembly

☞ **NOTE: The Ultra Capacitors located on the street side (slave pack) requires you to add two P-clamps. Do not perform Step H on curb side (master pack) cabinet cover.**

- h. Install the two P-clamps supplied (**NFI PN 6350363**) on slave pack cabinet cover. Mark their location per Fig 6 and drill holes using a 1/8" drill bit. Secure with two 1/8" aluminum rivets (**NFI PN 60R02007**) and two #4 flat washer (**NFI PN 10W94000**). Ensure a small amount of silicone (**NFI PN 401722**) is placed over the rivets to ensure a water tight seal. This is to ensure the new fire suppression line exits through the new notch on the UCAP box.

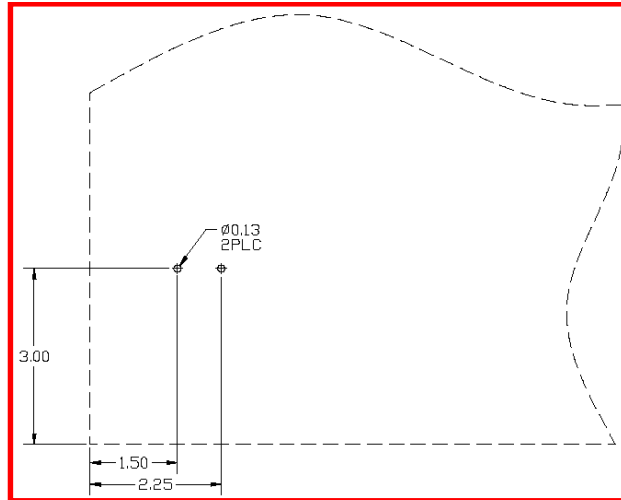


Fig 6 – Fire suppression clamping

☞ **NOTE: The Ultra Capacitors located on the curbside (master pack) require you to reroute the fire suppression line. Do not perform Step I on street side (slave pack) lid.**

- i. Route the fire suppression line back on master pack cabinet cover using twenty two 1/8" aluminum rivets (**NFI PN 60R02007**) and twenty two #4 flat washers (**NFI PN 10W94000**) to secure clamps to the cabinet cover. Make sure to follow the same pattern of original route. Basically, the fire suppression hose end will be on opposite side as original configuration. Place a small amount of silicone (**NFI PN 401722**) over the rivets to ensure a water tight seal. See Fig 7.

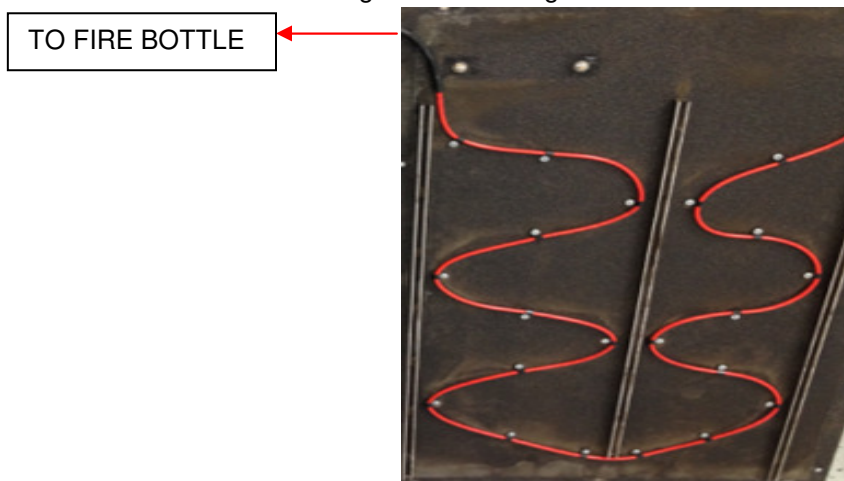


Fig 7 – Fire suppression routing

- j. Using high temp loom (NFI PN 198159), cover each suppressor line, from the bottle to the cabinet cover and wrap each entire line with electrical tape to prevent water intrusion. See Fig 8.



Fig 8 – Fire suppression hose with loom and tape

- k. Secure the existing fire bottle bracket and clamp, saved from **Step F**, to the new bracket assemblies (NFI PN 492376 and 495022) using the hardware saved from **Step F** as well.
- l. Secure new Fire Bottle Brackets (NFI PN 492376 and 495022) to the existing UCAP cabinet cover by drilling two ¼” diameter holes and using two (NFI PN 20B04016) ¼ - 20 x 1.0lg bolts, two (NFI PN 333084) ¼ - 20 nylon lock nuts and four (NFI PN 50W04000) ¼ flat washers to hold the brackets down. Add silicone to the bottom of the washers and hardware to ensure no leaks. See Fig 9 for location measurements.

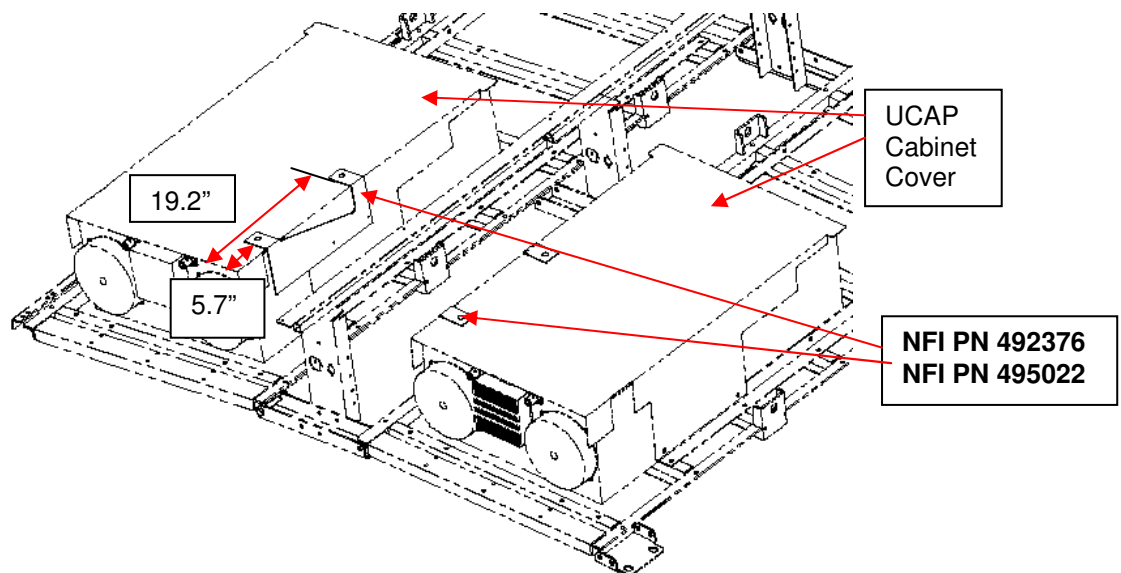


Fig 9 – Location of Brackets on Covers

- m. Slide both Fire Suppression Bottles back into clamps and tighten up.
- n. Take both UCAP cabinet covers back on the roof of the bus.

- o. On the UCAP boxes, mark the location of the .9" deep notch for the suppression lines/harness using the dimensions outlined in Fig 10. After cutting out each notch, ensure edges are smooth and free of burrs and add rubber channel **NFI PN 6412095** to each notch.

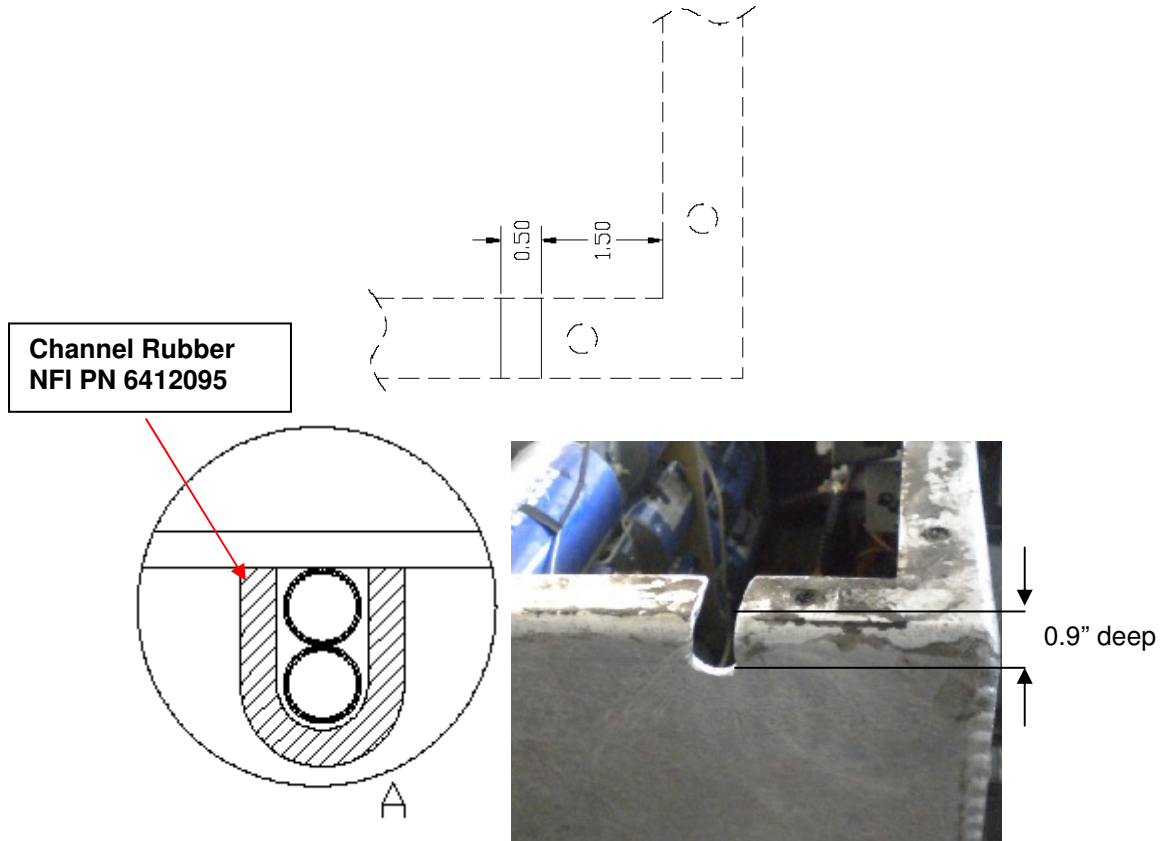


Fig 10 – Fire suppression hose and harness notch

- p. Add high temperature loom (**NFI PN 198159**) to each fire suppression extension harness (**NFI PN 6409056**) and wrap each entire harness with electrical tape to prevent water intrusion. Plug each assembly into the circuit board harness. Leave the fire suppression bottles disconnected from harnesses for now. See Fig 11.



Fig 11 – Extension Harness Assembly

- q. Activate each bottle assembly by turning the valve in the ACTIVATE position (see label on bottle). Refer to Fig 12.



Fig 12 – Fire Bottle Activated

- r. Plug the extension harness into the fire bottle harness. Secure harnesses using four tyraps (NFI PN 5958112)
- s. Dry fit the correct UCAP lids on the correct UCAP boxes to make sure harness and line routing matches up with the notches in the UCAP boxes. Adjust if necessary.
- t. Ensure the mating surface of the UCAP lids are clean and free of dirt. Place a bead of silicone around perimeter of the UCAP boxes.
- u. Fit the UCAP lids on the UCAP boxes ensuring that the fire suppression bottle lines and harnesses are properly routed through the notches in the UCAP boxes.
- v. Secure each lid with sixteen bolts (NFI PN 14S04012), sixteen lock washers (NFI PN 30W04000) and sixteen flat washers (NFI PN 10W04000). Add silicone to the bottom of the washers and hardware to ensure no leaks. See Fig 13.

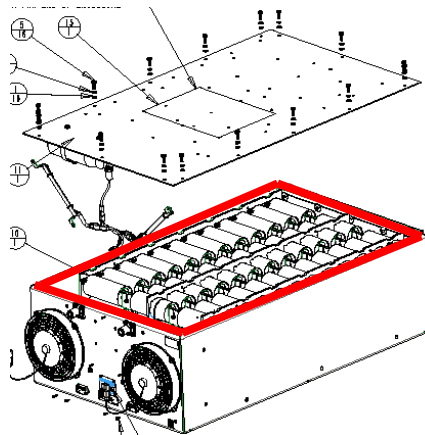
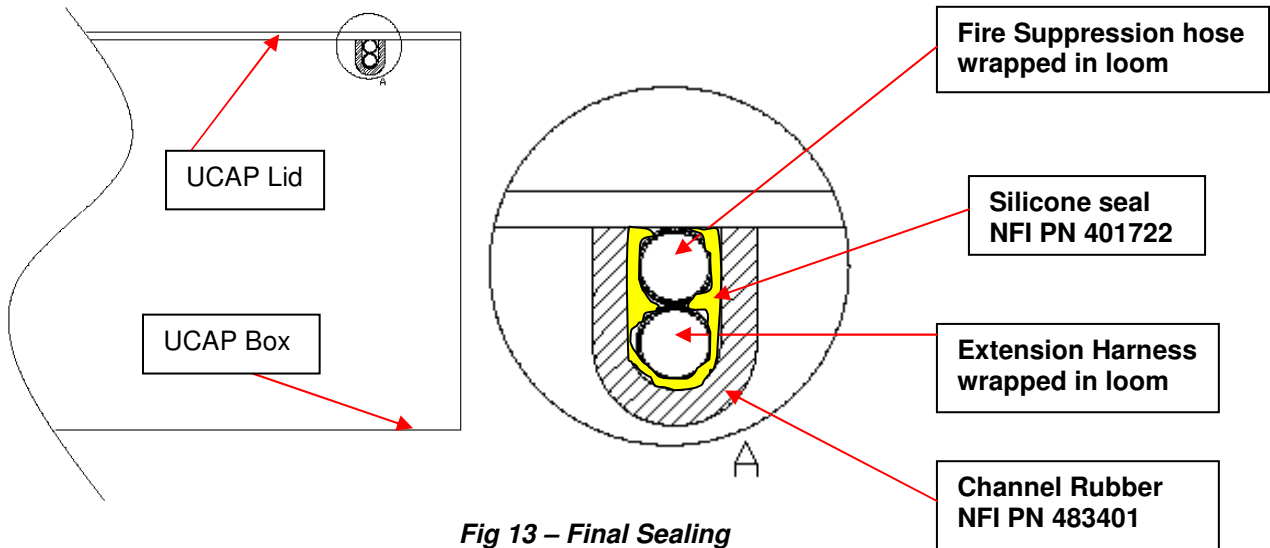


Fig 13 – UCAP Sealing

- w. Seal around harness opening to prevent water intrusion. See Fig 14



- x. Clean up all tools and debris and return the bus to service.
- y. Turn the main battery disconnect switch to the “ON” position.

LABOUR ESTIMATE				
	Operation	Men	Hours	Labour Time M X HR
1	Fire Bottle Relocation	2	4.0	8.0

PARTS REQUIRED					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	198159	LOOM-CONVOL HIGH TEMP SPLIT .40"	4	FT	
2	492376	ANGLE-MTG FIRE SUPPRESSION	1	EA	
3	5958112	TYRAP-7.0 BLACK	4	EA	
4	14S04012	SCREW PH CROSS RECESS SS	32	EA	
5	30W04000	(OBS) WASHER-1/4 LOCK	32	EA	
6	10W04000	WASHER-FLAT 1/4 NOM	32	EA	
7	60R02007	RIVET AL 1/8 GRP 12-.31	24	EA	
8	10W94000	WASHER-FLAT #4	24	EA	
9	401722	SEALANT-PROFLEX CLEAR	2	EA	
10	6409056	HARNES-TRAILER EXTENSION 24"	2	EA	
11	6412101	CAP INSERT - LOCKING PLASTIC 1/4"	4	EA	
12	6412095	PVC EDGE TRIM	0.5	FT	
13	6350363	Loop Strap, Nylon 1/4"	2	EA	
14	495022	ANGLE-MTG FIRE SUPPRESSION	1	EA	
15	50W04000	WASHER-FLAT SS 1/4 NOM	8	EA	
16	20B04016	BOLT HEX SS 1/4" 20 UNC X 1" LG	4	EA	
17	333084	NUT-LOCK 1/4-20 UNC SST	4	EA	