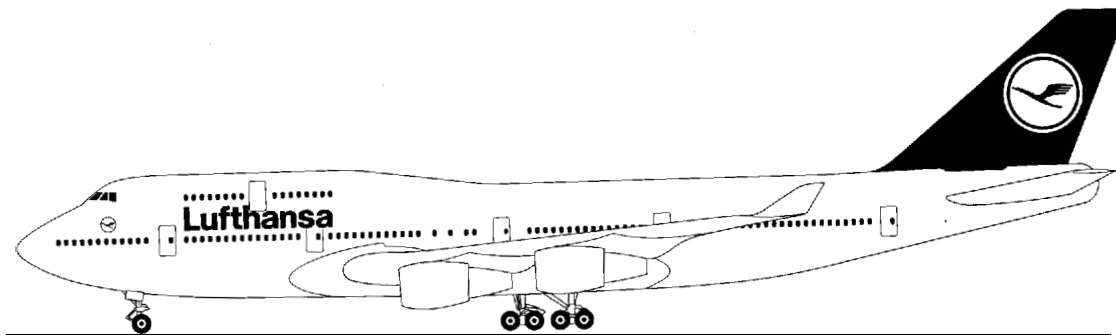




# **Lufthansa Technical Training**

## **Training Manual B 747-400**

### **ATA 20-41 WIRE INTEGRATION Level 3**



Book No:

Lufthansa  
Technical Training GmbH  
Lufthansa Base

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**ATA 20    STANDARD PRACTICES - AIRFRAME**

**20-41        STATIC GROUNDING**

**20-41-03    WIRE INTEGRATION UNIT**

## STANDARD PRACTICES - AIRFRAME WIRE INTEGRATION



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### INTRODUCTION

#### General

Wire integration provides an interface between airplane wiring and line replaceable units (LRUs). It has components called wire integration units (WIUs).

WIUs are used for these reasons:

- No solder required
- Weight savings
- Space savings
- Higher connection capacity
- Higher reliability

LRU equipment wiring is matched to the airplane wiring by the wiring patterns in the WIU. If the airplane is reconfigured to a different type of equipment, or retrofitted with an updated model of the same kind of equipment, wiring changes can be done in the WIU. Thus, the LRU or the airplane wiring does not have to be modified.

#### Wire Integration Units (WIU)

The WIUs are panels of wirewrap receptacles. They provide the interface between airplane wiring and LRU wiring. They also provide a breakout point for testing equipment and wiring. Receptacle posts are connected to circuits by wirewrap connections on the back of the receptacles.

The WIU design allows standard wire bundles to be used in all 747-400's. Customer equipment configurations are connected by the appropriate wire wrap posts. When a reconfiguration is required, only the wirewrap points need to be changed, not the airplane wiring.

#### Component Location

There are 15 wire integration units (WIUs) in the main equipment center and in the ceiling of the main passenger cabin. Fifteen WIUs are in the main equipment center (E1/ E2) and three WIUs (panels) are in the main passenger cabin.

#### Main Equipment Center

There are twelve WIUs in the main equipment center on the aft side of electronic equipment racks E1 and E2.

Three WIUs are located on the E2-6 shelf.

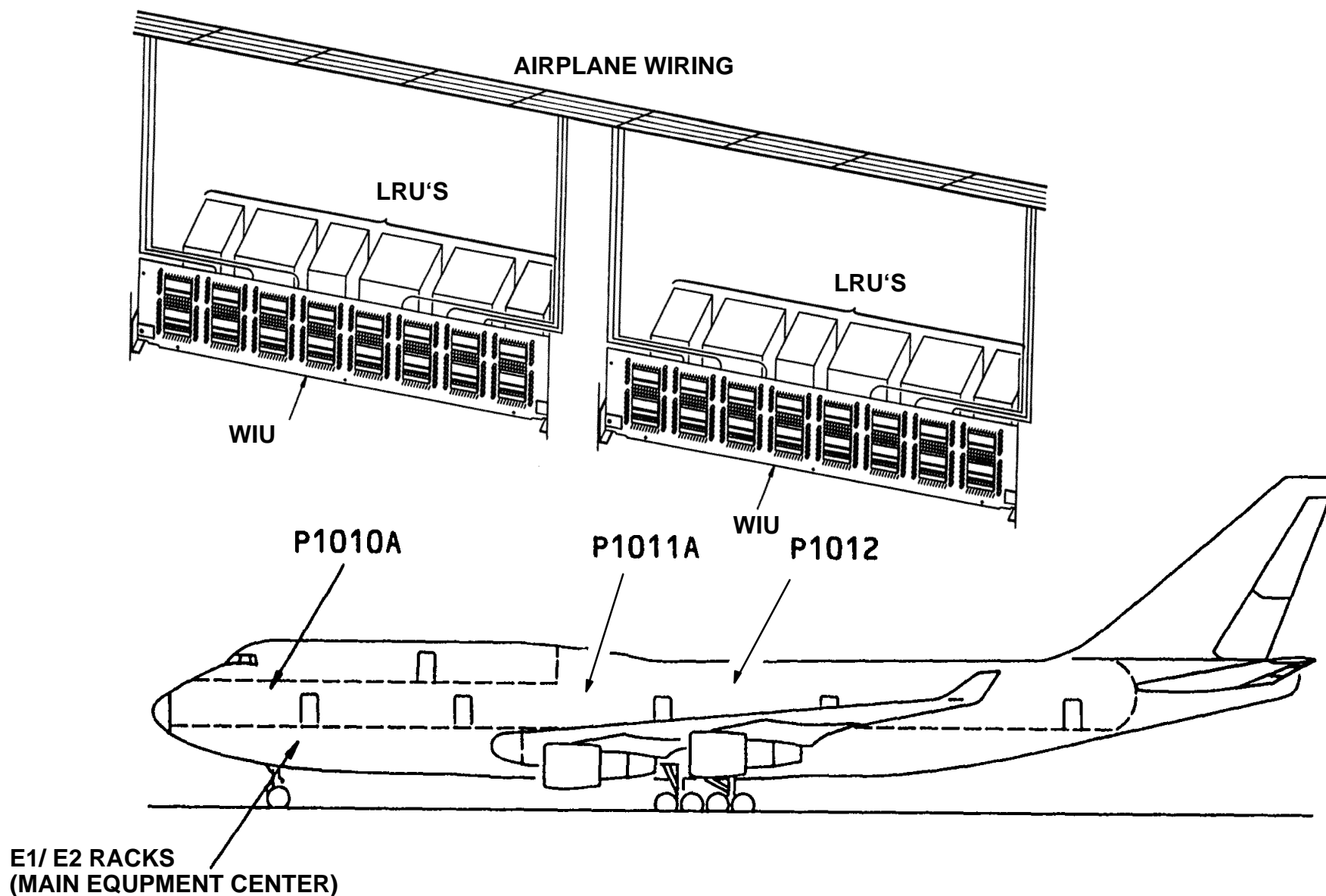
#### Main Passenger Cabin

The P1010A, P1011A and P1012 WIUs are above the ceiling panels in the main passenger cabin area. They are on the left side of the airplane.

P1010A is located forward of door 1L.

P1011A is located between doors 2L and 3L.

P1012 is located between doors 3L and 4L.



**Figure 1 INTRODUCTION**

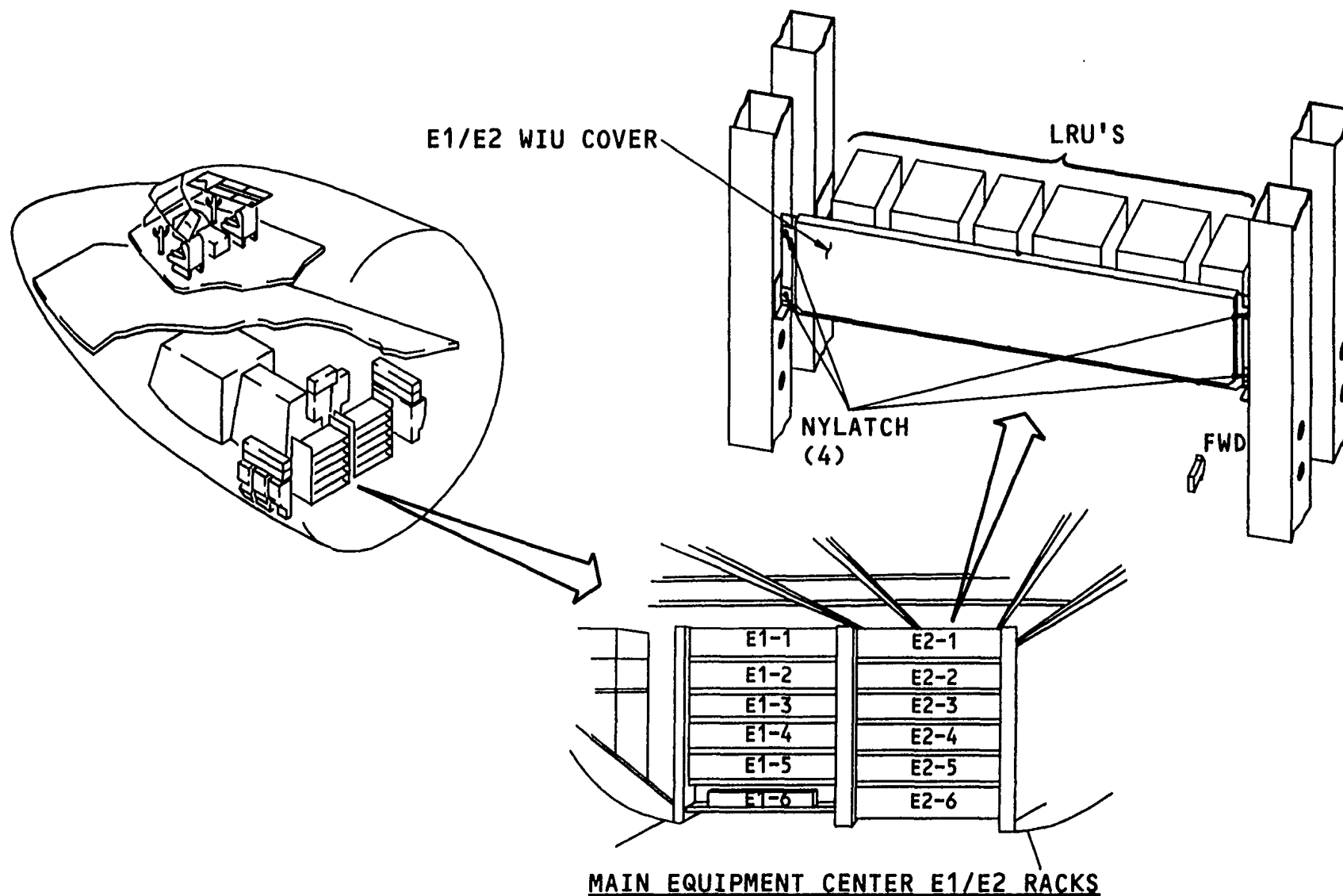


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**COMPONENT LOCATION (E1/E2) RACKS**

Twelve (E1/E2) WIUs are on the aft side of equipment racks E1 and E2 in the main equipment center. Each WIU is protected by a plastic cover which is held in place with four nylatches.





**Figure 2 COMPONENT LOCATION (E1/E2) RACKS**

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### **E1 / E2 WIUS**

There are twelve WIUs on the aft side of the equipment racks (E1/E2).

Each WIU has eight rows, except the E1-6 WIU which has five rows.

Each row has two to eight receptacles.

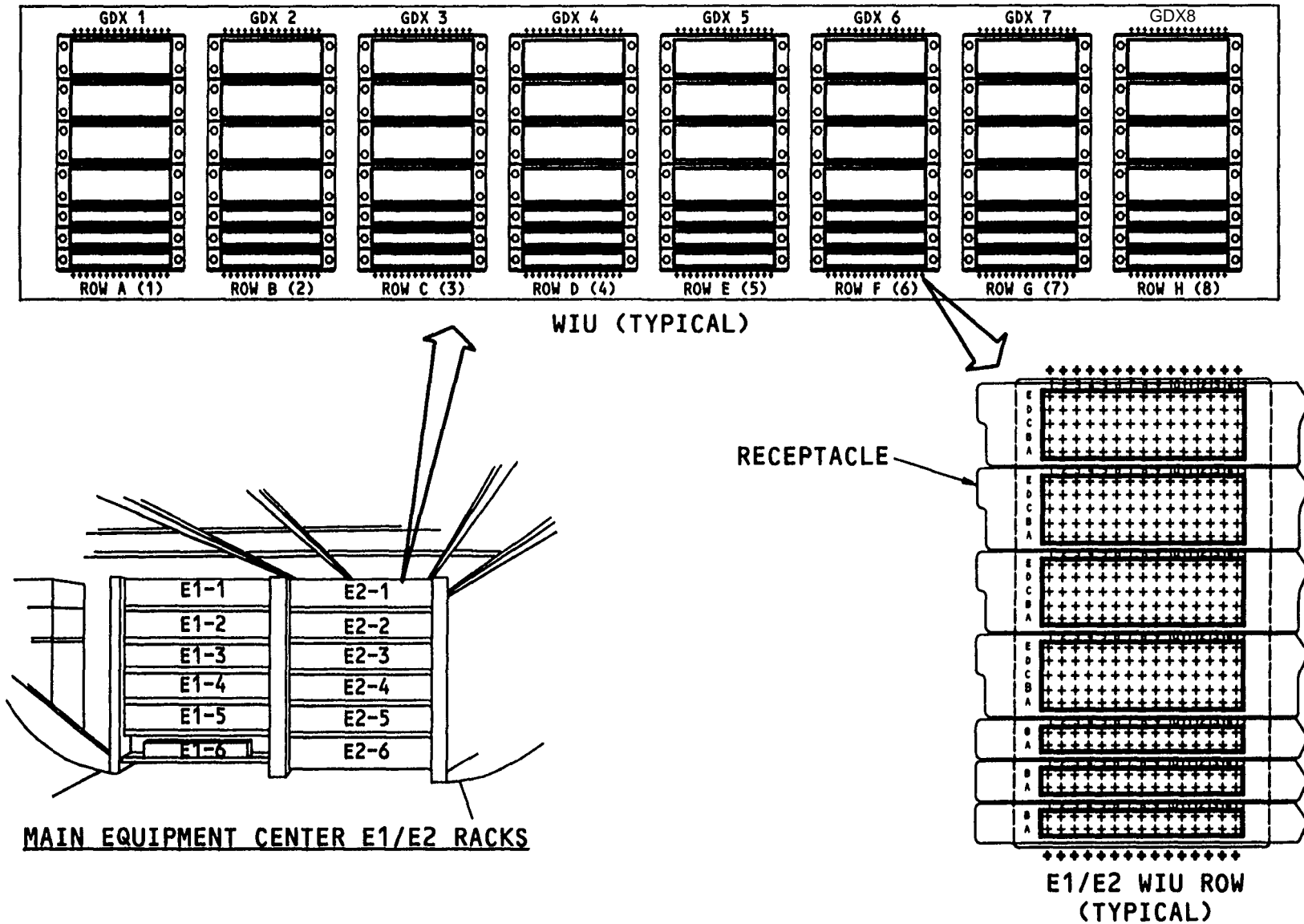


Figure 3 E1 / E2 WIUS

## STANDARD PRACTICES - AIRFRAME

### WIRE INTEGRATION UNIT



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### E1 / E2 WIU RECEPTACLES

#### General

There are twelve WIUs on the aft side of the equipment racks for the (E1/E2)  
Each rack shelf has one WIU.

There are three sizes of WIUs for the (E1/ E2) racks.

Rack E2-6 has a "large" WIU.

Rack E1-6 has a "small" WIU.

All other racks have "medium" sized WIUs.

Each WIU contains wirewrap receptacles. The size of a WIU depends on the number, size, and arrangement of receptacles. Each of the receptacles has a unique identification code.

There are two sizes of receptacles:

- two wafer and
- five wafer.

The two wafer receptacle has two sets of posts. The five wafer receptacle has five sets of posts.

Each group of receptacles is called a row.

Racks E1-1 through E1-5 and E2-1 through E2-5 have eight rows of receptacles.

Rack E1-6 has five rows of receptacles, while rack E2-6 has eight rows of receptacles.

#### Grounding Posts

Rack E2-6 has two upper and two lower sets of grounding wirewrap posts for each row of receptacles.

All other racks have one upper and one lower set of ground wirewrap posts for each row of receptacles.

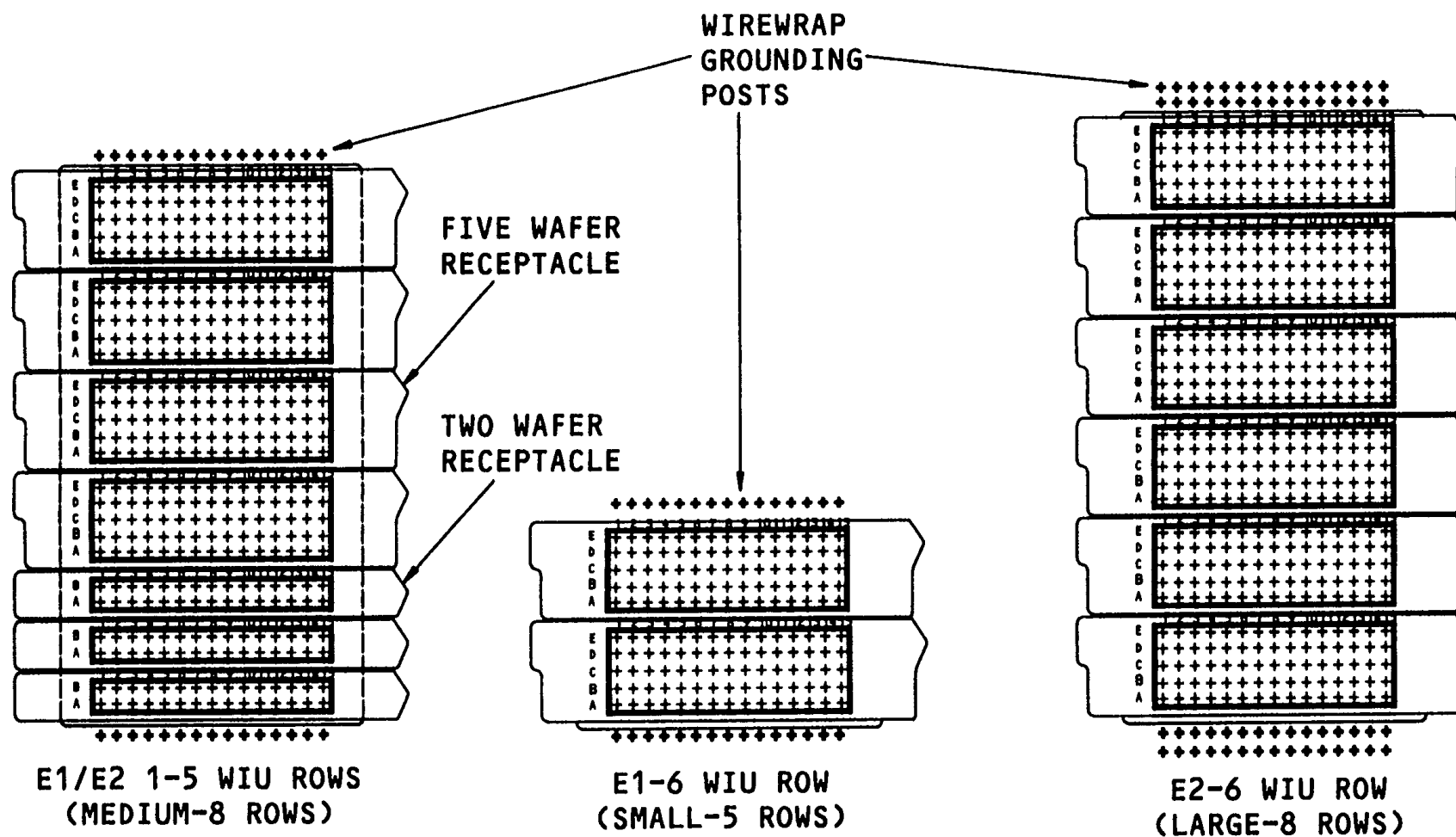


Figure 4 E1 / E2 WIU RECEPTACLES

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### **E1/1-5 AND E2/1-5 WIU ROWS**

#### **General**

Ten of the (E1/E2) WIUs E1-1 through E1-5 and E2-1 through E2-5) are the medium size WIU.

The graphic shows the middle row of a medium size WIU.

#### **Receptacle Identification**

The receptacle identifier is a sixcharacter code. For example consider receptacle **"DQ2343"**.

The first two characters, **DQ**, indicate an (E1/E2) WIU.

The next two characters, **23**, specify the E2-3 shelf.

The fifth character, **4**, represents the fourth group (row) of receptacles from the left side of the WIU.

The last character, **3**, is the vertical position of the designated receptacle. (Vertical position 10 is represented as "0".)

Vertical position 11 ("\*\*") of the medium size WIU is never used for a two-wafer receptacle. There is one vertical position labelled "\*\*\*" on each medium size WIU.

Each five wafer receptacle occupies the space of two vertical position numbers. In this case, the receptacle is identified by the lower number and the upper number is not used.

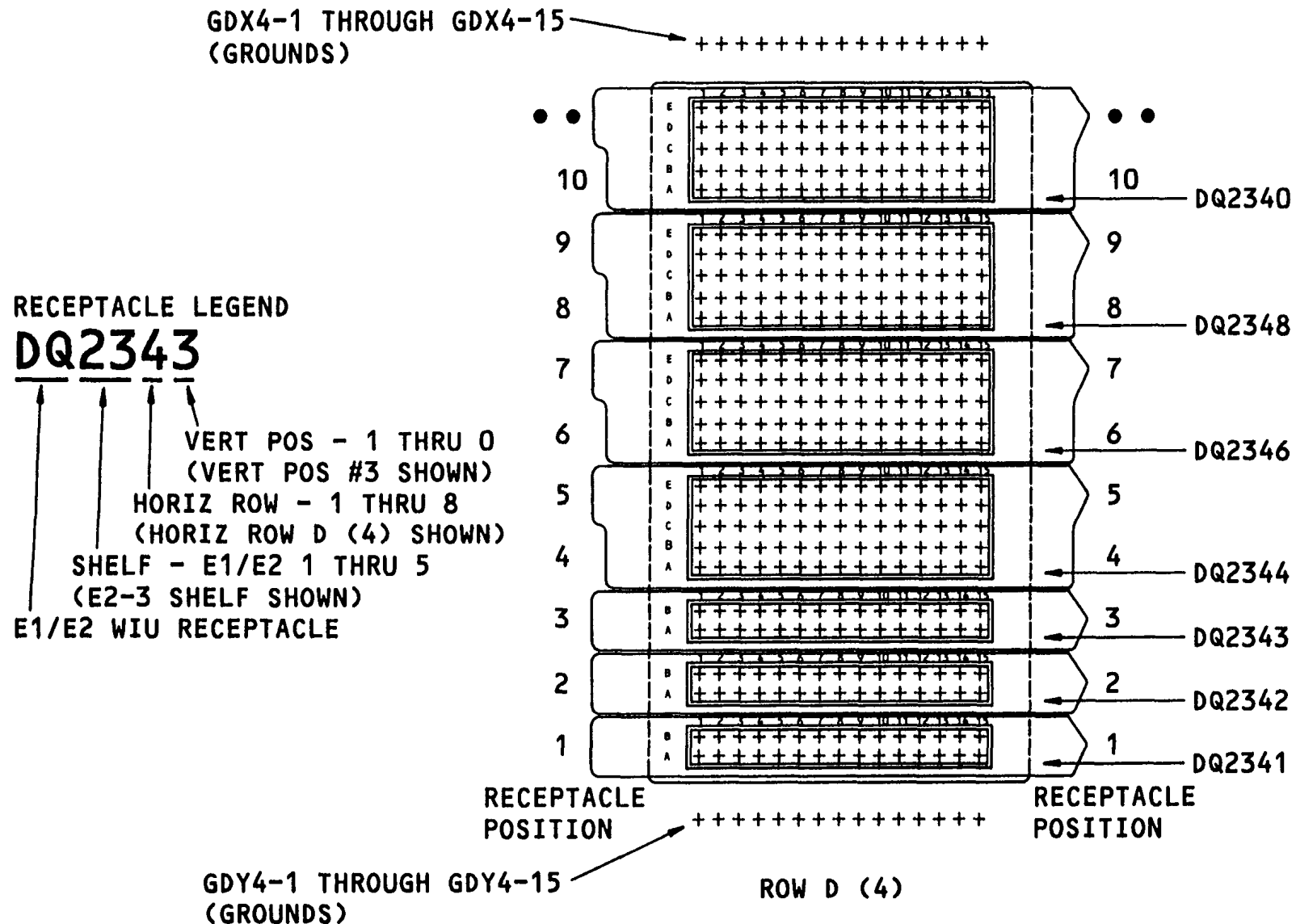


Figure 5 E1/1-5 AND E2/1-5 WIU ROWS



## **E2-6 WIU ROWS**

The E2-6 WIU is a large size WIU.

The graphic shows the third row from the left side of the E2-6 WIU.

There are two "\*\*\*" positions on a large WIU. The "\*\*\*" positions are never used for a two wafer WIU.



**Figure 6 E2-6 WIU ROWS**

**E1-6 WIU ROWS**

The E1-6 WIU is a small WIU.

The graphic shows the left row of the small size WIU E1-6

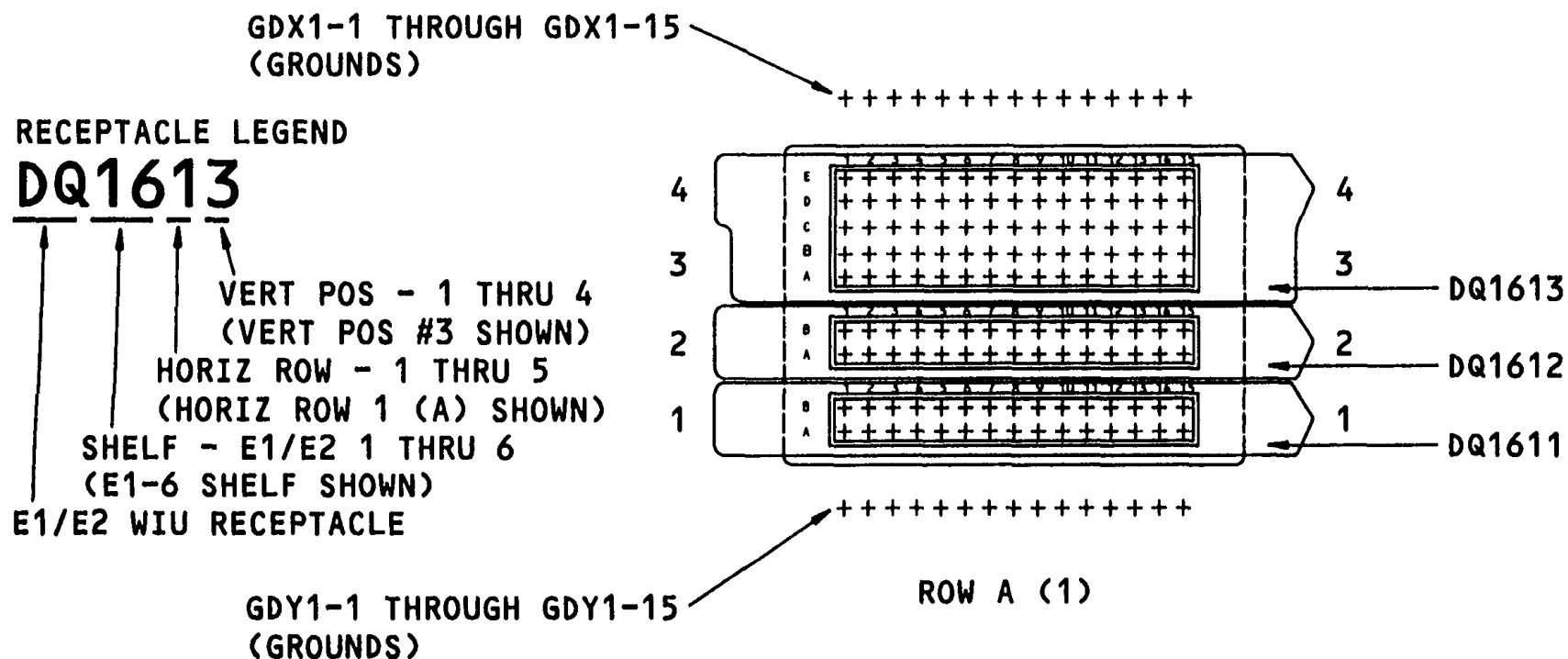


Figure 7 E1-6 WIU ROWS



## **E1 / E2 WIU - ACCESS**

### **Access**

Remove the WIU cover to access the wirewrap posts. Plastic covers (snap-on/snap-off) protect the wirewrap posts on each receptacle. Holes in these receptacle covers allow access to the wirewrap posts.

The WIUs rotate downward 90 degrees to give access to the connectors on the forward side of the WIU.

**NOTE:** DO NOT ROTATE WIUS IF THE RECEPTACLE COVERS HAVE BEEN REMOVED. DAMAGE TO WIREWRAP POSTS COULD RESULT.

The WIU may be used for continuity checks by disconnecting the wirewrap connector plugs.

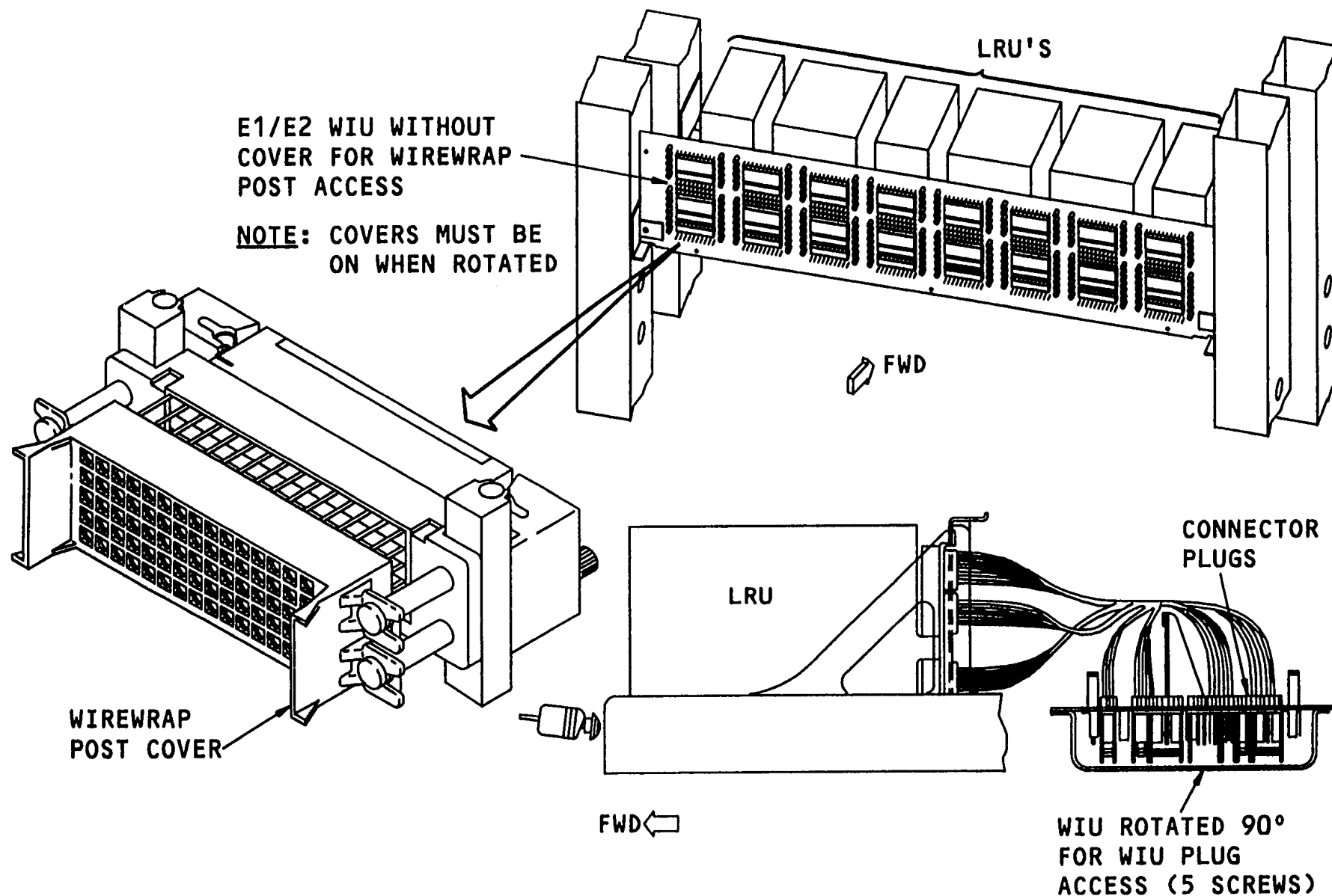


Figure 8 E1 / E2 WIU - ACCESS



---

**COMPONENT LOCATION – PANELS**

WIU panel P1010A is above the main passenger cabin ceiling panels at station 400. It is attached to the floor beams supporting the upper passenger cabin.

WIU panel P1011A is above the main passenger cabin ceiling panels at station 1060. It is attached to the floor beams supporting the upper passenger cabin.

WIU panel P1012 is above the main passenger cabin ceiling panels at station 1600. It is mounted on a circumferential hull member.

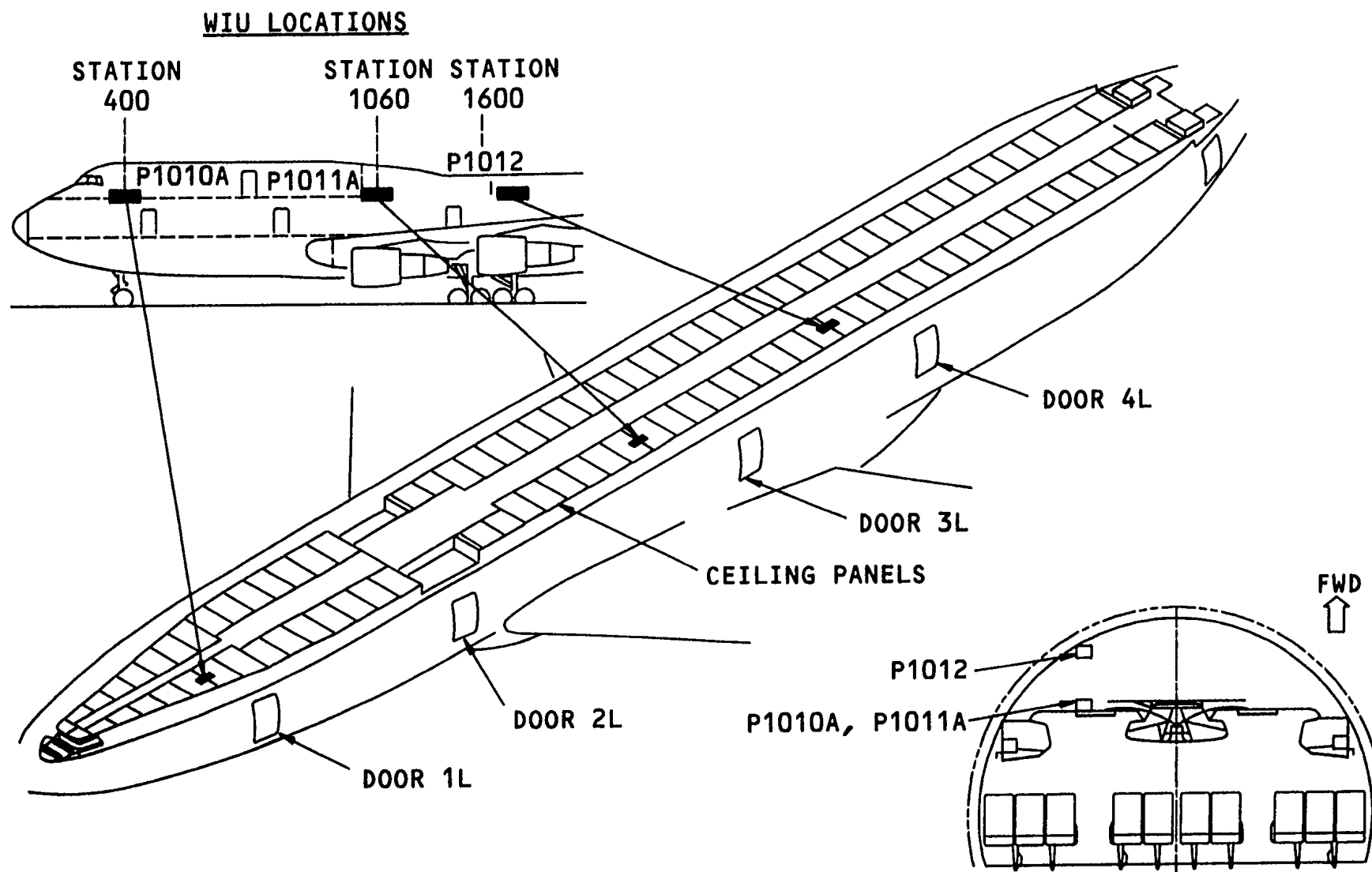


Figure 9 COMPONENT LOCATION – PANELS



### **P1010A PANEL**

The P1010A WIU is located between the upper deck floor beams, overhead of the main passenger cabin, forward of door 1L.

The airplane wiring connectors are on the outboard side of the panel.

The wirewrap side of the receptacles are on the inboard side of the panel.

All receptacles for the P1010A are identified as D116XXJ.

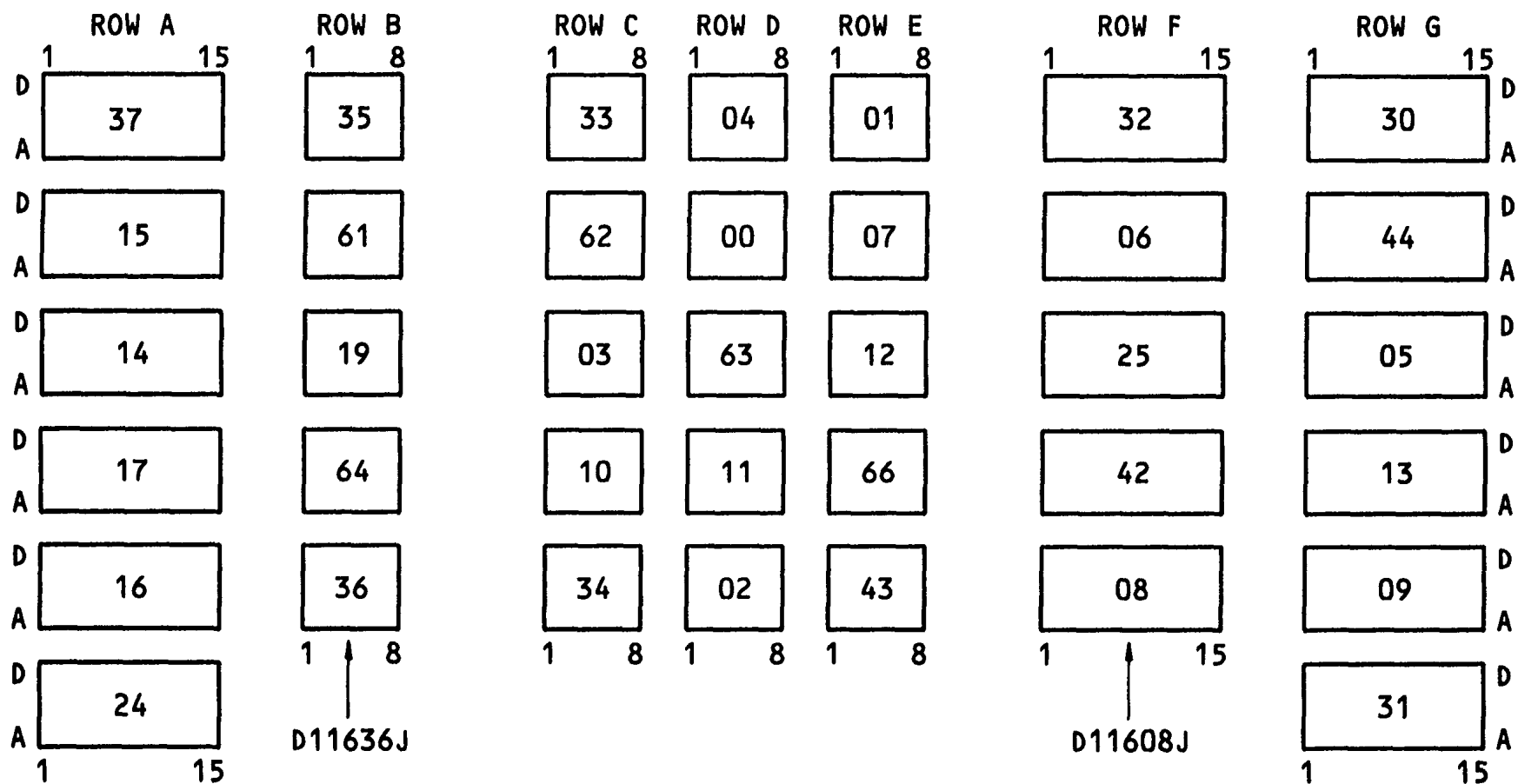
The actual two (XX) digits for any particular receptacle shows on the graphic inside the box corresponding to the relative location of that connector.

The graphic shows the maximum possible number of receptacles which can be assigned to the P1010A panel.



**P1010A**

IDENTIFIED BY  
**D116 XX J**



(WIREWRAP SIDE OF RECEPTACLES SHOWN - INBOARD SIDE)

**Figure 10 P1010A PANEL**



### **P1011A PANEL**

The P1011A WIU is located between the upper deck floor beams, overhead of the main passenger cabin, between door 2L and door 3L.

The airplane wiring connectors are on the outboard side of the panel.

The wirewrap side of the receptacles is on the inboard side of the panel.

All receptacles for the P1011A are identified as D117XXJ. The actual two (XX) digits for any particular receptacle shows on the graphic inside the box corresponding to the relative location of that connector.

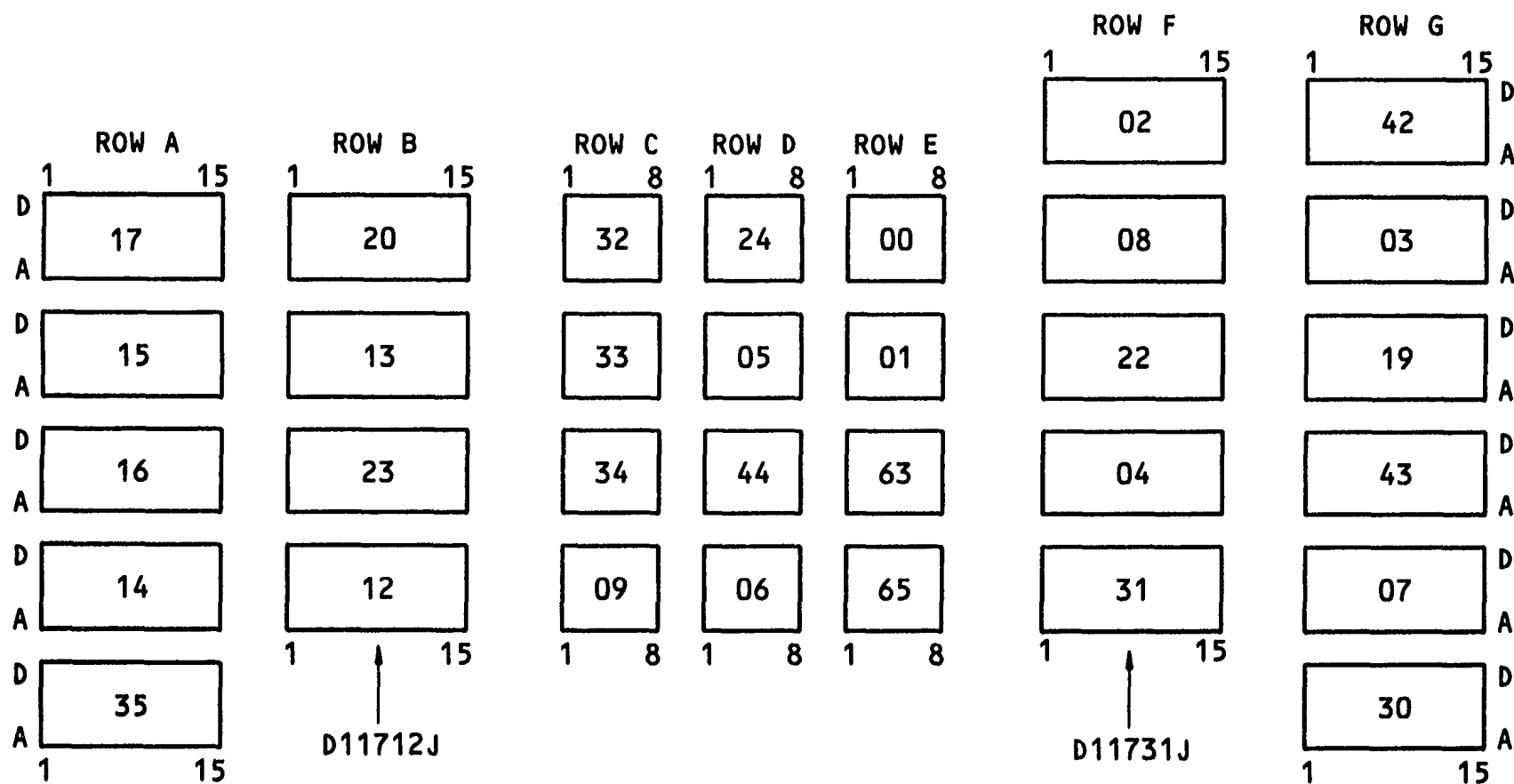
The graphic shows the maximum possible number of receptacles which can be assigned to the panel.



P1011A

IDENTIFIED BY

D117 XX J



(WIREWRAP SIDE OF RECEPTACLES SHOWN - INBOARD SIDE)

⇒ FWD

Figure 11 P1011A PANEL

**P1012 PANEL**

The P1012 WIU is located overhead of the main passenger cabin, between door 3L and door 4L.

The airplane wiring connectors are on the outboard side of the panel.

The wirewrap side of the receptacles are on the inboard side of the panel.

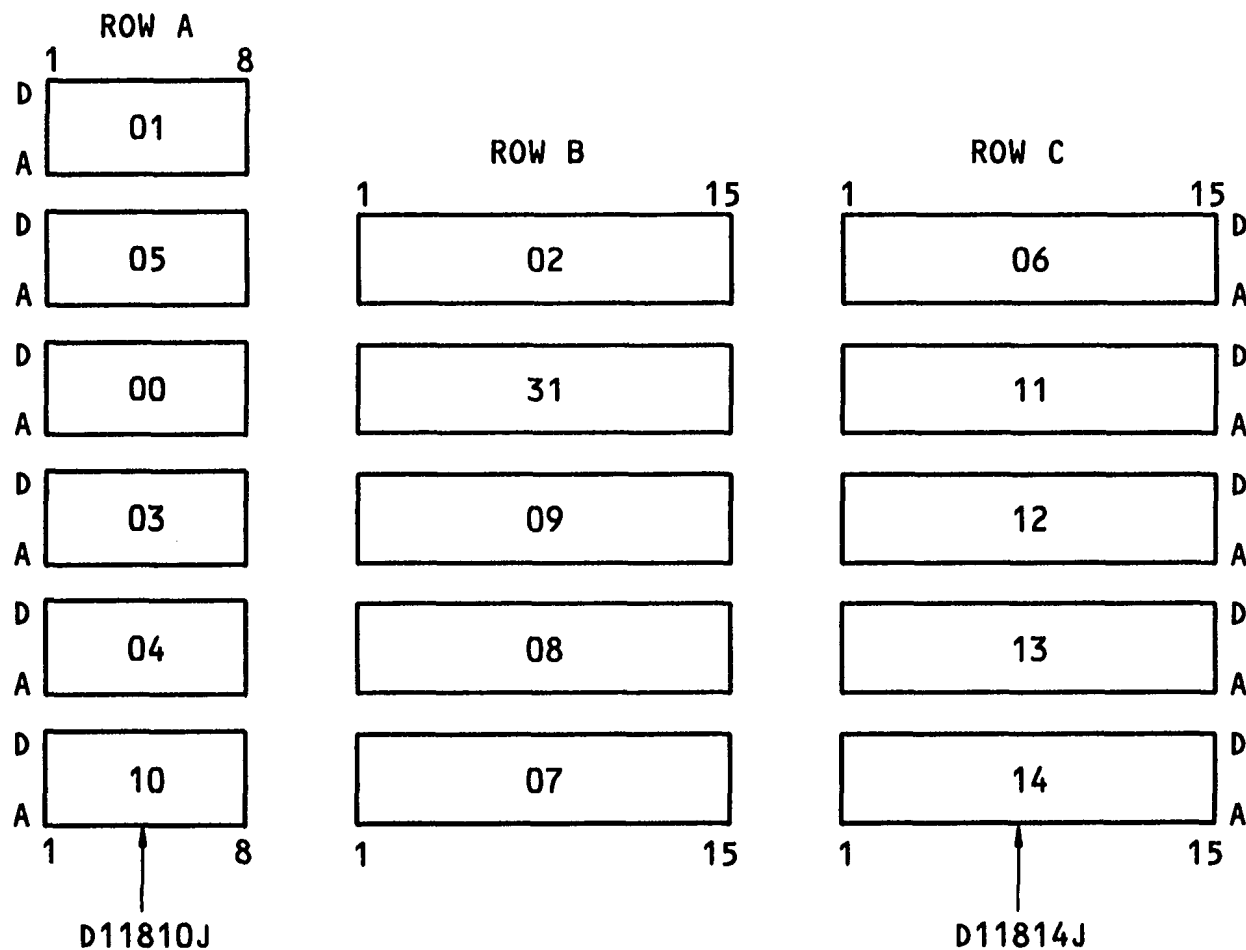
All receptacles for the P1012 are identified as D118xxJ. The actual two (xx) digits for any particular receptacle shows on the graphic inside the box corresponding to the relative location of that connector.

The graphic shows the maximum possible number of receptacles which can be assigned to the panel.

**P1012**

IDENTIFIED BY

**D118 XX J**



(WIREWRAP SIDE OF RECEPTACLE SHOWN - INBOARD SIDE)

⇒ FWD

**Figure 12 P1012 PANEL**

## STANDARD PRACTICES - AIRFRAME WIRE INTEGRATION UNIT



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### WIREWRAPE RECEPTACLES

#### General

The (E1/E2) WIUs have two different sizes of receptacles. They are 5 rows by 15 columns of pins, or 2 rows by 15 columns of pins.

The P-panel WIUs also have two sizes. They are 4 rows by 15 columns of pins, or 4 rows by 8 columns of pins.

#### Wirewrap Receptacles

Each receptacle has a rectangular body made from an insulating material. The wirewrap posts pass through the body to become connector pins on the opposite side.

Each receptacle has a plastic cover on the wirewrap side. The cover has holes above each post to permit electrical testing.

On the connector side, there are differences in the design of the receptacles.

The receptacles used in the (E1/E2) WIUs have wafer-type connector plugs. Two or more connector plugs can be locked together by a latch hook to act as a single connector for removal/ installation.

The P-panel receptacles use a single molded connector that fits over the receptacle block.

#### LRU Modules

Some receptacles have LRU modules instead of wire bundle connectors. These are a type of connector with discrete components across the pins (for example, a diode).

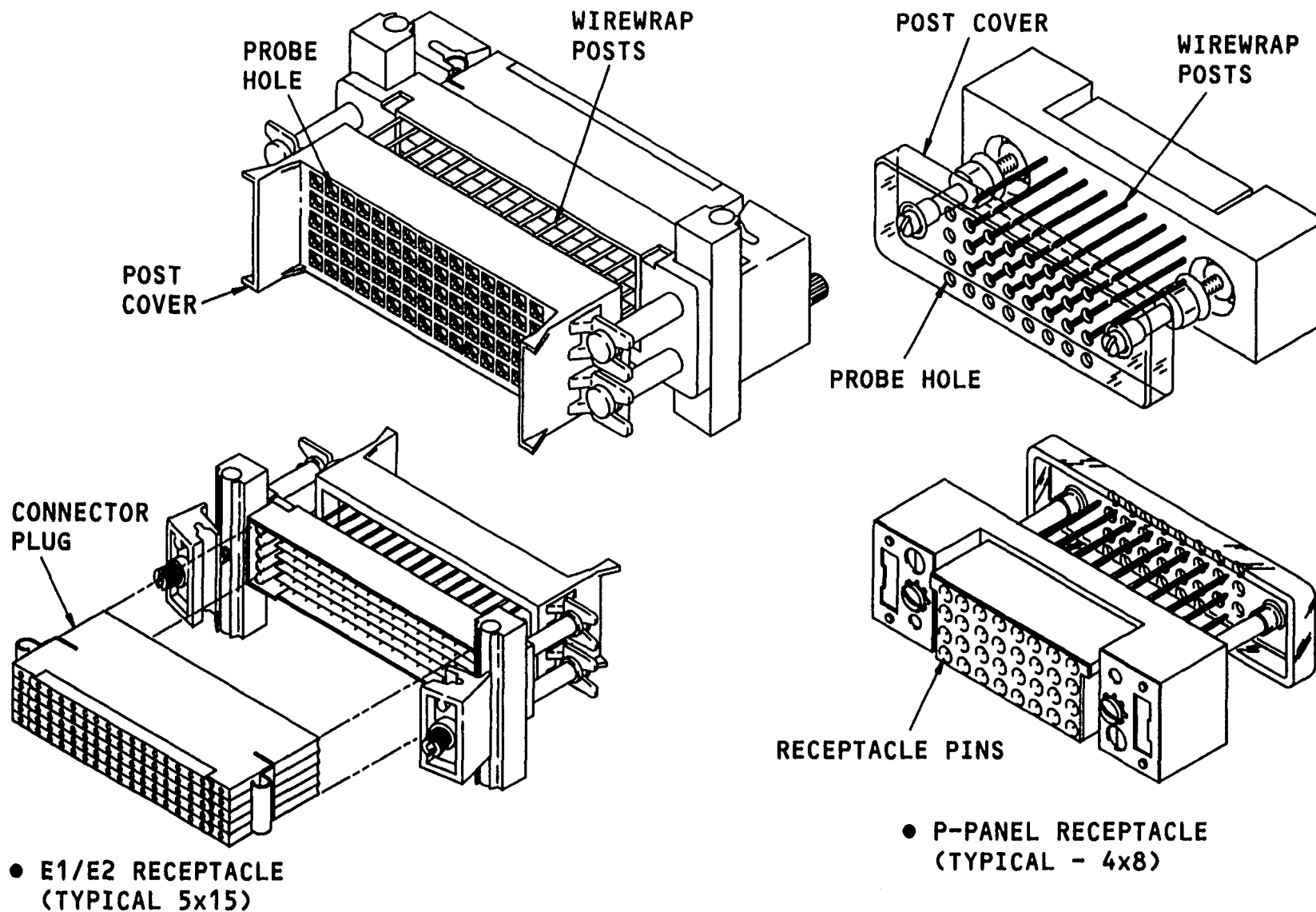


Figure 13 WIREWRAP RECEPTACLES



---

**E1 / E2 CONNECTOR PLUG DISCONNECT**

To disconnect a connector plug from a WIU, remove the 2 latch pins, turn both jackscrews counter-clockwise. Then push the lifter blocks outward until they clear the latch hooks. Then gently pull the connector plug from the WIU receptacle.



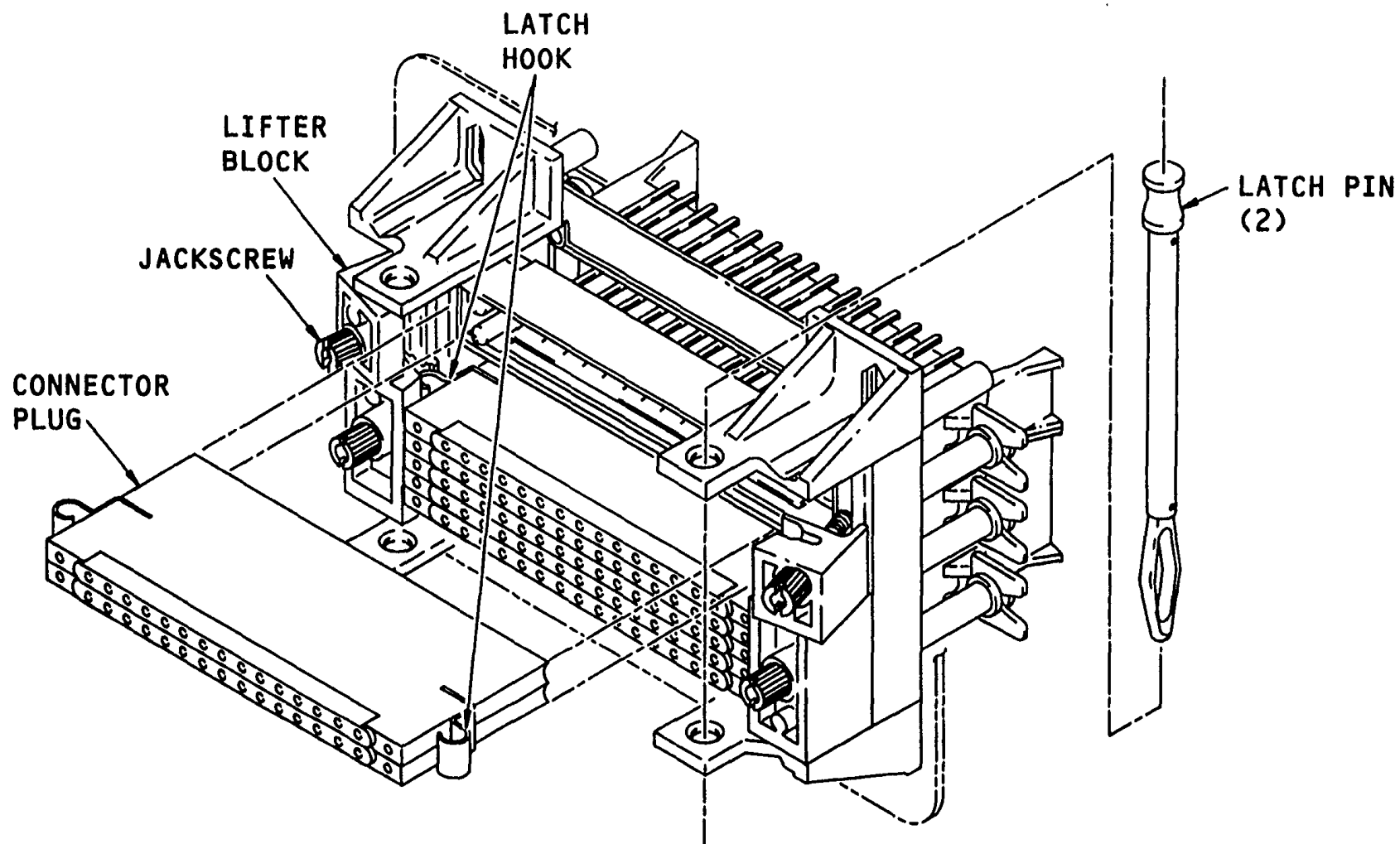


Figure 14 E1 / E2 CONNECTOR PLUG DISCONNECT



## **WIREWRAPE POSTS**

The WIU wirewrap posts are made of beryllium copper and are tin-plated.

The posts extend one inch from the block in which they are mounted. The posts have a square cross section with each side 0.045 inches wide.

(E1/E2) WIU posts are spaced 0.20 inches apart (from center to center). P-panel WIU posts are spaced 0.25 inches apart (from center to center).

Each post can hold up to three wires. The wires are typically wrapped with 1.5 to 2 turns of insulated wire for strain relief plus 4 to 7 turns of bare wire for electrical connection.

Wire sizes used in the (E1/E2) WIUs are 20 to 26 AWG. In the P-panel WIUs, 18 to 26 AWG wire is used. The wire is silverplated copper solid conductor.

**NOTE:** ONCE A WIRE IS WRAPPED ON A POST, IT MUST NOT BE PUSHED FURTHER DOWN AS THIS WILL DESTROY THE GAS-TIGHT CONNECTION. MOVING IT UP OR DOWN FROM THE ORIGINAL POSITION WILL REDUCE OR DESTROY THE RELIABILITY OF THE CONNECTION.

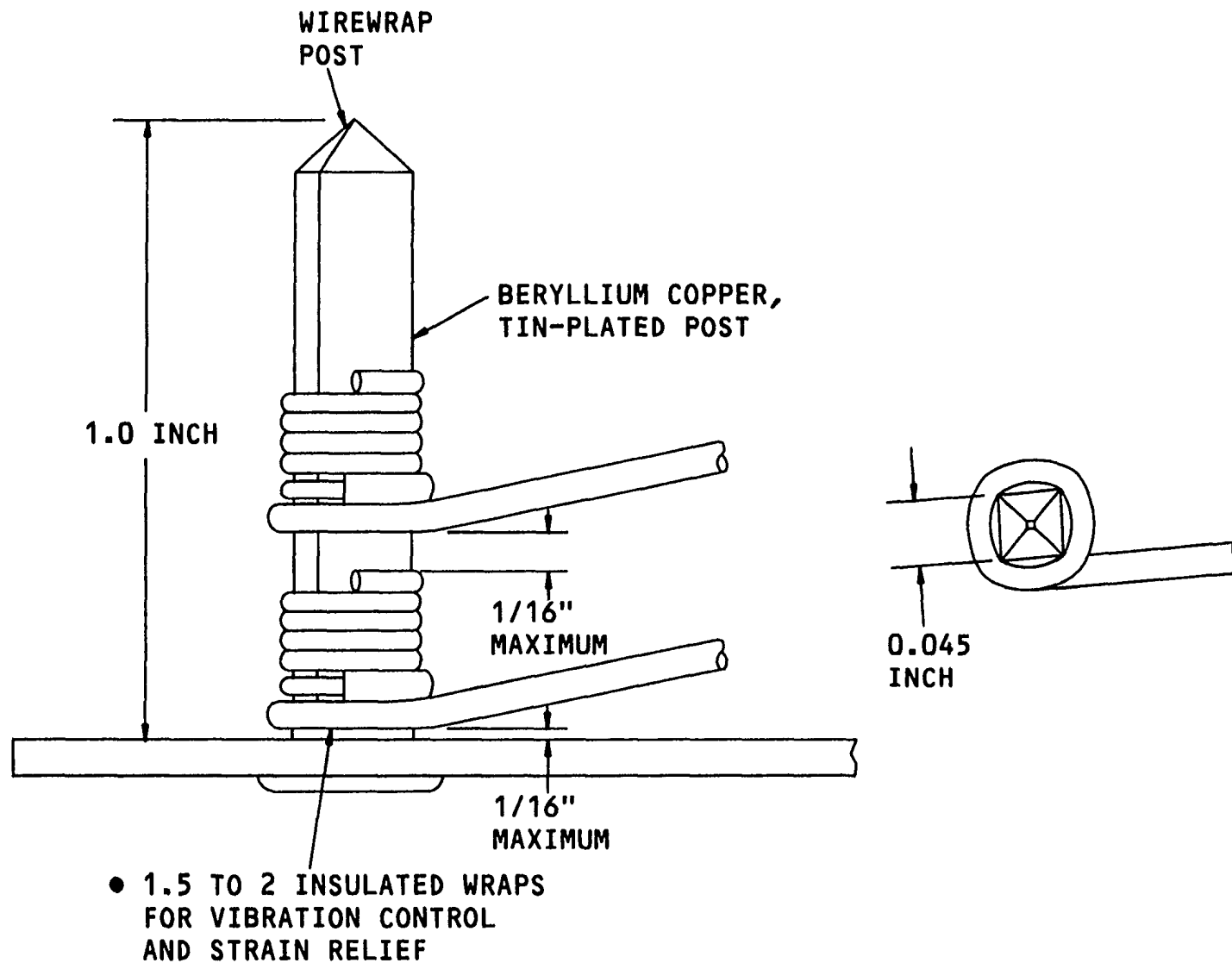


Figure 15 WIREWRAP POSTS



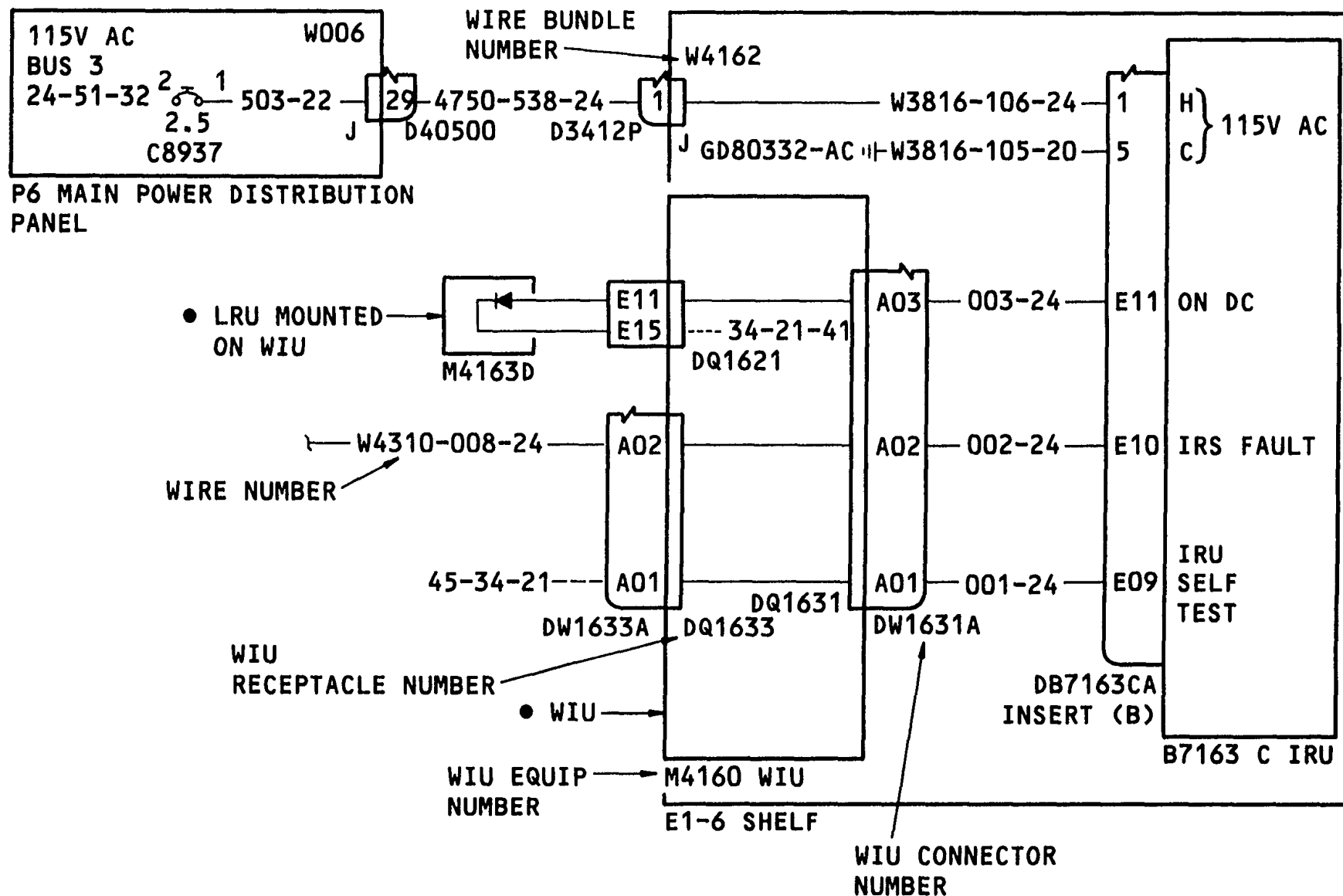
## **WIRING DIAGRAMS**

The WIU shows as a component on the wiring diagrams. Those parts of a WIU which are in a wire run are shown with the WIU number and the wirewrap post/connector pin numbers of the connectors involved.

LRU modules (components mounted on WIU connectors) also show on the wiring diagram.

The wiring diagrams show:

- WIU numbers
- WIU receptacle numbers
- WIU connector numbers
- Wire bundle numbers
- Wire numbers


**Figure 16 WIRING DIAGRAMS**



---

**SYSTEM SCHEMATICS**

The WIUs do not show on system schematics; they are considered part of a wire bundle.

However, LRU module components do show on the system schematics with the WIU equipment number.

## Figure 17 SYSTEM SCHEMATICS



---

**WIRE LIST**

The wire list provides information about all wires on the airplane. The information includes wire size, wire type, and terminations. The wires are grouped by wire bundle numbers. The bundle numbers are listed in numerical order. Following the wire bundle number, is the wire number. The wire numbers are also listed in numerical order.



## WIRING DIAGRAM MANUAL

### WIRE LIST



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R M	BUNDLE PART NUMBER AND TITLE										E O -----LENGTH													
V D	BUNDLE/WIRE/GA/CO				TY	FA	FT	/IN	DIAGRAM	EQUIP	TERM TT SP EQUIP				TERM TT SP EFFECTIVITY									
61B44140-WIRE BUNDLE-E1-4 WIU																								
W4140-Q 0835-26		RD			11	23-11-21			DQ1425	B09		GDY0002		5		ALL								
-Q 0836-26		RD			2	10 23-11-21			DQ1425	B12	*	DQ1463		C03		ALL								
-Q 0837-26		RD			1	11 23-11-21			DQ1425	B07	*	DQ1441		C10		ALL								
-Q 0838-26		RD			1	11 23-11-21			DQ1425	B08	*	DQ1441		C11		ALL								
-Q 0839-26		RD			2	23-11-21			DQ1425	B12	*	DQ1443		B03		ALL								
-Q 0840-26		RD			10	23-11-21			DQ1441	C12		GDY0004		12	*	ALL								
-Q 0841-26		RD			1	10 23-12-11			DQ1465	D05	*	DQ1431		B10		ALL								
-Q 0842-26		RD			1	10 23-12-11			DQ1465	D06	*	DQ1431		B11		ALL								
-Q 0843-26		RD			1	1 23-12-11			DQ1465	D07		GDY0006		5		ALL								
-Q 0844-26		RD			10	23-12-11			DQ1465	D05	*	DQ1451		C10		ALL								
-Q 0845-26		RD			10	23-12-11			DQ1465	D06	*	DQ1451		C11	*	ALL								
<div><div>W4140 -Q 0841-26 RD 1 10 23-12-11</div><div>-Q 0842-26 RD 1 10 23-12-11</div><div>-Q 0843-26 RD 1 1 23-12-11</div><div>-Q 0844-26 RD 10 23-12-11</div><div>-Q 0845-26 RD 10 23-12-11</div></div>																								
<div><div>WIRE NUMBER</div><div>GAUGE</div><div>LENGTH (FT/IN.)</div><div>WIRING DIAGRAM</div></div>																								
<div>WIRE CODE TO SPEC NO. IN WDM INTRODUCTION</div>																								
<div><div>TWO OR MORE WIRES TERMINATE ON THIS POST</div></div>																								
<div><div>FROM</div><div>TO</div><div>EFFECTIVITY</div></div>																								
<div><div>DQ1465 D05 * DQ1431 B10 ALL</div><div>DQ1465 D06 * DQ1431 B11 ALL</div><div>DQ1465 D07 GDY0006 5 ALL</div><div>DQ1465 D05 * DQ1451 C10 ALL</div><div>DQ1465 D06 * DQ1451 C11 * ALL</div></div>																								
-----																								
MODEL 747					REV DATE					MANUAL D280U102					WIRE LIST					SECTION W4140				
CUSTOMER NWA					JUN 29/88					DWG NO. 280U1102					91-21-11					PAGE 23				
747-400																								

### Figure 18 WIRE LIST



---

**HOOKUP LIST**

The hookup list provides information on all terminations. The terminations are grouped by the connectors they are attached to. The connectors are listed in numerical order by connector number. The termination number follows the connector number. The termination numbers are also listed in numerical order.

# WIRING DIAGRAM MANUAL HOOK-UP LIST



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RM EQUIPMENT						RM EQUIPMENT						
EO						EO						
VD	TERM	BUNDLE/WIRE/GA/CO	TT	DIAGRAM	EFFECTIVITY	VD	TERM	BUNDLE/WIRE/GA/CO	TT	DIAGRAM	EFFECTIVITY	
DQ1465												
WIU RECEP- TACLE NUMBER	B13	W4140-Q	0667-26	45-45-14	ALL	POST NUMBER	D05	W4140-Q	0841-26	23-12-11	ALL	
	B14	W4140-Q	0668-26	45-45-14	ALL		D05	W4140-Q	0844-26	23-12-11	ALL	
	B15	W4140-Q	0683-26	45-45-14	ALL		D06	W4140-Q	0842-26	23-12-11	ALL	
	C01	W4140-Q	0430-26	45-22-11	ALL		D06	W4140-Q	0845-26	23-12-11	ALL	
	C01	W4140-Q	0434-26	45-22-11	ALL		D07	W4140-Q	0843-26	23-12-11	ALL	
	C02	W4140-Q	0551-26	45-45-13	ALL		D08	W4140-Q	1024-26	45-45-15	ALL	
	C03	W4140-Q	0552-26	45-45-13	ALL		D09	W4140-Q	1023-26	45-45-15	ALL	
	C04	W4140-Q	0583-26	45-45-13	ALL		D10	W4140-Q	G0010-26	45-45-15	ALL	
	C05	UNUSED			ALL		D11	W4140-Q	0916-26	45-34-51	ALL	
	C06	UNUSED			ALL		D12	W4140-Q	0917-26	45-34-51	ALL	
	C07	W4140-Q	0573-26	45-45-14	ALL		D13	W4140-Q	G0001-26	45-34-51	ALL	
	C08	W4140-Q	0574-26	45-45-14	ALL		D14	UNUSED			ALL	
	C09	W4140-Q	0876-26	45-45-14	ALL		D15	UNUSED			ALL	
	C10	W4140-Q	0435-26	45-22-11	ALL		<div><div>WIRE BUNDLE NUMBER</div><div>D05 W4140-Q 0841-26 23-12-11 ALL D05 W4140-Q 0844-26 23-12-11 ALL D06 W4140-Q 0842-26 23-12-11 ALL D06 W4140-Q 0845-26 23-12-11 ALL D07 W4140-Q 0843-26 23-12-11 ALL</div><div>WIRE NUMBER</div><div>GAUGE</div><div>WIRING DIAGRAM</div></div>					
	C10	W4140-Q	0437-26	45-22-11	ALL							
C11	UNUSED			ALL								
C12	UNUSED			ALL								
C13	UNUSED			ALL								
C14	UNUSED			ALL								
C15	UNUSED			ALL								
D01	W4140-Q	0378-26	34-61-16	ALL	<div><div>WIRE NUMBER</div><div>GAUGE</div><div>WIRING DIAGRAM</div></div>							
D01	W4140-Q	0381-26	34-61-16	ALL								
D02	W4140-Q	0379-26	34-61-16	ALL								
D02	W4140-Q	0382-26	34-61-16	ALL								
D03	W4140-Q	0380-26	34-61-16	ALL	<div><div>WIRE NUMBER</div><div>GAUGE</div><div>WIRING DIAGRAM</div></div>							
D04	W4140-Q	0198-26	27-09-15	ALL								
D04	W4140-Q	0199-26	27-09-15	ALL	<div><div>WIRE NUMBER</div><div>GAUGE</div><div>WIRING DIAGRAM</div></div>							
					<div><div>WIRE NUMBER</div><div>GAUGE</div><div>WIRING DIAGRAM</div></div>							
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					<div><div>WIRE NUMBER</div><div>GAUGE</div><div>WIRING DIAGRAM</div></div>							



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**EQUIPMENT LIST**

The equipment list provides information on parts of the airplane. The information includes part numbers, wiring diagram numbers, and location. The parts are identified by their equipment number. The equipment numbers are listed in numerical order.

## WIRING DIAGRAM MANUAL

### EQUIPMENT LIST



# Lufthansa Technical Training

**B747-400**

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R M E O V D	EQUIP	O P T	P T	PART NUMBER PART DESCRIPTION	USED ON DWG	VENDOR	QTY	DIAGRAM STATION -WL -BL	EFFECTIVITY
	DQ1461			280U0002-4 WW RECP		V81205 ARO414-	1	36-24-12 -E1-4	ALL
	DQ1463			280U0002-5 WW RECP		V81205 ARO414-	1	27-09-15 -E1-4	ALL
→	DQ1465			280U0002-6 WW RECP	→	V81205 ARO414-	1	31-31-11 -E1-4	ALL
	DQ1467			280U0002-7 WW RECP		V81205 ARO414-	1	45-45-13 -E1-4	ALL

R M E O V D	EQUIP	O P T	P T	PART NUMBER PART DESCRIPTION	USED ON DWG	VENDOR	QTY	DIAGRAM STATION -WL -BL	EFFECTIVITY
	DW1461A			280U0007-4 WW PLUG		V81205 ARO414-	1	45-45-21 -E1-4	ALL
	DW1463A			280U0007-5 WW PLUG		V81205 ARO414-	1	45-45-21 -E1-4	ALL
	DW1465A			280U0003-26 WW PLUG		V81205 ARO414-	1	31-31-11 -E1-4	ALL
	DW1465B			280U0004-22 WW PLUG		V81205 ARO414-	1	34-61-18 -E1-4	ALL
→	DW1465D			280U0003-29 WW PLUG		V81205 ARO414-	1	23-12-11 -E1-4	ALL

### Figure 20 EQUIPMENT LIST



---

## **WIRE IDENTIFICATION**

### **General**

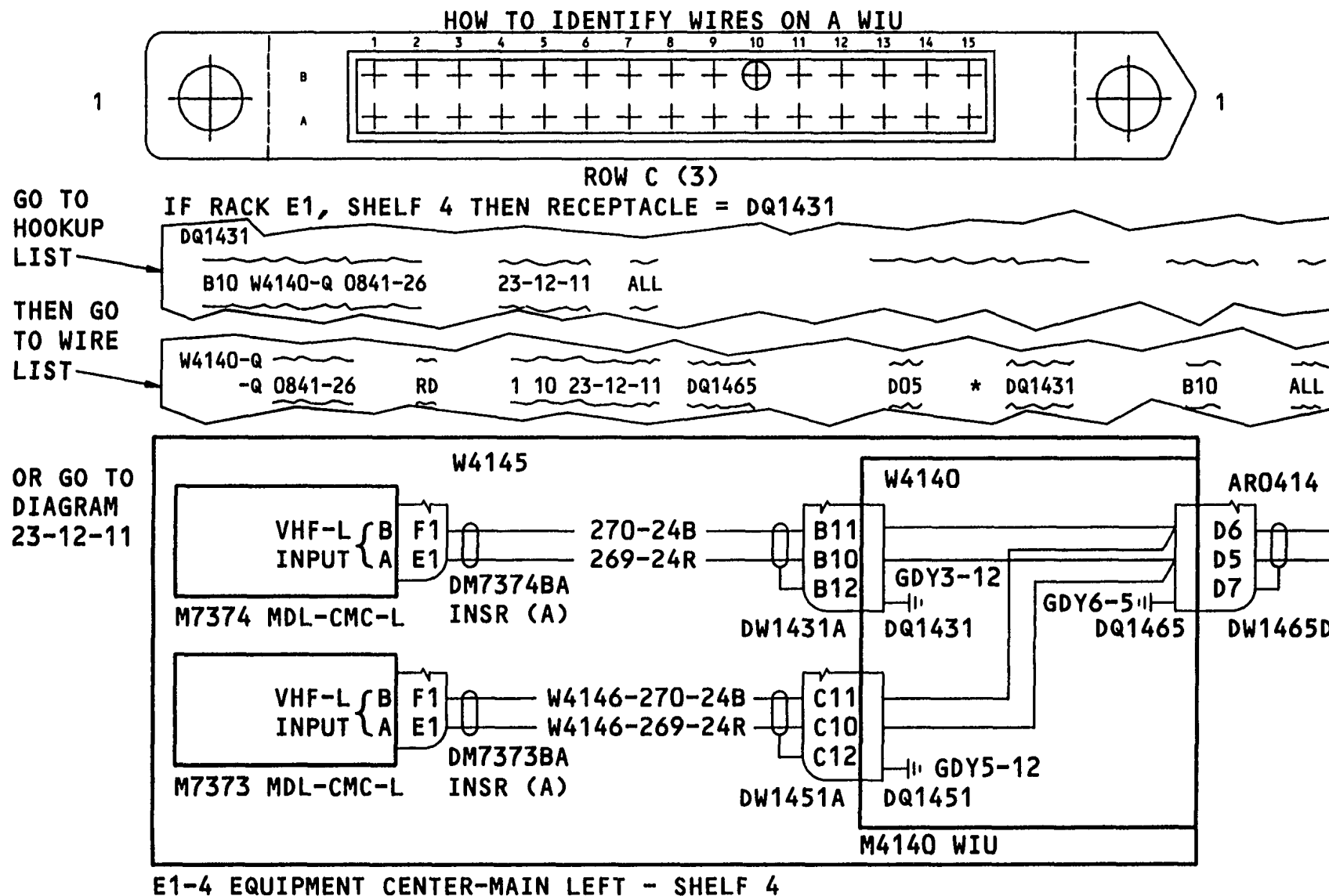
There are two methods to identify a wire if the post is known. one way is to use the hookup list and wire list. The other way is to use the hookup list and wiring diagrams.

### **Wire List**

First, identify the post and WIU receptacle. Then, go to the hookup list and find the wire number. With the wire number, go to the wire list and look up the wire. The wire list shows both terminations of the wire.

### **Wiring Diagrams**

Again, identify the post and WIU receptacle. Then go to the hookup list and find the wiring diagram number. The wiring diagram shows the wire connections.


**Figure 21 WIRE IDENTIFICATION**



## **SYSTEM TROUBLESHOOTING**

Trouble-shooting should be avoided at the WIU level if possible. If system trouble-shooting is required at the WIU level, several precautions must be followed. The precautions are:

- Wear an approved ESDS wrist strap
- Post covers must be on
- Do not disconnect wirewrap plugs
- Do not disconnect shelf boxes
- Probe the posts only with a number sixteen gauge socket





## REQUIREMENTS - WITH POWER ON

- ESDS WRIST STRAP MUST BE ON
- POST COVERS MUST BE ON
- DO NOT DISCONNECT WIREWRAP PLUGS
- DO NOT DISCONNECT SHELF BOXES
- POST PROBING SHOULD BE WITH NO. 16 SOCKET

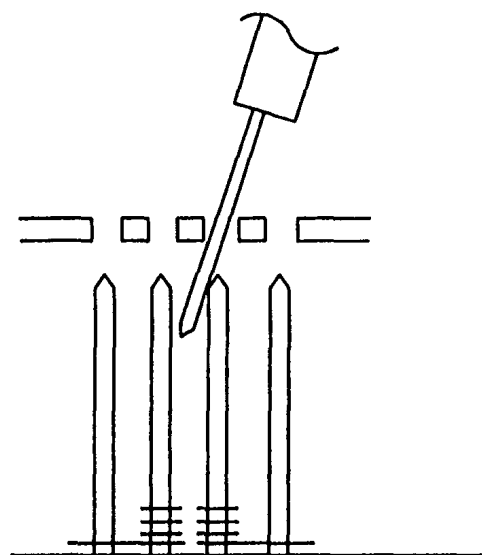
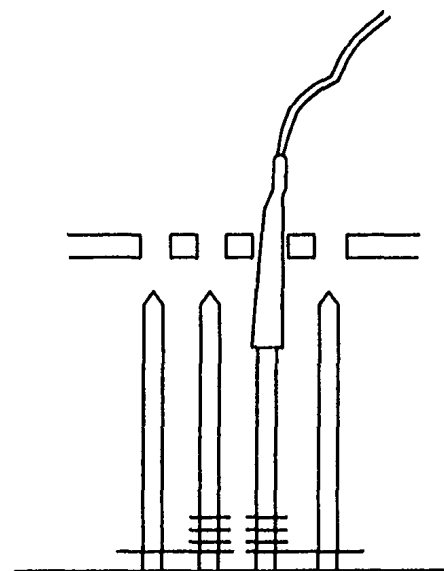
THIN TEST PROBE  
NONO. 16 SOCKET  
YES

Figure 22 SYSTEM TROUBLESHOOTING



## **CONTINUITY CHECKS**

When doing continuity checks, several precautions must be followed. The precautions are:

- Wear an approved ESDS wrist strap
- Post covers must be on
- Determine circuit from wiring diagrams
- Remove power from all affected circuits
- Disconnect all LRUs in circuit
- Do not disconnect wirewrap plugs

First check the continuity between LRU connectors. If there is an open circuit, check the continuity between the LRU connectors and the WIU posts. If there is continuity, then check the continuity between the WIU posts.

## REQUIREMENTS - CONTINUITY CHECKS

- ESDS WRIST STRAP MUST BE ON
- POST COVERS MUST BE IN PLACE
- DETERMINE CIRCUIT FROM WIRING DIAGRAM
- REMOVE POWER FROM ALL AFFECTED CIRCUITS
- DISCONNECT ALL BOXES IN CIRCUIT
- DO NOT DISCONNECT WIREWRAP PLUGS

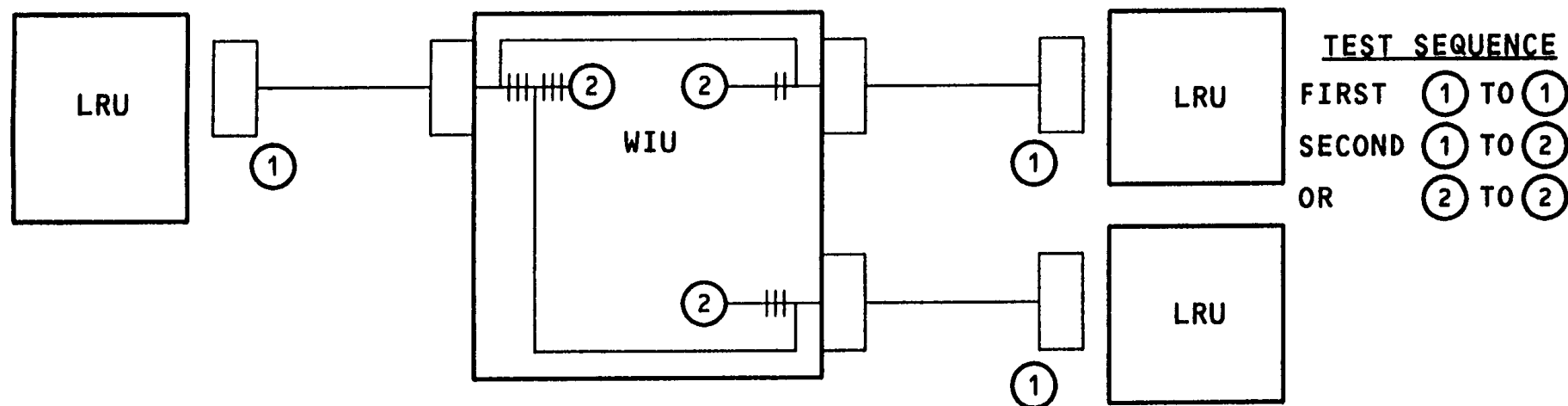
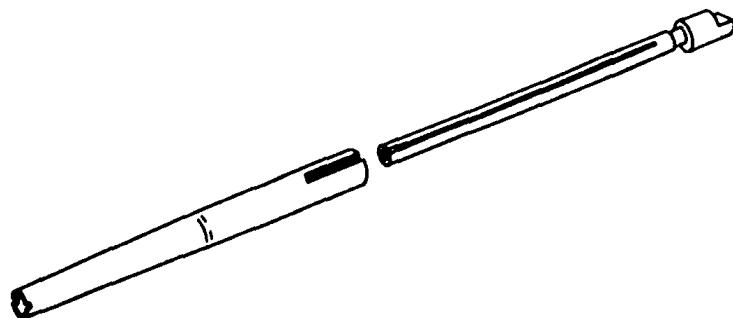


Figure 23 CONTINUITY CHECKS

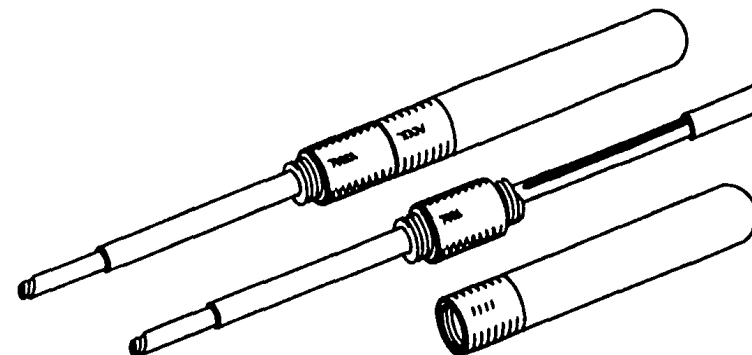


## **WIREWRAP TOOLS**

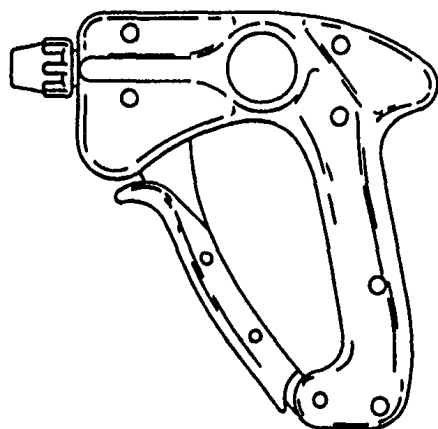
Only approved manual hand-operated wirewrap tools should be used during on-aircraft maintenance. Power wirewrap tools should be used only in component shops when WIUs have been removed. Refer to Wiring Diagram Manual ATA Chapter 20 for approved tools, standard practices and caution notes.



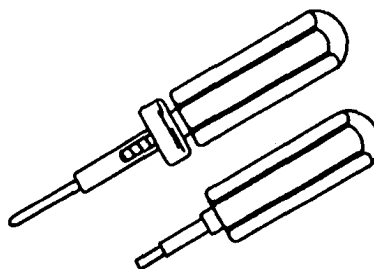
**WIRE-WRAPPING BIT  
AND SLEEVE**



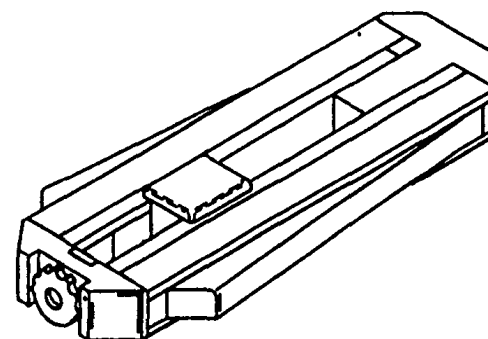
**HAND WRAPPING/UNWRAPPING TOOLS**



**MANUAL WRAP TOOL  
ALUMINUM HOUSING**



**RECEPTACLE POST  
REMOVAL AND  
INSERTION TOOLS**



**WIRE STRIP TOOL**

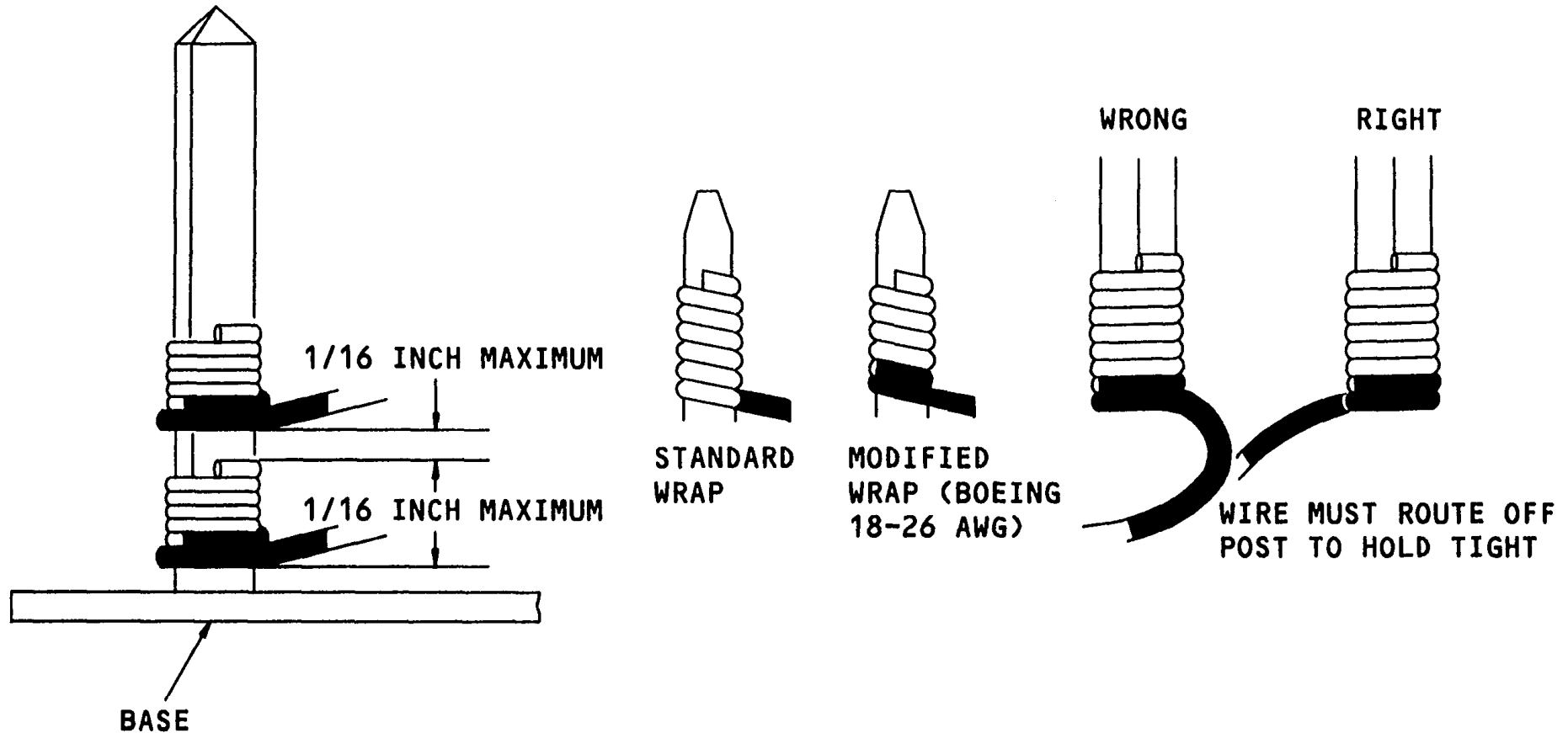
**Figure 24 WIREWRAP TOOLS**



---

**WIREWRAPE PRACTICES**

Each post can have no more than three wires on it. Each wire has one and a half to two turns of insulation and four to seven turns of stripped wire. There can be no more than one sixteenth of an inch space between wires. The wire must be routed in the direction of the turn.



**Figure 25 WIREWRAP PRACTICES**

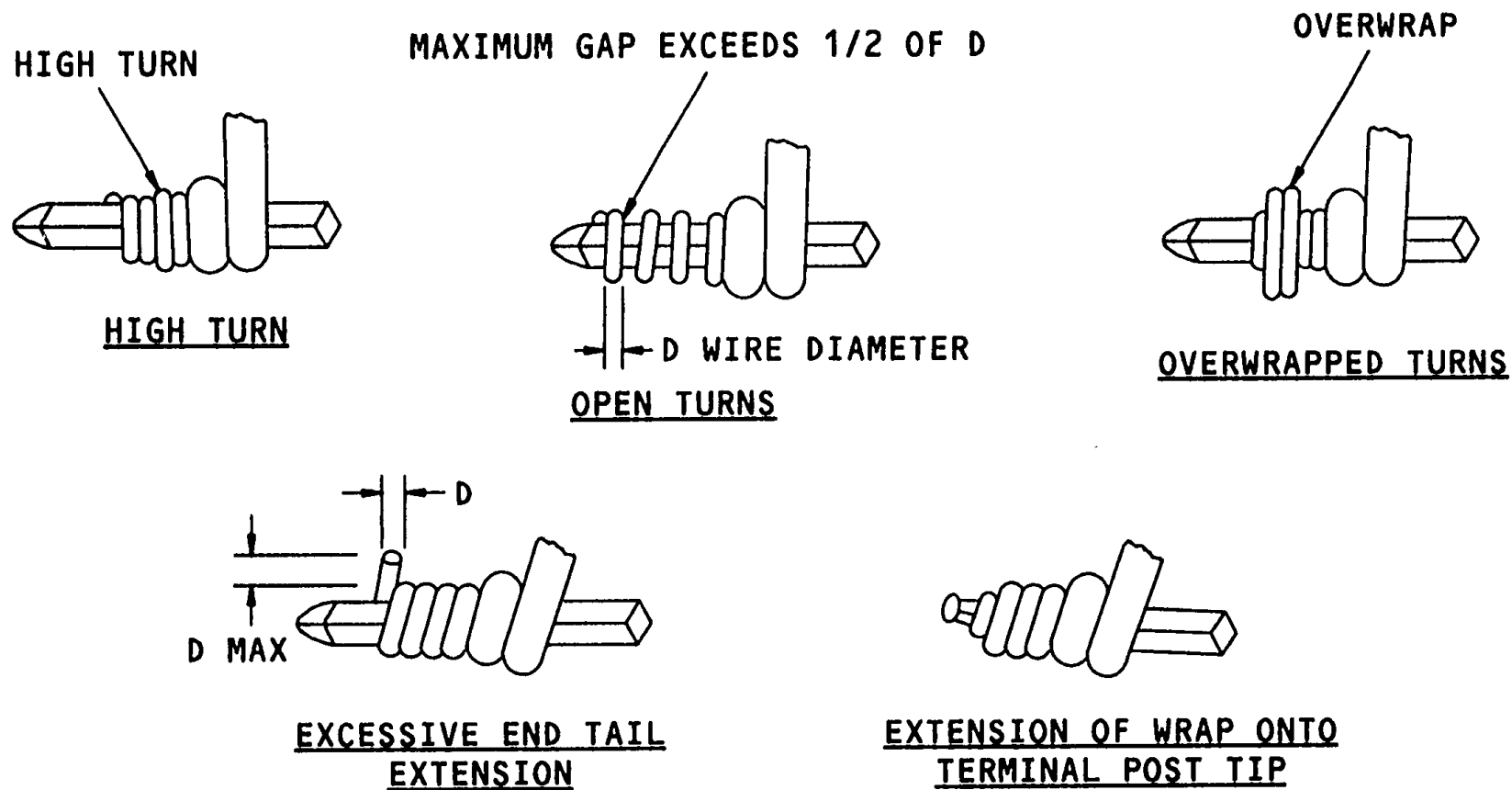


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**BAD CONNECTIONS**

This graphic shows some bad wirewrap connections.





**Figure 26 BAD CONNECTIONS**



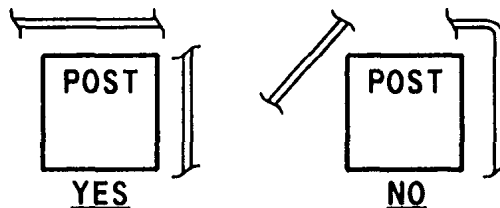
---

**WIRE ROUTING**

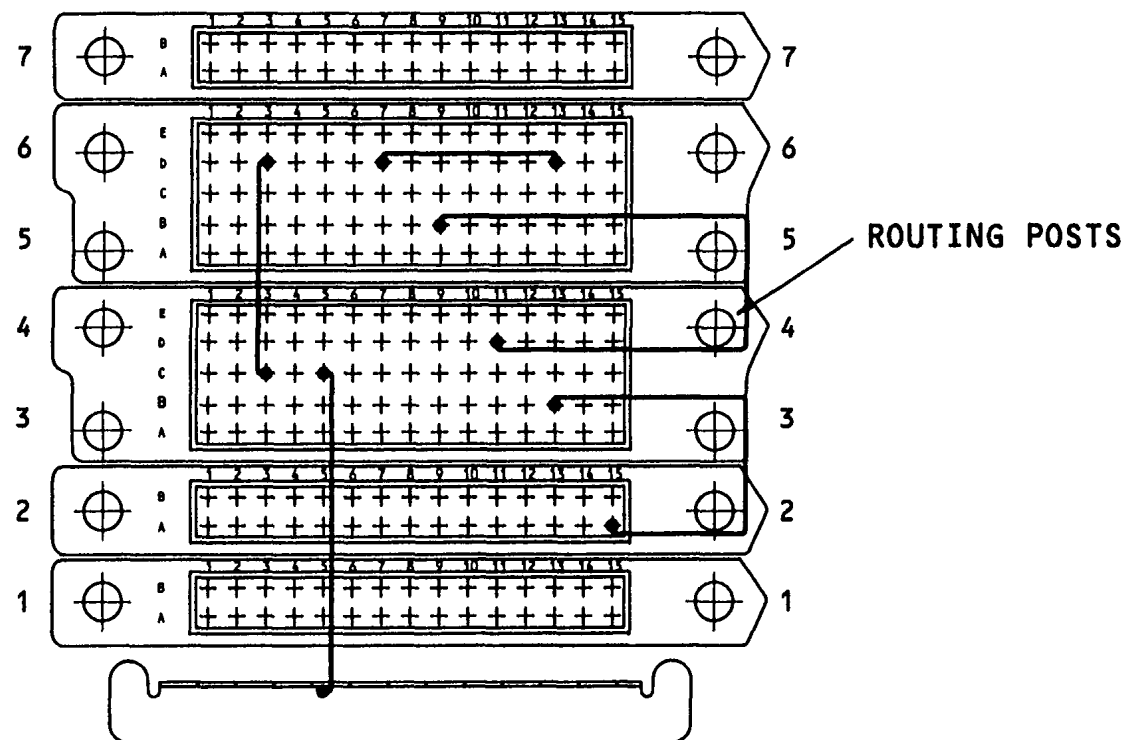
Wire routing can go vertically or horizontally on a WIU receptacle. Wire routing should not cross diagonally on a WIU receptacle. If a wire connects to two posts that are not either vertical or horizontal from each other, then the wire must go around one or more routing posts.

## WIRE ROUTING

- WIRES MUST NOT BE ROUTED ACROSS CORNERS OF POSTS



- WIRES MUST USE ROUTING POSTS TO AVOID DIAGONALS



**Figure 27 WIRE ROUTING**



## **SUBJECT/IMPACT WIRES**

When doing a wire modification, there are two categories of wires:

- Subject wires
- Impact wires

Subject wires are the wires that you want to remove or replace as part of the modification. Impact wires are wires that are wrapped on a post above the subject wire. Impact wires must be unwrapped to access the subject wire. Since wires cannot be rewrapped, impact wires must be replaced.



- 3 LEVELS OF WRAP POSSIBLE ON POST
- S = SUBJECT WIRE = WIRE YOU WANT TO WORK ON  
I = IMPACTED WIRE = WIRE IN THE WAY

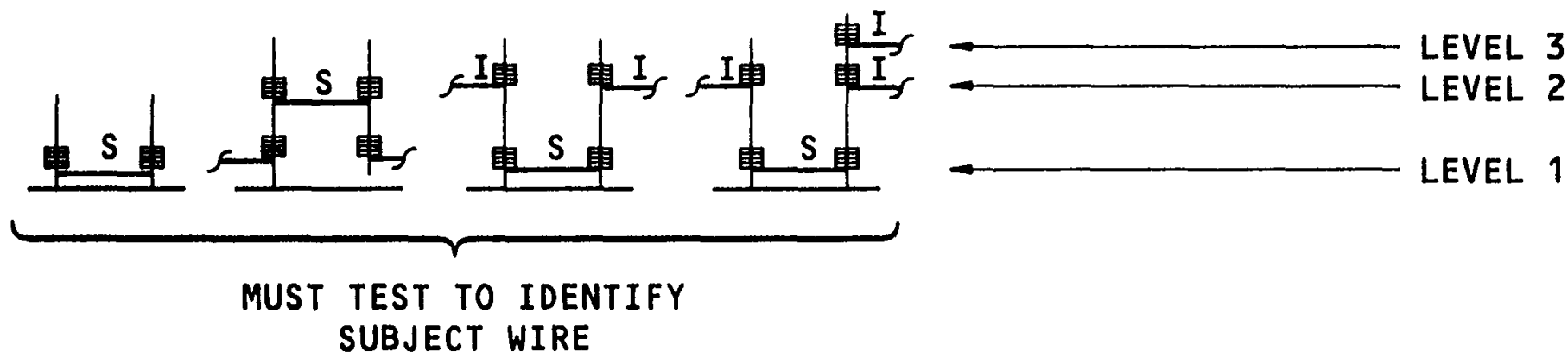


Figure 28 SUBJECT/IMPACT WIRES



---

**REWORK EXAMPLE - 1**

The next seven graphics follow through a rework example step by step.

In the example, the subject wire is under one impact wire.

The wire to be reworked goes from DQ2660 post A13 to DQ2660 post D13.

The new wire will go from DQ2660 post A13 to DQ2660 post C13.

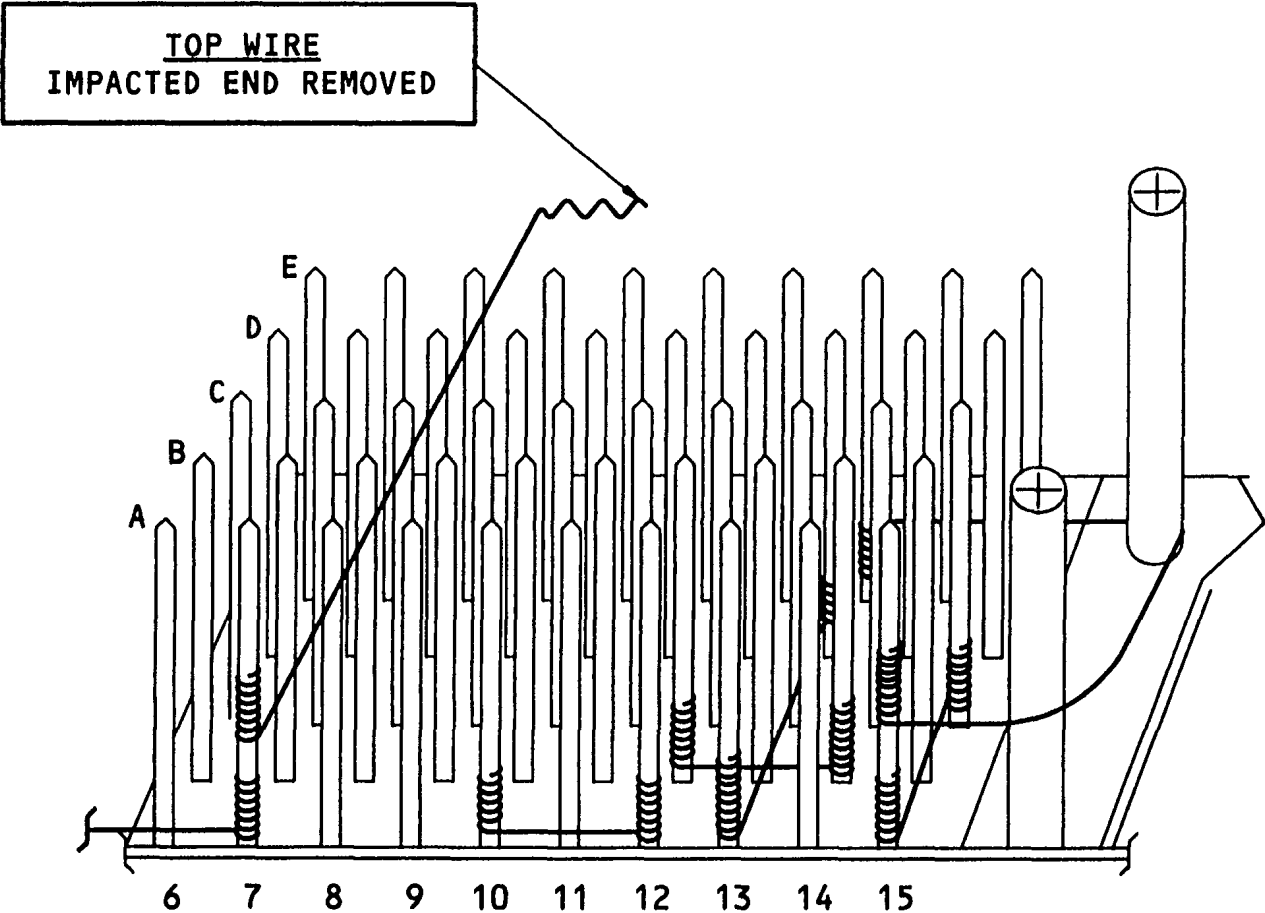
<u>WIRE TO RETERMINATE:</u>	Q0021								RC
OLD TERMINATION	DQ2660 POST A13	DQ2660 POST D13							D
NEW TERMINATION	DQ2660 POST A13	DQ2660 POST C13							D



**REWORK EXAMPLE - 2**

The impact wire must first be removed from post A13.





ACTION	WIRE NO.	TYPE	FROM		WIRING DIAGRAM	TO		LENGTH	NOTE
			EQUIP NO.	PIN		EQUIP NO.	PIN		
IMPACT	Q1786-26	RD	DQ2660	A07	34-45-16	DQ2660	A13	4.3	REMOVE FROM A13

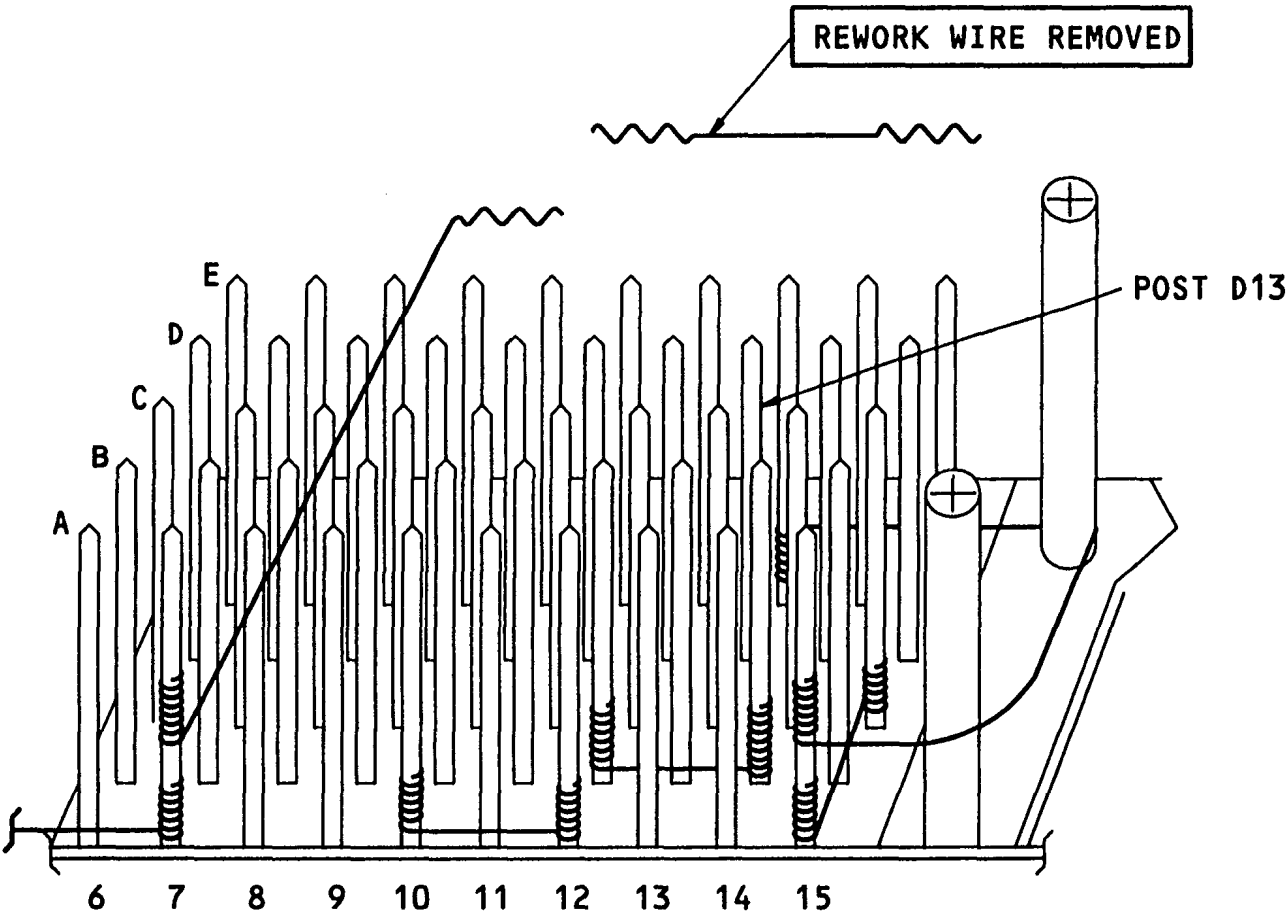
Figure 30 REWORK EXAMPLE - 2



---

**REWORK EXAMPLE - 3**

Once the impact wire has been removed, then remove the subject wire.



ACTION	WIRE NO.	TYPE	FROM		WIRING DIAGRAM	TO		LENGTH	NOTE
			EQUIP NO.	PIN		EQUIP NO.	PIN		
REMOVE	Q1787-26	RD	DQ2660	A13	34-45-16	DQ2660	D13		

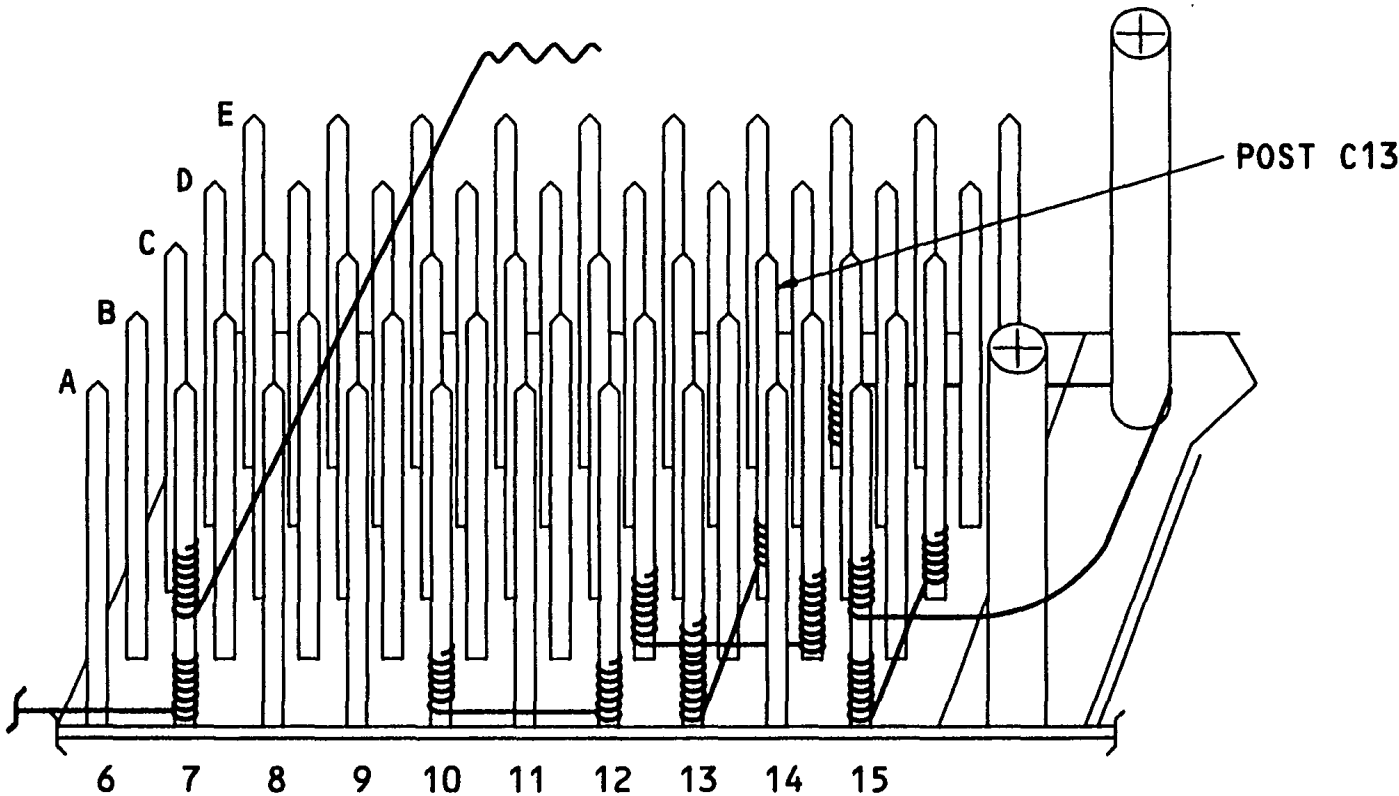
Figure 31 REWORK EXAMPLE - 3



---

**REWORK EXAMPLE - 4**

Once the subject wire has been removed, then add the new subject wire.



ACTION	WIRE NO.	TYPE	FROM		WIRING DIAGRAM	TO		LENGTH	NOTE
			EQUIP NO.	PIN		EQUIP NO.	PIN		
ADD	Q1792	RD	DQ2660	A13	34-45-16	DQ2660	C13	4.1	

Figure 32    REWORK EXAMPLE - 4

**REWORK EXAMPLE - 5**

Next check the wire list or wiring diagram to determine the impact wire's other termination. Then check to be sure its the proper post by doing a continuity test of the wire to the post.

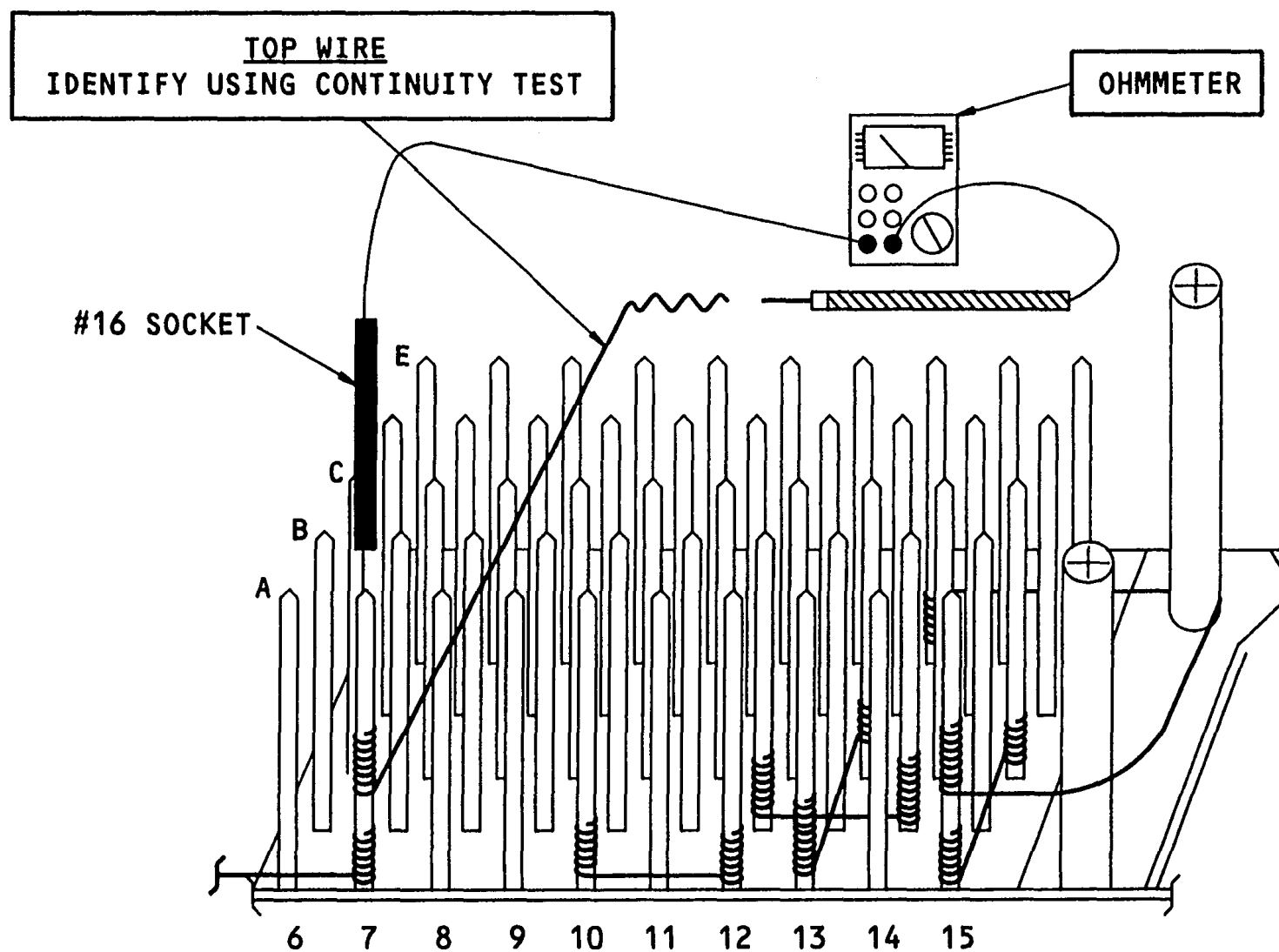


Figure 33 REWORK EXAMPLE - 5



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**REWORK EXAMPLE - 6**

Once you have verified the proper termination, then remove the impacted wire.



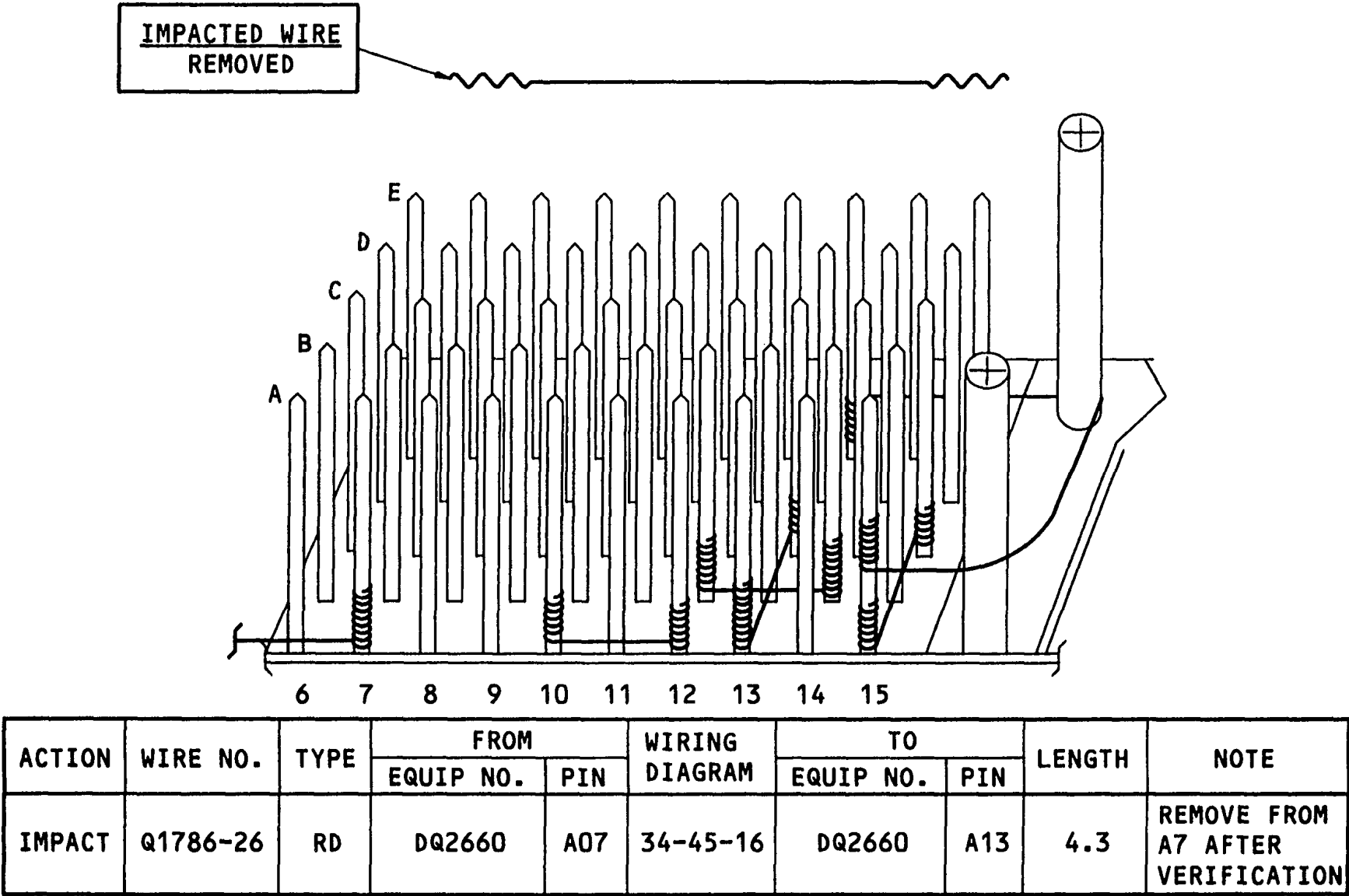
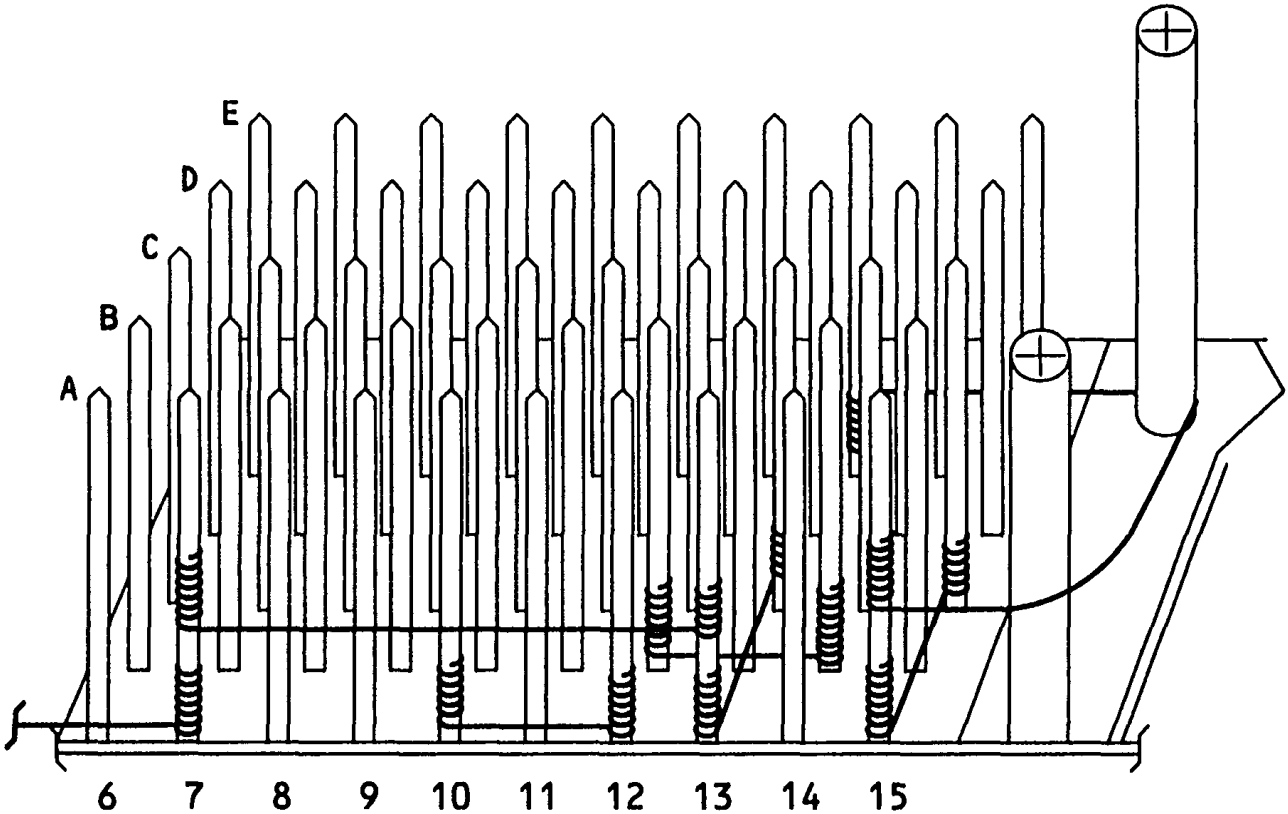


Figure 34 REWORK EXAMPLE - 6



**REWORK EXAMPLE - 7**

Once the impacted wire is removed, then add the new impacted wire.



ACTION	WIRE NO.	TYPE	FROM		WIRING DIAGRAM	TO		LENGTH	NOTE
			EQUIP NO.	PIN		EQUIP NO.	PIN		
ADD	Q1786-26	RD	DQ2660	A07	34-45-16	DQ2660	A13	4.3	

Figure 35    REWORK EXAMPLE - 7



---

**WIRE WRAPPING ON THE AIRPLANE**

This graphic shows guidelines that must be followed while wire wrapping on the airplane.



## WIRE WRAPPING - ON THE AIRPLANE

- ALL POWER MUST BE OFF
- ESDS WRIST STRAP MUST BE ON
- ONLY APPROVED TOOLS MAY BE USED
- UNWRAPPED WIRE MUST BE REPLACED
  - REWRAP NOT ACCEPTABLE
  - TOO LITTLE SLACK IN WIRE
- SLIDING WRAP ON POST NOT ALLOWED
  - DESTROYS GAS TIGHT CONNECTION
- NICKED WIRE AND CHAFED INSULATION NOT ALLOWED
- WIRES MUST BE UNWRAPPED TO REMOVE
  - CUTTING WIRE AND LEAVING WRAP ON POST NOT ALLOWED
  - CHISEL POINT OF CUT WIRE MAY DAMAGE ADJACENT WIRE
- TARNISHED WIRE
  - MUST NOT BE WRAPPED
  - TARNISH AFTER WRAPPING IS ACCEPTABLE

Figure 36 WIRE WRAPPING ON THE AIRPLANE



---

**OPERATIONAL TEST**

After a modification has been done an operational test must be done for:

- Every disconnected LRU
- Every system in every disconnected wirewrap plug
- Every subject wire
- Every impact wire



## TESTING

**AN OPERATIONAL TEST IS REQUIRED FOR:**

- **EVERY DISCONNECTED LRU**
- **EVERY SYSTEM IN EVERY DISCONNECTED WIREWRAP PLUG**
- **EVERY SUBJECT WIRE IF NOT PART OF A SPECIFIED TEST**
- **EVERY IMPACTED WIRE IF NOT PART OF A SPECIFIED TEST**

## STANDARD PRACTICES - AIRFRAME WIRE INTEGRATION UNIT



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039.01  
**20-41**

### **SUMMARY**

Avoid trouble-shooting at the WIU if possible. If you must trouble-shoot at the WIU be sure post covers are on and wear a wrist strap.

If a WIU modification is necessary, be sure all power is off and wear a wrist strap.





## SUMMARY

- AVOID TROUBLE-SHOOTING AT WIU IF POSSIBLE
- TROUBLE-SHOOTING AT WIU
  - ESDS WRIST STRAP ON
  - POST COVERS ON
- WIU REPAIR/MODIFICATION
  - ALL POWER OFF
  - ESDS WRIST STRAP ON
  - DISCONNECT LRUs BEFORE CONTINUITY TESTS
- ALL DISTURBED CIRCUITS REQUIRE OPERATIONAL TEST



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**ESDS - ELECTRO-STATIC DISCHARGE SENSITIVE**  
**LRU - LINE REPLACEABLE UNIT**  
**WIU - WIRE INTEGRATION UNIT**





