



# **SERVICE BULLETIN**

## **CN1036-28-01**

**SUBJECT:** Fuel Quantity Indicating System, Out-Tank Densitometer Wire Harnesses – Hot Short Protection (HSP) Harness Upgrade / Replacement for Center Tank & Horizontal Stabilizer Tank

**MODEL:** 747-400 Airplanes



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REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
E	<p>Reasons: Added preferred crimp ferrule termination option. No rework required for previous revisions &amp; installations.</p> <p><u>Revision Changes:</u></p> <ul style="list-style-type: none"> <li>- <b>Pg. 2:</b> Added Table of Contents.</li> <li>- <b>Pg. 3:</b> Added Revisions table.</li> <li>- <b>Pg. 11:</b> Changed "6.15 to 6.14" in Section II, D.</li> <li>- <b>Pgs. 12-13:</b> Added Inner Ferrule part number BACS13S090BNP to Tables 1 &amp; 2 in Section III, A.</li> <li>- <b>Pgs. 12-13:</b> Corrected typo by adding "NP" to part numbers BACS13S080B &amp; BACS13S187C in Tables 1 &amp; 2 in Section III, A.</li> <li>- <b>Pg.18:</b> Revised ground wire termination photo illustration to reflect proper information in Appendix A, Section 4.1.</li> <li>- <b>Pg. 24:</b> Revised paragraph to include BACS13S090BNP Inner Ferrule (Preferred) in Appendix A, Section 6.5.</li> <li>- <b>Pg. 24:</b> Corrected typo in paragraph 6.5 by replacing BACS12S080B with BACS13S080BNP.</li> <li>- <b>Pg. 25:</b> Corrected typo in paragraph 6.6 by adding "NP" to part number BACS13S187C.</li> <li>- <b>Pg. 25:</b> Revised Detail A to add BACS13S090BNP Inner Ferrule (Preferred) in Appendix A, Section 6.6.</li> <li>- <b>Pg. 25:</b> Revised Detail A to include "NP" for part numbers BACS13S080B &amp; BACS13S187C.</li> <li>- Repaginated all document pages.</li> </ul>	1/12/12	M.Hyrc



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### I. PLANNING INFORMATION

#### A. EFFECTIVITY

This bulletin is applicable to the Fuel Quantity Indicating System (FQIS) out-tank “Densitometer” harnesses shown below:

CINCH HARNESS PART NUMBER	BOEING HARNESS PART NUMBER	CINCH UPGRADE APPLICATION KIT <sup>P/N</sup>
CN1036-353	S283U007-353	CN1036-K553 (Center Tank)
CN1036-153	S283U007-153	
CN1036-554	S283U007-554	CN1036-K754 (Horizontal Stabilizer Tank)
CN1036-354	S283U007-354	
CN1036-154	S283U007-154	

#### B. CONCURRENT REQUIREMENTS

- 1) For Center Tank assemblies, Boeing Service Bulletin 747-28A2266 shall be accomplished concurrent to the accomplishment of Cinch SB CN1036-28-01.
- 2) For Horizontal Stabilizer Tank assemblies, Boeing Service Bulletin 747-28A2267 shall be accomplished concurrent to the accomplishment of Cinch SB CN1036-28-01.

#### C. REASON

Boeing and the FAA have determined that the Center & Horizontal Stabilizer Tank, Densitometer wiring requires additional electrical isolation (Hot Short Protection “HSP”) to meet SFAR 88 safety requirements. To comply with this requirement, Boeing has issued Service Bulletins 747-28A2266 for the Center tank and 747-28A2267 for the Horizontal Stabilizer tank.



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This Cinch Service Bulletin combined with the applicable Boeing Service Bulletin provides the necessary instructions to install replacement kits that upgrade the specified "Densitometer" out-tank Fuel Quantity Indicating System wire harnesses with Hot Short Protection "HSP" features.

### **D. DESCRIPTION**

Install the "HSP" electronics and wire harness per the Boeing specified Service Bulletin (747-28A2266 or 747-28A2267) instructions. Get access to the individual harness wires underneath the spar plug connector backshell. Push out and remove each contact from the plug connector (See Appendix A). Identify each wire by wrapping a pre-identified wire designator label (contained within the SB upgrade kit) around each wire. Cut off all of these contacts in front of the wire identification labels and discard. Record the harness part number and serial number (if present) located on the blue identification sleeve, which is positioned 4-8 inches behind the backshell.

- 1) **For "Center" tank harnesses with retrofit upgrade kit #CN1036-K553 (Boeing SB 747-28A2266):** Remove the lightning shield from the harness wires. Discard the removed shield assembly. Reroute per Boeing SB, the existing "FQIS Densitometer" wire harness so that it passes over the outside of the HSP box. (**Note:** Once re-terminated, this harness will mate to the "Ship Side" of the HSP box.) Attach a second set of pre-identified wire designator labels from the service bulletin kit around each individual wire. Position these labels around each wire toward the inboard side of the "HSP" box. If excess wire length is present at the "Ship Side" connector termination location on the HSP box, completely cut through the "Densitometer" harness wires at this location. Discard the cut-off section. Using electrical tape, wrap the ends of the exposed signal wires together. Locate the new lightning shield assembly from the SB retrofit upgrade kit that contains a terminated backshell. Locate the end of the new lightning shield assembly with the two (2) pigtail wires and carefully slide this end first over the cut end of the exposed signal wires until the wires exit from the interior of the backshell. Install per Appendix A, section 4.
  
- 2) **For "Horizontal Stabilizer" tank harnesses with retrofit upgrade kit #CN1036-K754 (Boeing SB 747-28A2267):** Reroute harness and connector per Appendix A, section 5. Reroute the existing "FQIS



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Densitometer” wire harness per Boeing SB so that it passes over the outside center of the HSP box. Note: Once re-terminated, this harness will mate to the “Ship Side” of the HSP box. Attach a second set of pre-identified wire designator labels from the SB kit around each individual wire. Position these labels around each wire toward the inboard side of the “HSP” box. At the “Ship Side” connector location on the HSP box, completely cut through the existing “Densitometer” harness shielding & wires at this location. Discard the cut-off section. Using electrical tape, wrap the exposed end of the shielding and signal wires together. Locate the serialization sleeve, identification sleeve and 3 inch long black adhesive sleeve from the Cinch service bulletin retrofit upgrade kit and slide them over the wrapped end of the lightning shield as shown in Appendix A, section 5. Locate the backshell EMI band from the service bulletin upgrade kit and terminate the backshell to the shield per Appendix A, section 5 or SWPM chapter 20-61-11.

Slide the backshell up the wires and expose the wire ends for contact termination. Strip the insulation from the single wires and terminate size 20 socket contacts to all wires except the shielded wire. Insert the 3/8-inch diameter yellow shrink sleeve and the 2 inch long black adhesive sleeve over the wire bundle. Strip insulation and prepare the shielded wire. Locate the eight (8) pre-terminated pigtail wires from the SB retrofit upgrade kit along with the inner & outer crimp ferrule. Crimp the eight (8) pigtail wires to the shield of the shielded wire per Appendix A, section 6. Terminate a size 20 socket contact to the center of the shielded wire. Slide the backshell further up the wires (approximately 6 inches) and position the black adhesive sleeve & yellow shrink sleeve. Pull the wires taught and shrink the black & yellow sleeve in place over all wires until the adhesive flows out from the sleeving ends.

Locate the BACC63 connector from the Cinch SB kit and install the terminated harness wires into the plug connector per Appendix A, section 6. Slide backshell forward and assemble backshell to connector per Appendix A, section 6. Determine the correct backshell clocking position and couple/tighten the backshell to the rear of the plug connector to 50 +/-5 inch-lbs of torque. Position and/or slide the shrink sleeving & shrink boot from the lightning shield assembly as shown. Heat shrink the sleeving and boot in place as shown in attached Appendix A, section 6. Mate the harness connector to the “HSP” box per harness installation requirements. Access the inboard end of the upgraded harness at the pressure



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seal or EE (Electronic Equipment) bay as appropriate and install the yellow rework identification label on the same harness part number.

Locate the "Notification Card" from the upgrade kit and record the part number and serial number of the original airplane harness on this card. After the kit installation, return the card to Cinch within 30 days. Kit upgrade includes a new serial number that must be documented for warranty and trace ability purposes.

### **E. APPROVAL**

This service bulletin has been reviewed by Boeing and the Federal Aviation Administration (FAA). The changes specified in this service bulletin comply with the Federal Aviation Regulations (FAR) Part 25 and are on record with the supplier as FAA approved for installation on Boeing Model 747-400 airplanes per Boeing Service Bulletins 747-28A2266 and 747-28A2267.

### **F. MANPOWER**

Approximately three (3) man-hours are necessary to install this retrofit upgrade kit for each tank application.

This estimate is for direct labor only and does not include planning, set-up, access or other lost time.

NOTE: For each additional tank installation kit, add 3 man-hours to the above estimate.

### **G. MATERIAL – COST AND AVAILABILITY**

Operators who intend to install this retrofit upgrade kit may obtain the kit(s) shown in paragraph III A. One (1) kit is required per tank and may be obtained from Boeing Commercial Spares as shown below. If the initial quantity of kits is consumed, more kits will become available as deemed necessary to supply demand. Contact Boeing Commercial Spares for material cost and availability.



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<b>Kit Number</b>	<b>Kit Description</b>	<b>Quantity Required Per Tank</b>
CN1036-K553	Retermination, Center Tank, Densitometer, HSP	1
CN1036-K754	Retermination, Horizontal Stabilizer Tank, Densitometer, HSP	1

The first twenty five (25) pieces of each kit are available starting February 1, 2006. Remaining component kits will be available at the rate of five (5) each per week, as orders deem necessary.

The kits are subject to the Boeing standard sales terms and conditions as detailed on Boeing's standard purchase order acknowledgement.

### **H. TOOLING – COST AND AVAILABILITY**

Standard tooling for removal and installation of typical circular electrical connectors is required. Note: Equivalent alternatives can be used when available. Specific required tooling shall be:

- MS24256A20 Contact Insertion Tool (Daniels)
- M22520/1-01 Crimp Tool with M22520/1-02 Turret (Daniels)
- HT250-4 Contact Retention Test Tool <sup>W/</sup> Red (size 20) Pin Contact Tip (Daniels)
- Connector Strap Wrench Capable of Gripping from 3/4" to 2" Diameter Connectors and Backshells (Daniels)
- Torque Meter/Wrench Capable of Mounting to Strap Wrench Above and Having a Range up to 125 in-lbs. (Daniels)
- Heat Shrink Gun with large deflector nozzle (300 – 400 F degree adjustable range)





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- A40199 Hand Banding Tool (Band-It)
- WT-406 Hand Crimp Ferrule Tool (Thomas & Betts)

Contact and connector tooling are stock items. For cost and availability information, please contact:

Daniels Manufacturing Corporation  
526 Thorpe Road  
Orlando, FL 32809 USA  
Phone: 407-855-6161  
Fax: 407-855-6884

BAND-IT IDEX, INC.  
4799 Dahlia Street  
Denver, Colorado USA  
80216-0307  
Phone: 303-320-4555  
Fax: 303-333-6549

Thomas & Betts  
1555 Lynnfield Road  
Memphis, TN 38119 USA  
Phone: 1-800-888-0211  
Fax: 901-680-5200

### **I. WEIGHT AND BALANCE**

None

### **J. ELECTRICAL LOAD DATA**

Not affected

### **K. REFERENCES**

- a) Boeing Standard Wire Practices Manual (SWPM)
- b) Boeing Service Bulletin's 747-28A2266, 747-28A2267

### **L. OTHER PUBLICATIONS AFFECTED**

None



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### M. FAMILY TREE CHARTS OF MODIFICATION RELATIONSHIPS

New production harnesses incorporating the shield to backshell upgrades, are available as shown below:

EXISTING SINGLE HARNESS		NEW UPGRADED "HSP" HARNESSES		
CINCH Part No	BOEING Part No	CINCH Part No	BOEING Part No	LOCATION
CN1036-153	S283U007-153	CN1036-553	S283U007-553	HSP Ship Side
CN1036-353	S283U007-353	CN1036-553	S283U007-553	HSP Ship Side
CN1036-154	S283U007-154	CN1036-754	S283U007-754	HSP Ship Side
CN1036-354	S283U007-354	CN1036-754	S283U007-754	HSP Ship Side
CN1036-554	S283U007-554	CN1036-754	S283U007-754	HSP Ship Side



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### **II. ACCOMPLISHMENT INSTRUCTIONS**

#### **A. PREPARATION**

Observe appropriate safety precautions as identified in Chapter 28 of the aircraft maintenance manual. **“WARNING: Make sure to obey all of the recommended safety precautions for use of heat guns. Refer to SWPM Chapter 20-00-10”**

#### **B. HARNESS IDENTIFICATION**

Find the harness part number on the blue heat shrink sleeve, located approximately 8 inches from the spar connector. Make sure that you have the correct retrofit upgrade kit for the wire harness at the tank location. Refer to Section I.

#### **C. KIT INSTALLATION**

Refer to Appendix A, “Cinch – HSP Field Upgrade Procedure, 747-400 FQIS” for the instructions to install the retrofit upgrade kit.

Note 1: The procedure given in Appendix A upgrades the wire harness on the airplane. As an alternative, remove the entire harness per applicable AMM instructions. Once removed, the wire harness can be upgraded on the bench.

Note 2: As an alternative to upgrading the wire harness, you can replace the harness with a new one per applicable AMM instructions. Refer to paragraph I.M for part numbers of the new wire harness.

#### **D. TEST**

Conduct an in-process electrical bonding test of the shield-to-shield junction as indicated in VSB CN1036-28-01 Appendix A, Section 5.11 and conduct a harness continuity test per Appendix A, Section 6.14.



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### III. MATERIAL INFORMATION

#### A. PART REQUIRED PER APPLICABLE DENSITOMETER HARNESS

To get the kit(s) shown below, refer to paragraph I. G for Material, Price and Availability.

NOTE: One (1) HSP retrofit upgrade harness kit is required for each Center and/or Horizontal Stabilizer Tank Fuel Quantity System harness to be upgraded.

#### 1) CN1036-K553 Kit, Retermination, FQIS Center Tank Densitometer, HSP

Nomenclature	Manufacturer	Qty
Backshell w/Terminated Lightning Shield Assembly, #CN0951-210	Cinch	1
Connector, #BACC63BP14D15SN	Cinch	1
#20 Socket Contact, #BACC47CP1A	Boeing Spec	8
Pigtail Wires w/Terminated #20 Socket Contact, #CN0951-211	Cinch	8
Inner Crimp Ferrule, #BACS13S080BNP	Boeing Spec	2
Inner Crimp Ferrule, #BACS13S090BNP	Boeing Spec	2
Outer Crimp Ferrule, #BACS13S187CNP	Boeing Spec	2
Identification/ Rework Notification Sleeve Kit, #CN0951-212	Cinch	1
Miscellaneous Shrink Sleeves, #CN0951-214	Cinch	1
Part & Serial Number "Notification" Card, #759067-01	Cinch	1

The CN1036-K553 "Center Tank" HSP upgrade kit contains all wiring/harnessing components required to complete the HSP upgrade installation for Cinch CN1036-153 and -353 harnesses. The kit contains more sleeving, contacts and crimp ferrules than necessary; discard the unused and removed parts. **This kit does not include the HSP electronics box.**



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### 2) CN1036-K754 Kit, Retermination, FQIS Horizontal Stabilizer Tank, Densitometer, HSP

Nomenclature	Manufacturer	Qty
Backshell, #440AN069Z1	Glenair	1
EMI Band Clamp, #A10089	Band-It	1
Shrink Boot, #202K121-25/225-0	Raychem	1
Connector, #BACC63BP14D15SN	Cinch	1
#20 Socket Contact, #BACC47CP1A	Boeing Spec	8
Pigtail Wires w/Terminated #20 Socket Contact, #CN0951-211	Cinch	8
Inner Crimp Ferrule, #BACS13S080BNP	Boeing Spec	2
Inner Crimp Ferrule, #BACS13S090BNP	Boeing Spec	2
Outer Crimp Ferrule, #BACS13S187CNP	Boeing Spec	2
Identification/ Rework Notification Sleeve Kit, #CN0951-213	Cinch	1
Miscellaneous Shrink Sleeves, #CN0951-215	Cinch	1
Part & Serial Number "Notification" Card, #759067-01	Cinch	1

The CN1036-K754 "Horizontal Stabilizer Tank" HSP upgrade kit contains all wiring/harnessing components required to complete the HSP upgrade installation for Cinch CN1036-154, -354 and -554 harnesses. The kit contains more sleeving, contacts and crimp ferrules than necessary; discard the unused and removed parts. **This kit does not include the HSP electronics box.**

# APPENDIX A

## HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

- 1 **WARNING: WHEN YOU USE A HEAT GUN, MAKE SURE THAT YOU OBEY THE RECOMMENDED SAFETY PRECAUTIONS. REFER TO BOEING STANDARD WIRING PRACTICES MANUAL (SWPM) 20-00-10.**

**Note:** When you install heat shrinkable sleeving, refer to Boeing SWPM 20-10-14, Installation of Shrinkable Sleeving

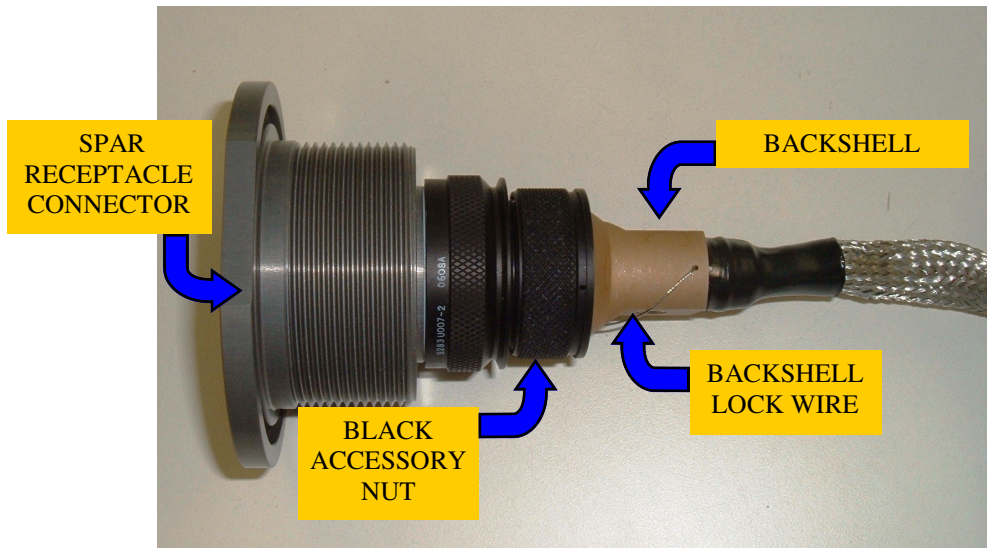
- 2 **EQUIPMENT & MATERIALS REQUIRED: Reference main CN1036-28-01 Service Bulletin, section I.H. for specific descriptions. (NOTE: When available, equivalent alternatives can be used)**

1. Diagonal Wire cutters - Small & Medium
2. Connector Strap Wrench - Medium
3. Contact removal tools (MIL-I-81969/19 for size 16 and MS90456-8 for shielded)
4. Masking tape
5. Heat gun with Large Deflector Nozzle. (300 - 400 F Degree Adjustable Range)
6. Electrical Tape
7. Bonding Meter (Ref. SWPM 20-20-00)
8. Scissors - Small Size, Sharp
9. Size 20 contact installation tool MS24256A20.
10. Crimp Ferrule Tool (T & B #WT-406 or equivalent.)
11. EMI Banding Tool (Band-It #A40199 or equivalent)
12. M22520/1-01 Contact Crimp Tool with M22520/1-02 Turret
13. HSP Harness Upgrade Kit (CN1036-K553 or CN1036-K754 as applicable)

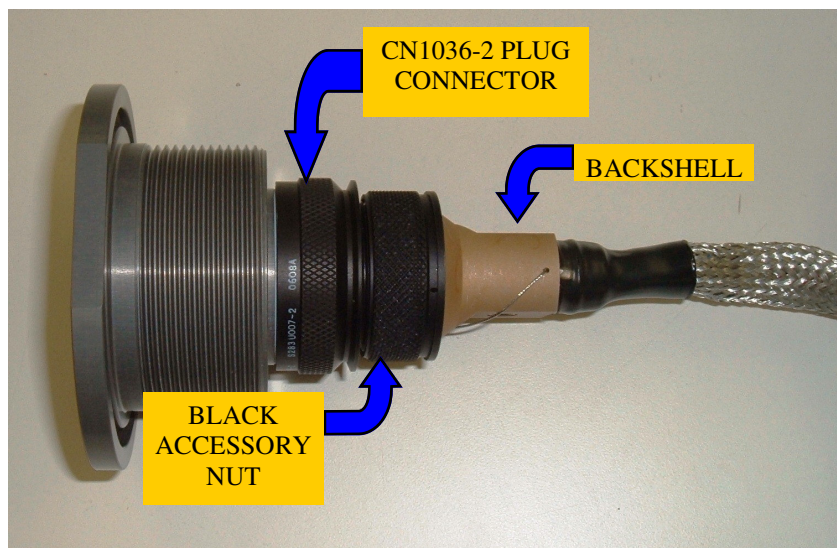
- 3 **FIELD UPGRADE PROCEDURE - Set-up & Harness Disassembly**

- **Whenever possible, attach and utilize the large heat deflector/concentrator nozzle on the heat gun. Use caution to direct the flow of heat to the harness and away from other objects.**
- **Adjust the heat gun to achieve an output air temperature between 325 F and 400 F. When instructed to heat shrink a component, uniformly apply heat to the entire surface for a minimum length of time such that the shrink sleeve visually appears tight and/or the contour & impression of the underlying component is visible on the exterior of the sleeve being shrunk down.**

### 3 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

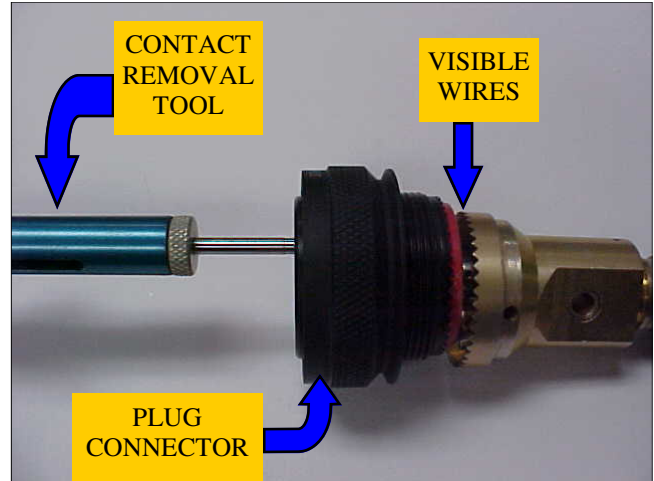
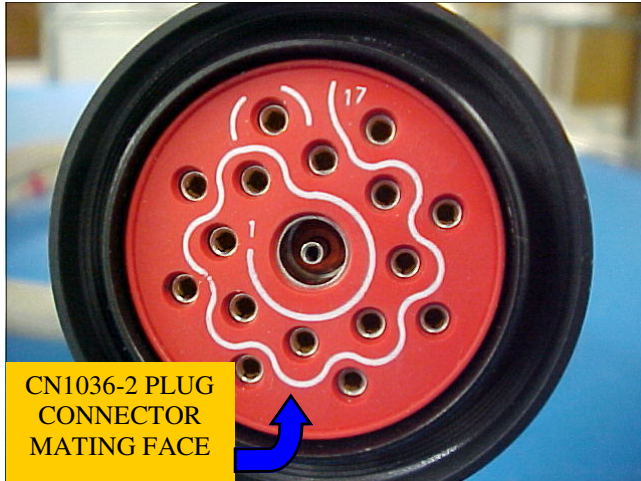


**3.1** Cut and remove the lock wire located between the black accessory nut and the Backshell.



**3.2** Disconnect (counterclockwise), the black accessory nut that connects the backshell to the CN1036-2 plug connector. Slide the accessory nut back over the backshell. Pull/slide the backshell back from the CN1036-2 plug connector approximately 1-2 inches to allow a clear view of the electrical wire colors.

### 3 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS



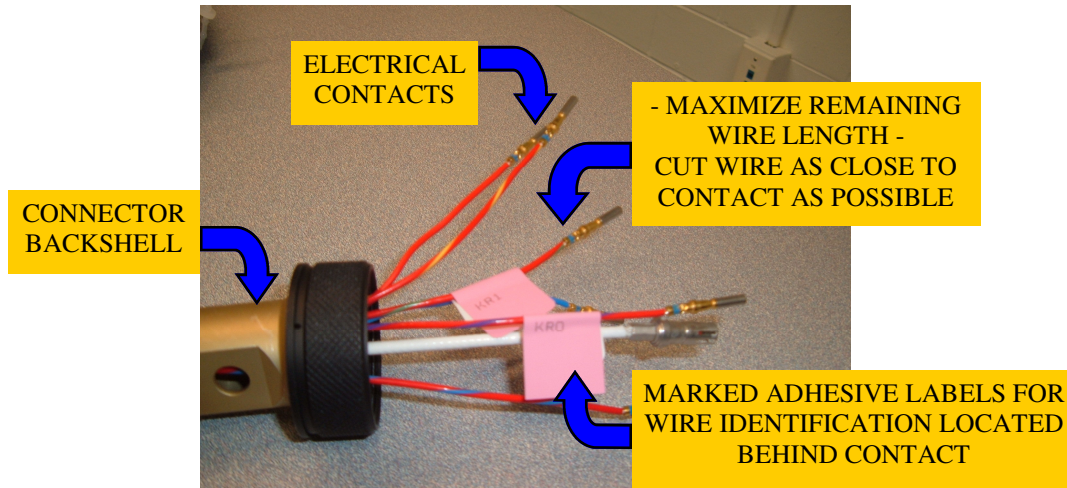
**3.3** When viewing the mating face of the plug connector, remove (push out) the contacts from the plug connector using standard contact removal tools per MIL-I-81969/19 for size 16 and MS90456-8 for the shielded contact. Only remove the contacts located in positions # 1, 2, 3, 6, 7, 8 & 9, do not remove the un-terminated contacts that have a visible “blue” seal plug installed on the connector backside. Discard the CN1036-2 plug connector once the terminated wires & contacts are removed.



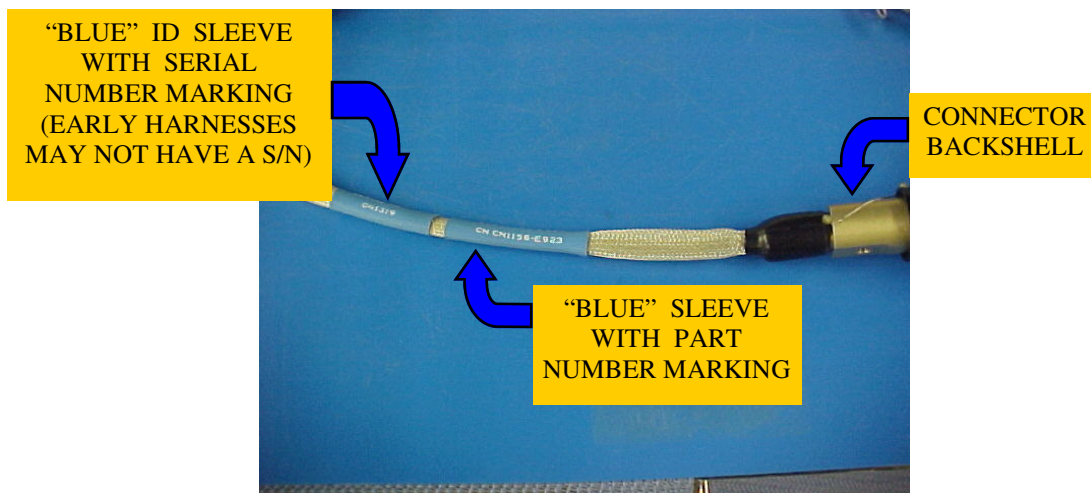
**3.4** This operation is very critical for proper termination, follow instructions carefully: As each contact is removed from the plug connector, wrap a wire designation label (Green in color, supplied in each kit) over each wire as specified in the table below. Make sure that each wire receives the proper label identification.

<u>CN1036-2 CONTACT LOCATION</u>	<u>WIRE COLOR</u>	<u>WIRE DESIGNATION</u>
1	WHITE SHIELDED	DENS SIG
2	BLUE	DRIVE +
3	RED	DRIVE -
6	RED or RED/YELLOW	KR0
7	RED or RED/GREEN	KR1
8	RED or RED/BLUE	KR2
9	RED or RED/VIOLET	KR3





- 3.5** Grasp each electrical contact (7 pc total) and carefully cut through the wire directly behind the contact crimp barrel and discard the contact. Remove & discard the rubber boot located on the shielded wire behind the contact.
- 3.6** Locate the blue colored identification sleeve(s) on the harness assembly, located 4-8 inches behind the backshell. Locate the "Upgrade Notification Card" included with each SB kit. Record the harness part number and if present, record the serial number from the harness onto the notification card as requested.

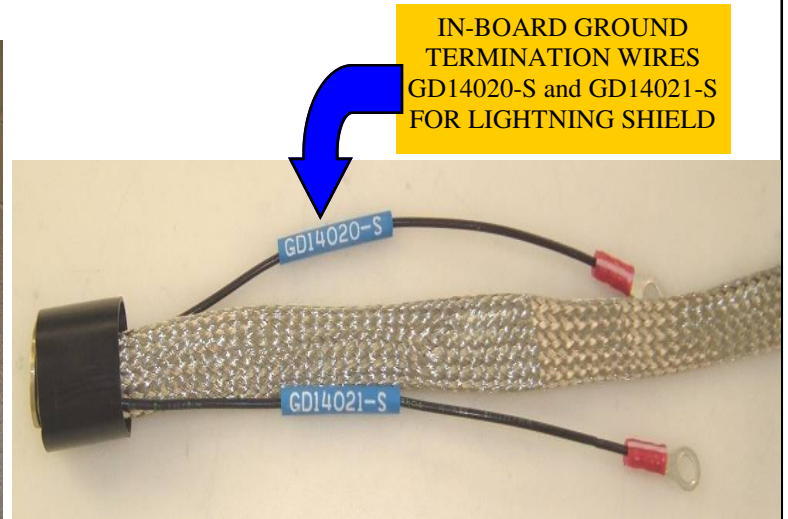
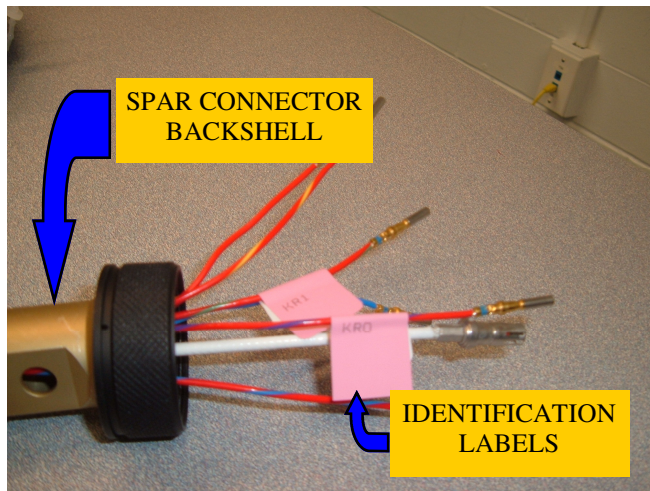


- 3.7 -** For further instructions installing "Center Tank" upgrade kit # **CN1036-K553**, proceed to **Section 4** herein.

- For further instructions installing "Horizontal Tail Tank" upgrade kit # **CN1036-K754**, proceed to **Section 5** herein.

## 4 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

### Section 4 Applies to Center Tank Upgrade - CN1036-K553 Only



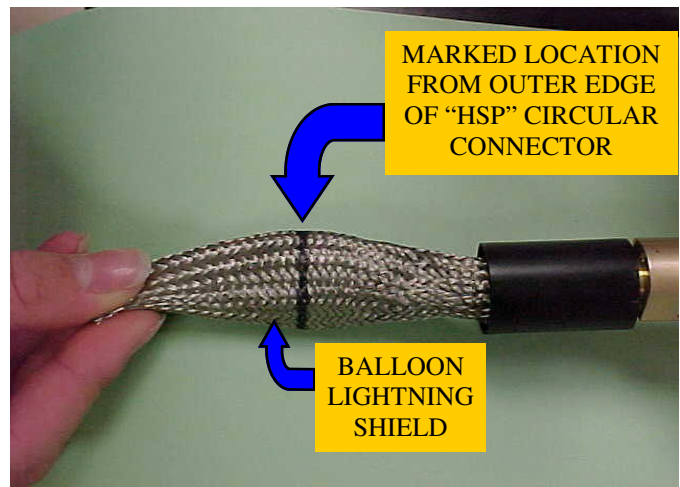
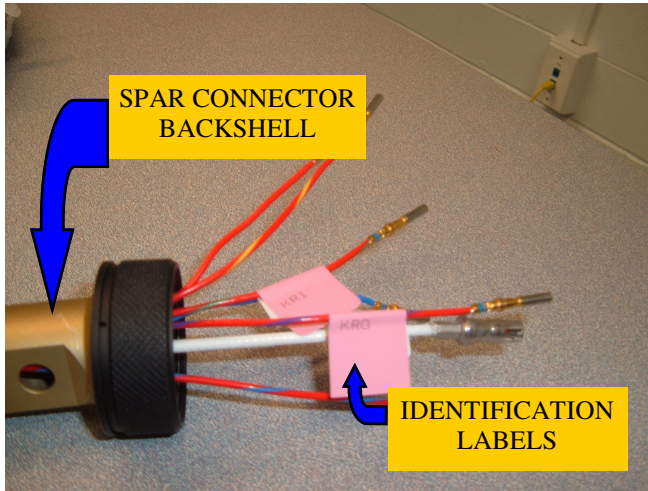
- 4.1** Gently grasp the end of the lightning shield near the ground wire terminations and remove it from the underlying electrical wires by sliding the shield towards the spar connector backshell. Use caution when sliding the backshell and shield over the wire identification labels so as not to tear or remove the labels. Discard the backshell with lightning shield assembly.
- 4.2** Grasp the end of the electrical wires that now have the contacts cut off and form the wires into a tight wrap configuration. Now wrap 2-3 turns of electrical tape around the combined wire ends (In front of the identification labels) to form one end. From the **CN1036-K553 kit**, locate the new lightning shield assembly that contains a terminated 90 degree backshell. Starting at the end of the new lightning shield with (2) ground wires attached, insert the taped end of the electrical wires through the inside diameter of the lightning shield until they protrude from the open end of the 90 degree backshell. Slide the ground wire end of the new lightning shield assembly inboard until it is located near the position of the original ground wire termination.
- 4.3** Locate the "Ship Side" circular electrical connector of the "HSP" electronics box that was installed as part of the Boeing SB 747-28A2266 requirements. Route the new lightning shield/harness assembly up to the mating face of the ship side electrical connector on the HSP box. Allow sufficient routing for a drip loop after installation. The length of the wires should be acceptable as originally cut. If there is excess wire length, mark the location where the harness electrical wires measure even with the outer edge of the above HSP electrical connector and cut each wire at this marked location. Measure approximately 2 inches in-board of the wire ends, attach/wrap a secondary wire identification label on each of the electrical wires within the harness assembly (Use section 3.4 and the previously applied wire identification labels to insure proper location).

**IMPORTANT**

- Proceed to Section 6 for contact termination & final assembly -

## 5 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

### Section 5 Applies to Horizontal Stabilizer Tank Upgrade - CN1036-K754 Only



**5.1** Simulate the routing of the Densitometer wire assembly up to the mating face of the ship side electrical connector on the HSP box. Clearly mark the location where the Densitometer harness electrical wires measure even with the outer edge of the above HSP electrical connector.

**5.2** Grasp the lightning shield and balloon both sides of the marked location (See above). Using a small sharp scissors, cut through and around the marked location of the lightning shield, being careful not to nick or cut the signal wires underneath. Once the shielding is completely cut, gently grasp the out-board end of the lightning shield and remove it from the underlying electrical wires by sliding the shield towards the spar connector backshell. Use caution when sliding the backshell and shield over the wire identification labels so as not to tear or remove the labels. Discard the lightning shield assembly with the backshell attached.

**5.3** Locate the "Ship Side" circular electrical connector of the "HSP" electronics box that was installed as part of the Boeing SB 747-28A2267 requirements. Simulate routing of the lightning shield/harness assembly up to the mating face of the ship side electrical connector on the HSP box. Clearly mark the location where the Densitometer harness electrical wires measure even with the outer edge of the above HSP electrical connector. Now approximately 2 inches inboard of this marked location, attach/wrap a secondary wire identification label from the kit onto each of the electrical wires within the harness assembly (Use section 3.3 and the previously applied wire identification labels to insure proper location). After each wire is properly identified, cut each of the electrical wires at the marked location and discard the cut wire ends with contacts.



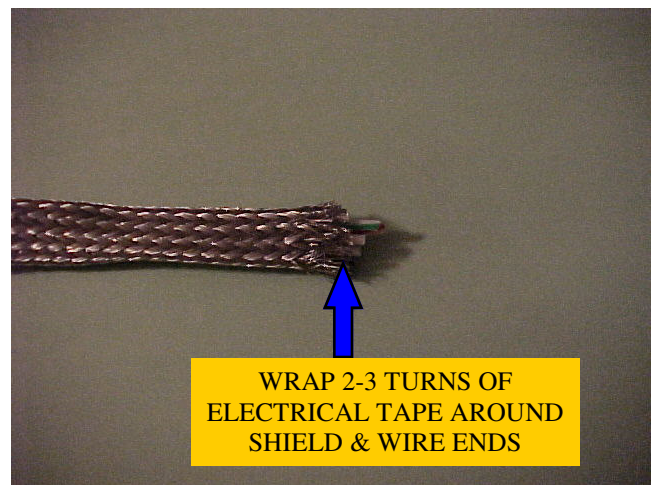
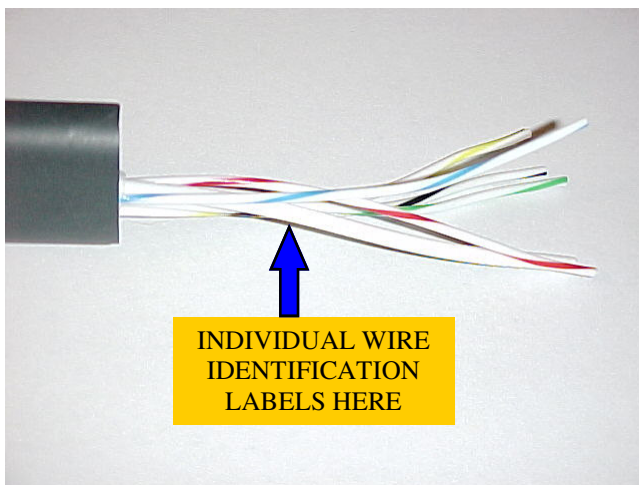
## 5 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

### Section 5 Applies to Horizontal Stabilizer Tank Upgrade - CN1036-K754 Only

5.4 From the **CN1036-K754 kit**, locate the following items:

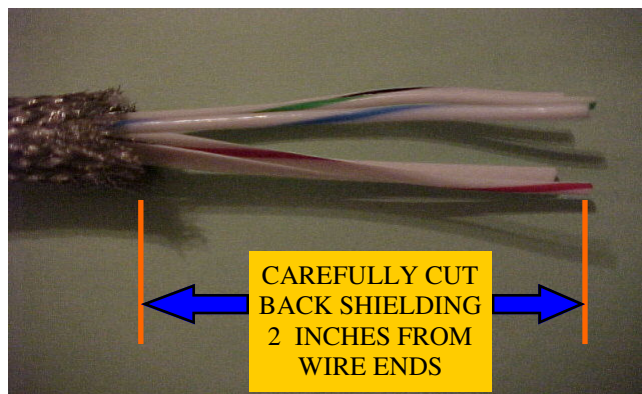
- Blue serialization shrink sleeve
- Blue part number identification shrink sleeve with "Rework" notification
- A 3 inch long x 3/4 inch diameter black adhesive shrink sleeve
- A 2 inch long x 1/2 inch diameter black adhesive shrink sleeve
- A black shrink boot with an internal "lip" on the inside diameter of one end
- New 90 degree Stainless Steel connector backshell

5.5 Slide the lightning shield forward in position, grasp the end of the shield and the signal wires and wrap 2-3 turns of electrical tape around the end.



5.6 Slide the blue "Serial Number" sleeve over the tape and onto the shield, followed by the blue "Part Number/Rework" sleeve, the 3 inch long x 3/4 inch diameter black adhesive sleeve and then the black "Shrink Boot" (The shrink boot has a small lip on the inside diameter on one end. Make sure that the end with the inner lip faces the end of the cut wires).

5.7 Carefully unwrap & discard the black electrical tape from the shield & wire ends. Mark the outside of the lightning shield 2 inches back from the wire ends. Carefully balloon the shield at this mark and cut off the 2 inch long section of the lightning shield.

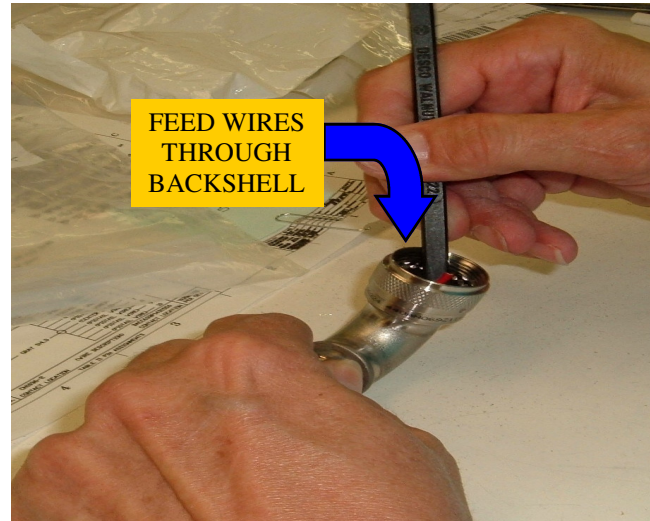
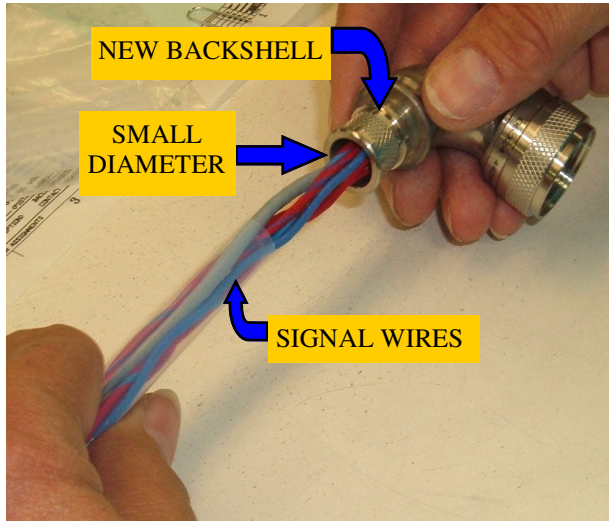


**IMPORTANT:** Fully clean and dry the first 5-6 inches of the existing harness shield. Use a cloth and Isopropyl Alcohol. Make sure that the first 5-6 inches of the shield is dry and has no unwanted material. This will make sure that there is a good electrical connection.

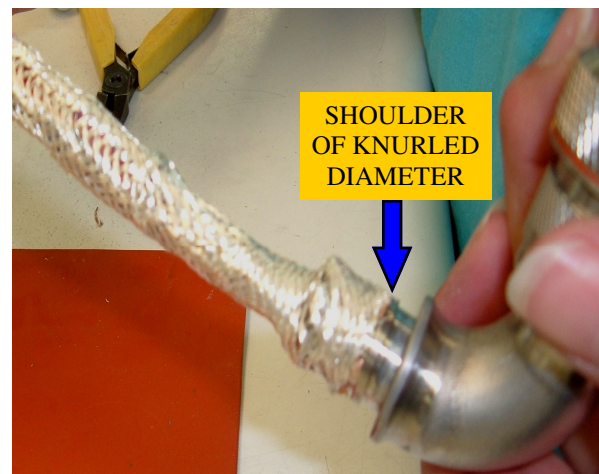
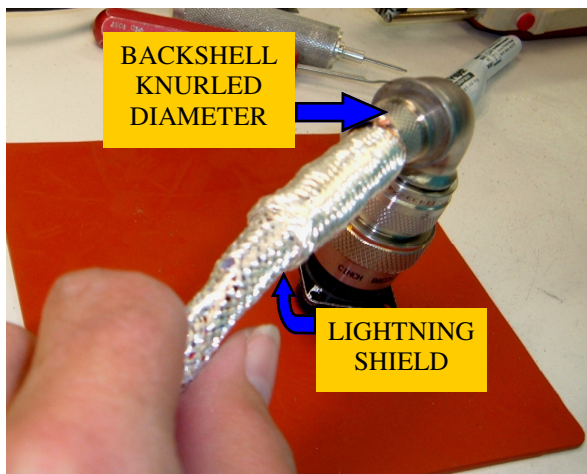
## 5 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

### Section 5 Applies to Horizontal Stabilizer Tank Upgrade - CN1036-K754 Only

5.8 From the **CN1036-K754 kit**, locate the new 90 degree connector backshell. Insert the Densitometer harness electrical wires through the small inside diameter of the backshell until they protrude from the open large end of the 90 degree backshell as shown below.

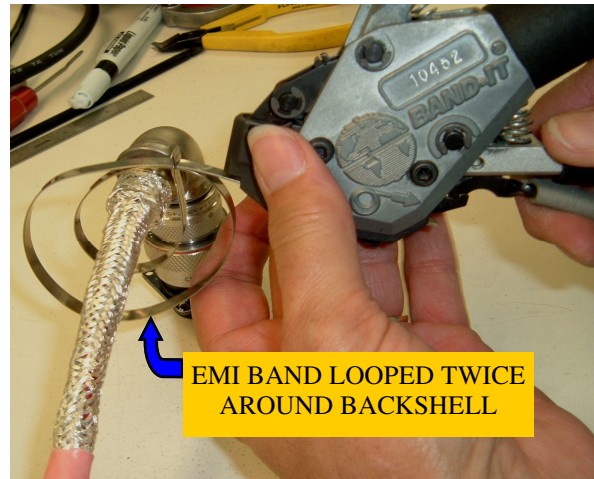
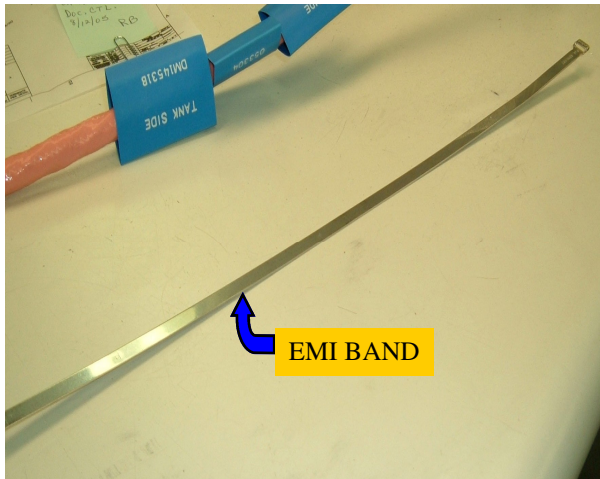


5.9 From the **CN1036-K754 kit**, locate the EMI band clamp (see photo on next page). Assemble backshell to metal shield per the following instructions or SWPM chapter 20-25-11. See the following photos as a guide for connector backshell installation. Carefully slide the end of the lightning shield over the knurled diameter of the backshell. Slide the shield up to the shoulder of the backshell as shown.

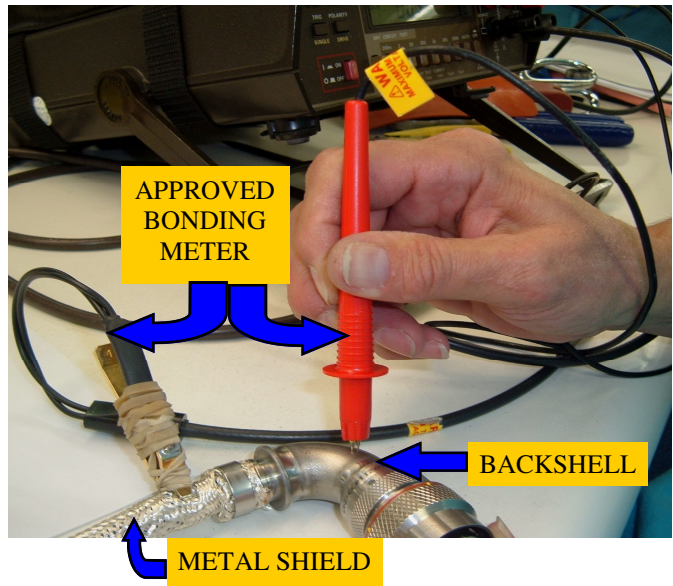
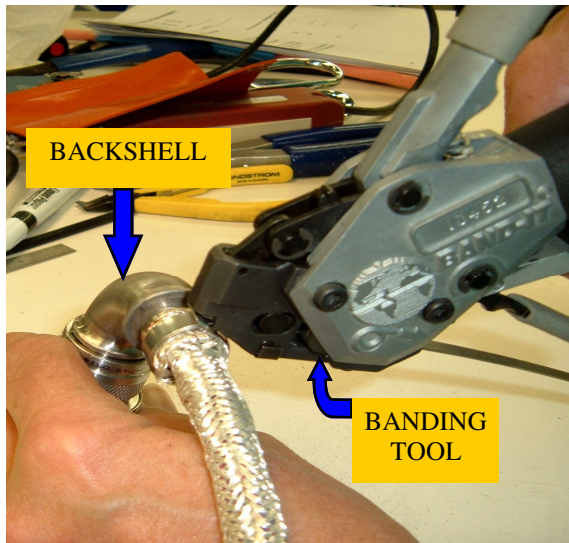


## 5 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

### Section 5 Applies to Horizontal Stabilizer Tank Upgrade - CN1036-K754 Only



5.10 Double loop the EMI Band around the metal shield at the backshell knurled diameter. Assemble/Tighten EMI Band per Boeing SWPM Chapter 20-25-11.



5.11 **\*\*WARNING\*\*** Use Only Airline Approved test Equipment & Practices in Areas Subject To Combustion, Fire & Explosion.

Bonding Meters per SWPM 20-20-00 or as listed below are approved for this test:

(1) Avtron Manufacturing Incorporated - Model T447W Bonding Meter

(2) BCD Electronics Ltd - Model M1 Bonding Meter, Serial Number A000112 and on

Verify proper EMI band installation. Use the Bonding Meter to measure the resistance between the new backshell and a **clean** location on the original shield surface. Make sure that the resistance is 2.00 Milliohms or less. If the resistance is greater than 2.00 Milliohms, the EMI band installation should be reworked until it meets the requirement.

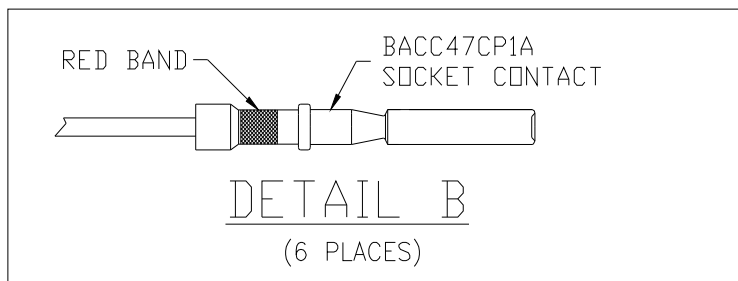
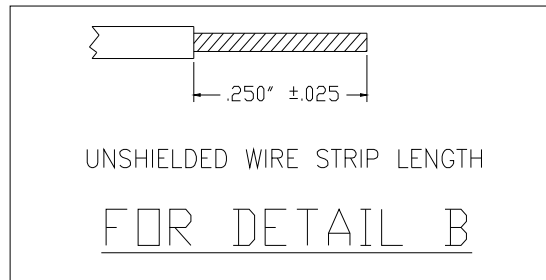
## 6 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

### Contact & Connector Termination - Upgrade Kits CN1036-K553 & CN1036-K754

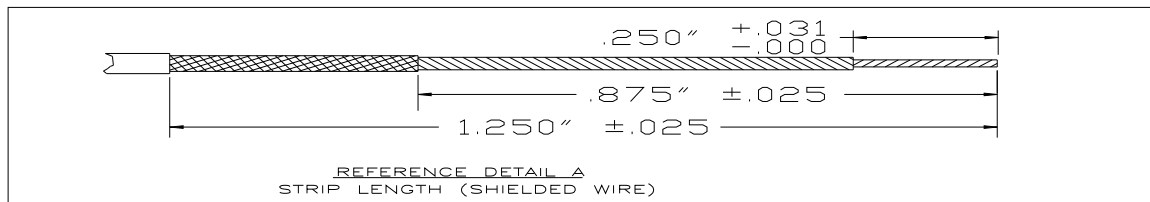
6.1 Prepare the Densitometer harness signal wires for contact termination using Boeing SWPM chapter 20-61-11 and this procedure. All specified lengths are in inches.

**“WARNING: Make Sure to Obey All of The Recommended Safety Precautions for Use of Heat Application Guns & Tools. Refer to SWPM Chapter 20-00-10”**

6.2 Locate the six (6) un-terminated wire ends labeled: **Drive +, Drive -, KR0, KR1, KR2 & KR3**. Remove the insulation from these wire ends as shown for Detail B below, followed by assembly and crimping of BACC47CP1A contacts as shown in Detail B below. See Connector Termination table following paragraph 6.7 for reference.



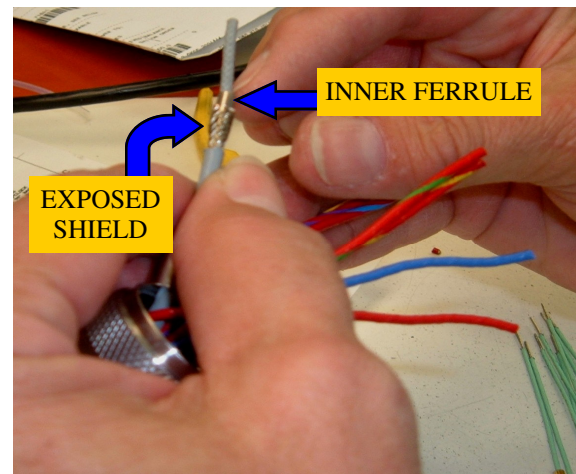
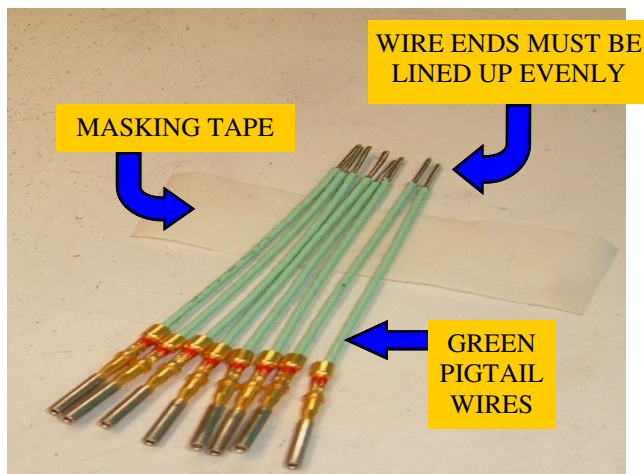
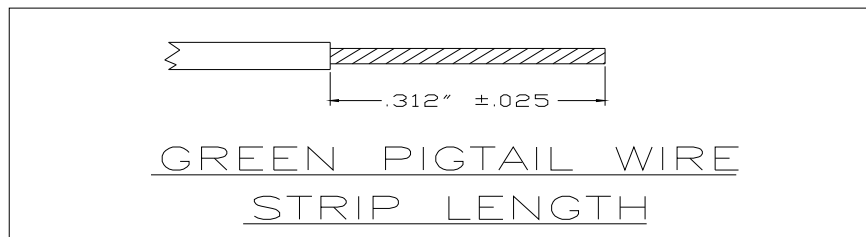
6.3 Locate the remaining un-terminated white shielded wire, labeled: **DENS SIG.** Remove the insulation and prepare the shield as shown in Detail A below:



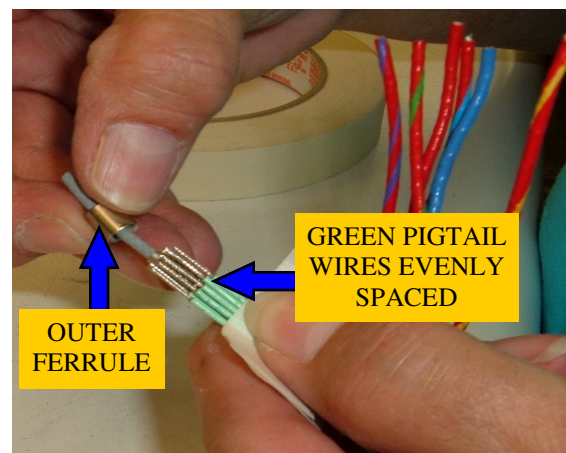
## 6 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

### Contact Termination - Upgrade Kits CN1036-K553 & CN1036-K754

6.4 From the SB upgrade kit, locate the 2 inch long x 1/2 inch diameter black adhesive sleeve and insert in over all contacts and wire ends. Slide this sleeve along with the terminated backshell up the wires for assembly during section 6.8. Locate the eight (8) green colored pigtail wires from the SB upgrade kit. Remove the insulation from these eight (8) wire ends as shown below.



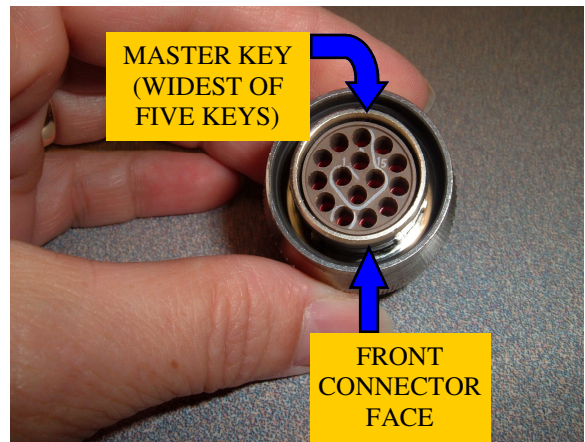
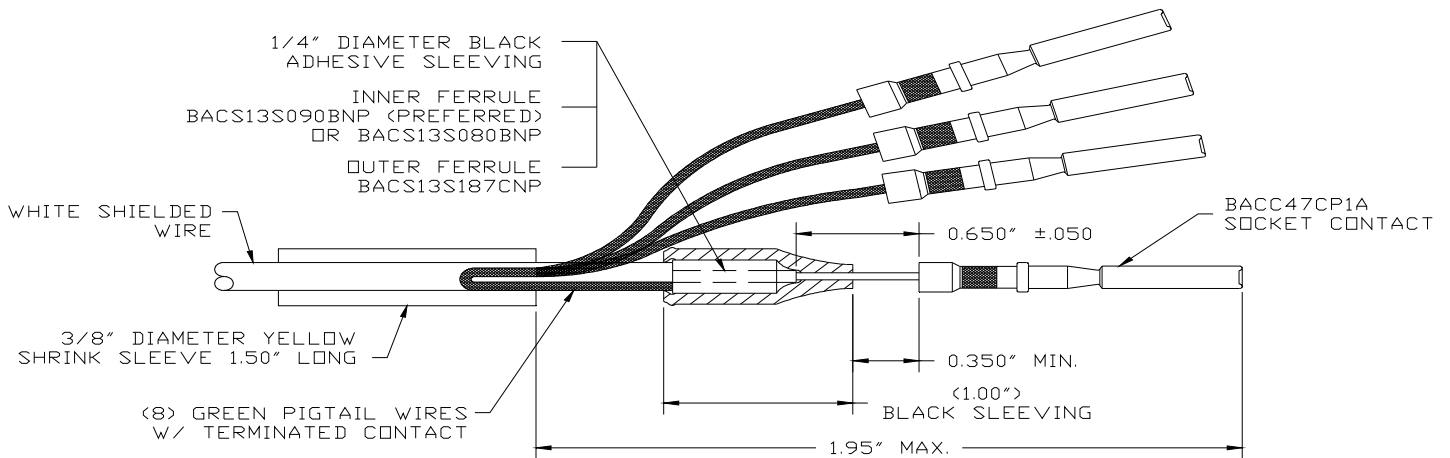
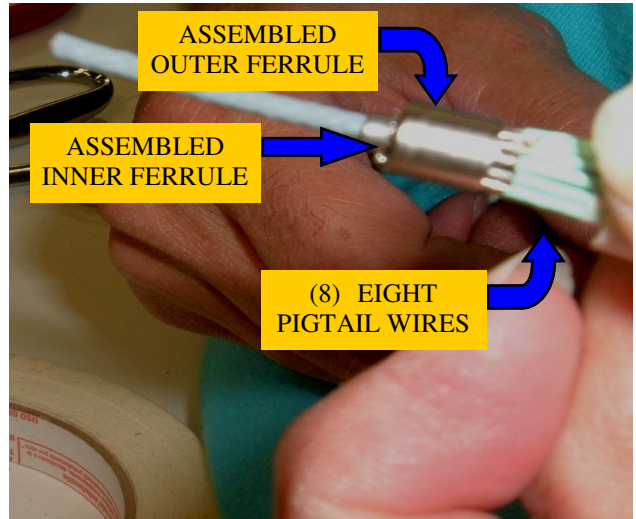
6.5 Evenly position & adhere all eight (8) pigtail wires on a piece of masking tape as shown above. From the kit, locate and insert one (1) 3/8 inch diameter x 1.5 inch long yellow shrink sleeve over the end of the shielded wire. Slide one (1) piece of the inner ferrule BACS13S090BNP (Preferred) or BACS13S080BNP underneath the exposed shielded wire and position as shown above. Evenly align & space all eight (8) pigtail wires around the entire circumference of the installed inner ferrule & exposed shield as shown.





**Contact Termination - Upgrade Kits CN1036-K553 & CN1036-K754**

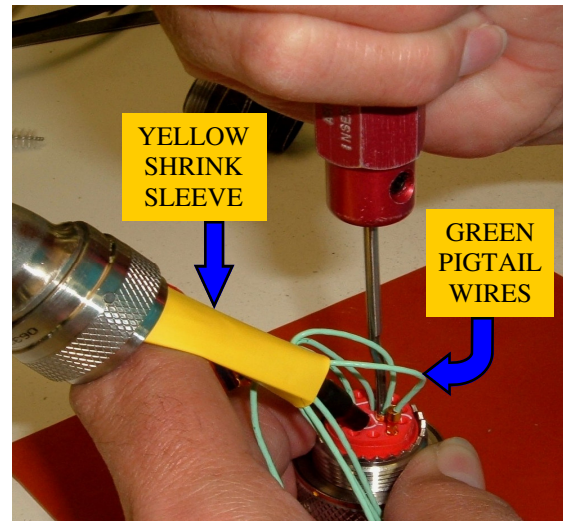
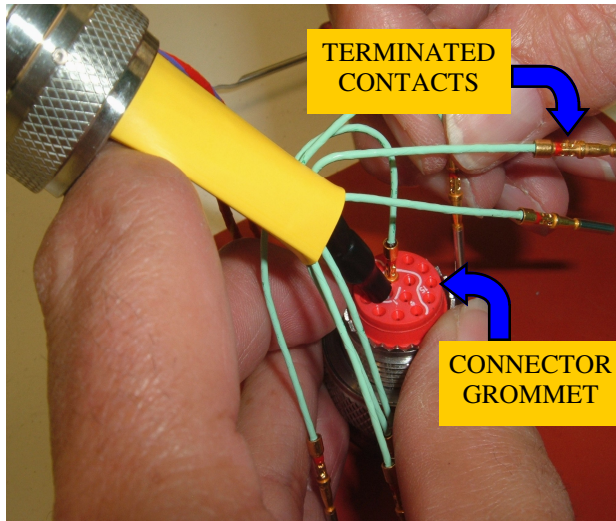
6.6 From the SB kit, locate and assemble one (1) piece each of the BACS13S187CNP outer ferrule over the evenly positioned pigtail wires and crimp as shown below using the WT-406 or equivalent tool. Position a 1.00 inch long, 1/4 inch diameter, shiny black adhesive shrink sleeve over the crimped ferrule as shown and shrink in place. Locate one (1) BACC47CP1A socket contact. Assemble this contact to the center shielded wire and crimp in place using the M22520/1-01 crimp tool. **See Detail A Below and the following Table for Details**



# 6 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

## Connector Termination - Upgrade Kits CN1036-K553 & CN1036-K754

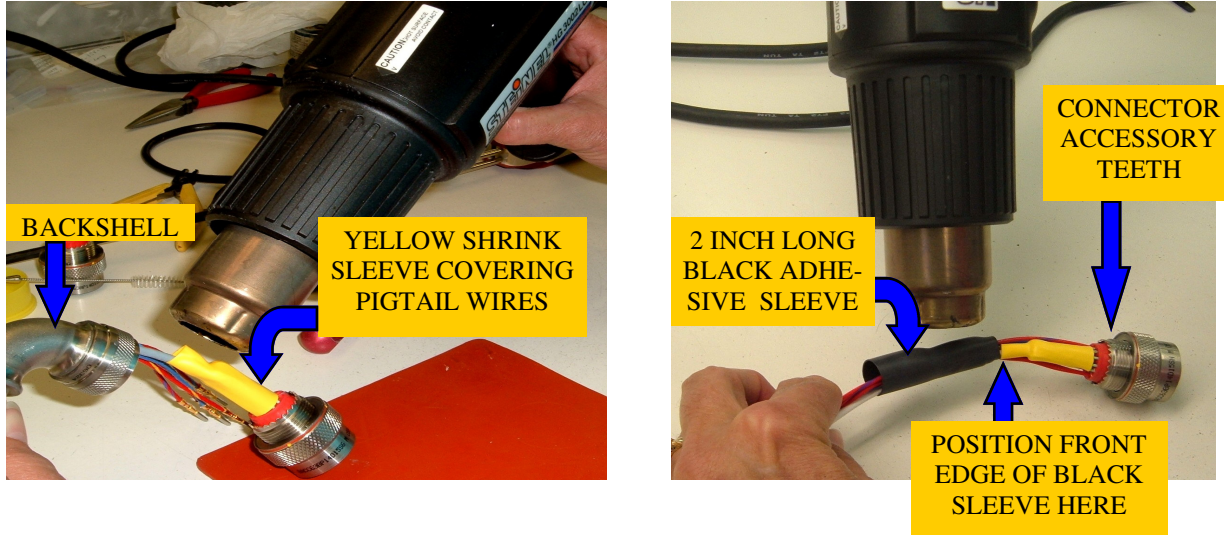
6.7 Using the table shown below, insert the previously terminated contacts into the proper location of the rear grommet of the BACC63BP14D15SN connector from the upgrade kit. Verify that each contact is properly locked in position by slightly pushing on the front of each contact.



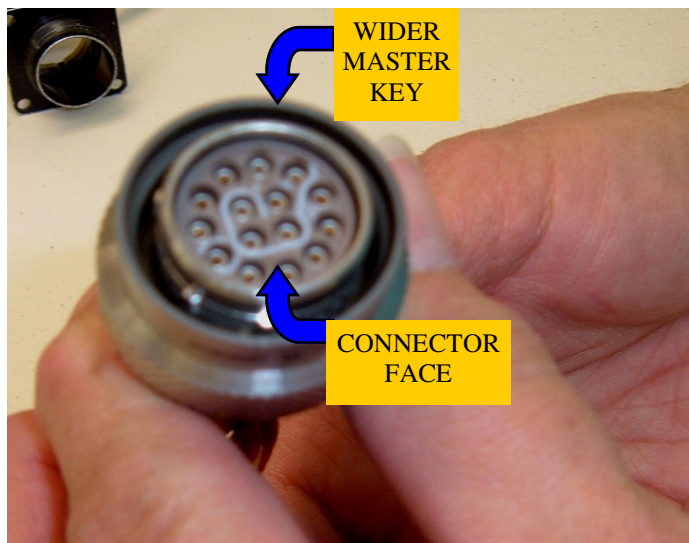
EXISTING IN-BOARD TERMINATION	NEW HSP CONNECTOR TERMINATION		
9	KR3 (RED or RED/VIOLET)	5	B
8	KR2 (RED or RED/BLUE)	14	B
7	KR1 (RED or RED/GREEN)	13	B
6	KR0 (RED or RED/YELLOW)	12	B
3	DRIVE - (RED TWISTED)	11	B
2	DRIVE + (BLUE TWISTED)	15	B
1	DENS SIG (WHITE SHIELDED)	PIGTAIL WIRE — 2 PIGTAIL WIRE — 3 PIGTAIL WIRE — 4 PIGTAIL WIRE — 6 CENTER SHIELD — 1 PIGTAIL WIRE — 7 PIGTAIL WIRE — 8 PIGTAIL WIRE — 9 PIGTAIL WIRE — 10	A
BACC63BP18A11P9 CONTACT LOCATION	LABEL DESCRIPTION (WIRE COLOR)	BACC63BP14D15SN CONTACT LOCATION	TERMINATE PER DETAIL
CONNECTOR TERMINATIONS - HSP SHIP SIDE			

## 6 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

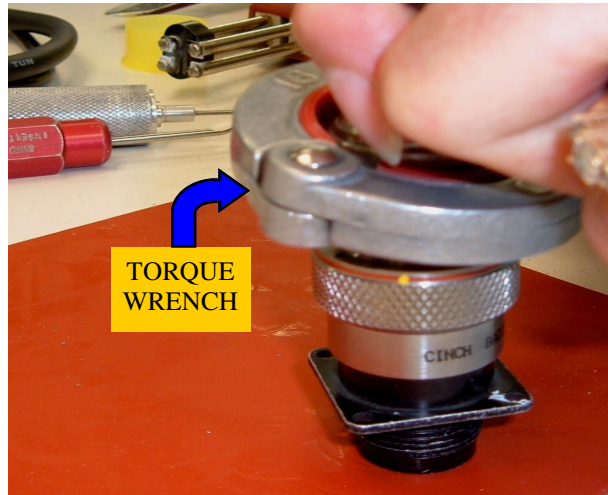
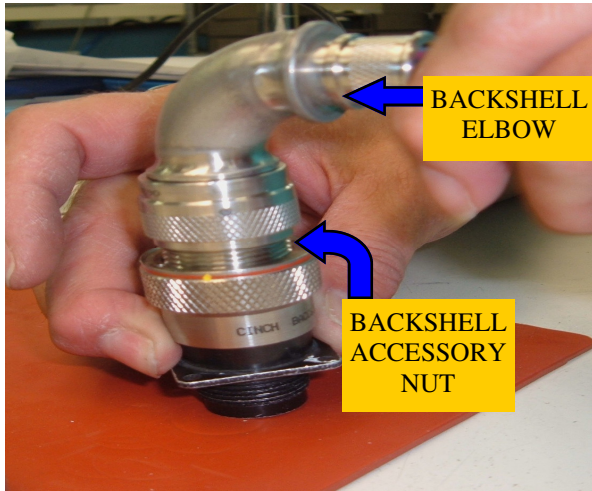
### Backshell Assembly - Upgrade Kits CN1036-K553 & CN1036-K754



**6.8** Position the yellow shrink sleeve on the outside of the folded over pigtail wires (See Detail A on previous page) and shrink in place as shown. Slide the 2 inch long black adhesive sleeve down the wires and position the front edge of the black sleeve so that it bottoms against the back edge of the previously shrunk yellow sleeve. Once properly positioned, shrink the black adhesive sleeve in place. Carefully slide the terminated backshell down the wires until positioned at the rear of the connector accessory teeth. View the mating face of the connector and locate the master key. Once the master key is identified, this key should be rotated to the 12 O'clock position. Future assembly of the backshell will reference the master key while held in this 12 O'clock position.



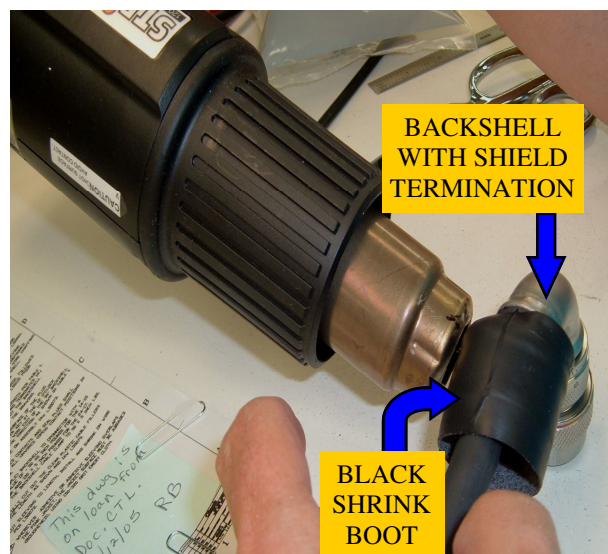
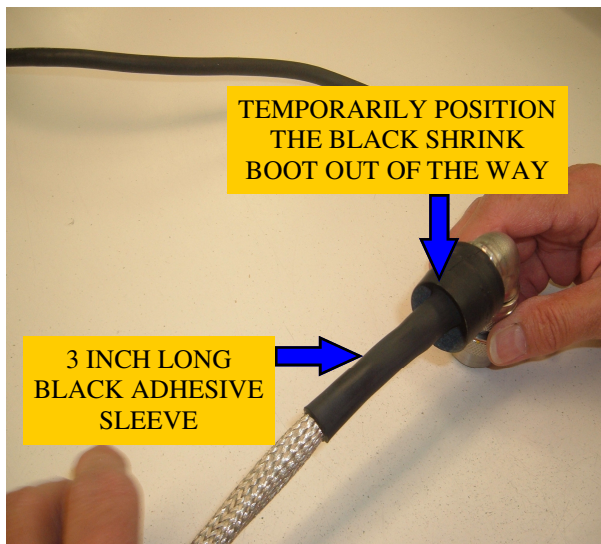
**Backshell Assembly - Upgrade Kits CN1036-K553 & CN1036-K754**



6.9 While **looking into the connector face**, position the master key at the 12 O'clock position, then rotate/point the 90 degree elbow of the backshell as follows:

- \*\* For the Center Tank (Kit CN1036-K553), position the backshell elbow at the **6 O'clock position**.
- \*\* For the Horizontal Tail Tank (Kit CN1036-K754), position the backshell elbow at the **2 O'clock position**.

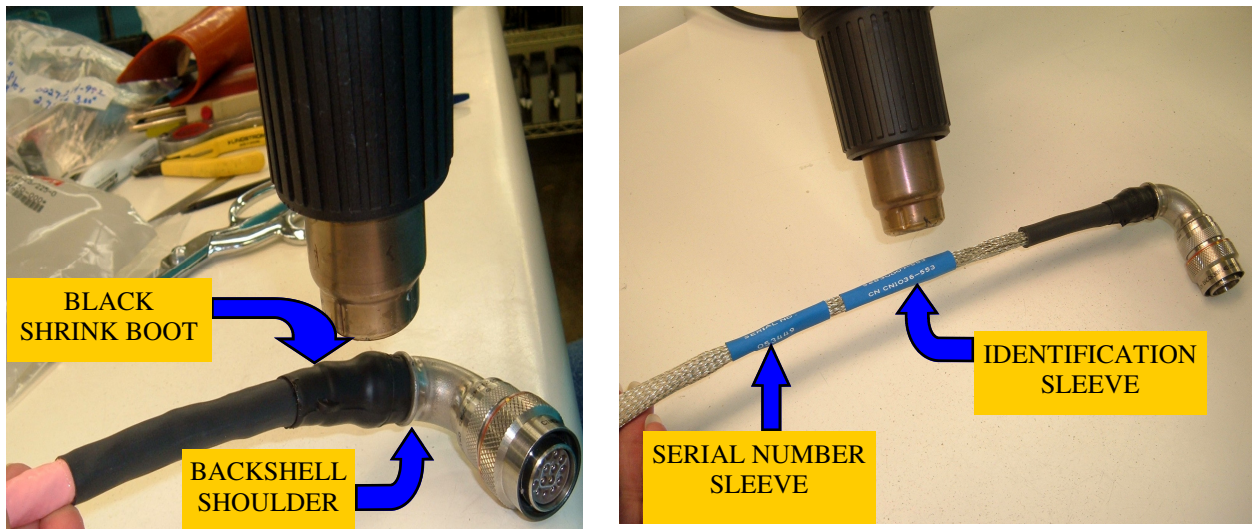
While holding the backshell in its specified orientation, engage the accessory teeth of the connector and tighten the backshell accessory nut to a torque value of 50 +/- 5 inch-lbs.



6.10 Slide the 3 inch long black adhesive sleeve down the shield. Line the edge of the black sleeve up with the edge of the shielding just before it expands on the backshell. Move the black boot out of the way and then shrink the black sleeve in place.

## 6 APPENDIX A - HSP HARNESS FIELD UPGRADE PROCEDURE - 747-400 FQIS

### Final Installation - Upgrade Kits CN1036-K553 & CN1036-K754



- 6.11** Slide the black shrink boot over the backshell shield termination (For CN1036-K553 kits, the shrink boot is located on the new shield assembly as received. For CN1036-K754 kits, the shrink boot was assembled during previous steps 5.4 and 5.6.) Position the front edge of the boot up to the shoulder on the backshell as shown above and shrink the boot in place.
- 6.12** Evenly space the blue colored identification & serial number sleeve starting approximately 4 inches behind the backshell and heat shrink in place. (For CN1036-K553 kits, these sleeves are located on the new shield assembly as received. For CN1036-K754 kits, these sleeves were assembled during previous steps 5.4 and 5.6.)
- 6.13** Access the inboard connector on the opposite end of the upgraded HSP harness. From the SB upgrade kit, locate the yellow adhesive rework identification label (Approximately 2 inches wide x 3 inches long). Remove the backing from the label and securely install it around (wrap so that adhesive ends touch together) the harness signal wires approximately 4 –12 inches behind the inboard connector.
- 6.14** **\*\*WARNING\*\* Use Only Airline Approved test Equipment & Practices in Areas Subject To Combustion, Fire & Explosion.**  
Do a continuity test of each wire in the harness. Refer to Table on page 26, paragraph 6.7 for applicable pin assignments.
- 6.15** Refer back to the Boeing SB for final bonding verification and system functional test.