RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

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RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

1. GENERAL DATA

A. Applicable Conditions for the RB 211 Trent 800 Power Plant Wiring Repair Data

The data and procedures that are given in Subject 20-23-00 through Subject 20-23-39 are applicable only for the RB 211 Trent 800 power plant wire harnesses that have Rolls-Royce part numbers.

CAUTION: THE DATA AND PROCEDURES IN SUBJECT 20-23-00 THROUGH SUBJECT 20-23-39 ARE NOT APPLICABLE FOR THE REPAIR OF THE WIRING OF OTHER POWER PLANTS, OF OTHER POWER PLANT MANUFACTURERS, OR OF RB 211 TRENT 800 WIRING THAT HAS A BOEING PART NUMBER. REPAIRS THAT ARE NOT APPROVED CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRING.

Refer to:

- The remainder of the SWPM for an RB 211 Trent 800 power plant wire harness that has a Boeing part number
- Rolls-Royce for problems with the RB 211 Trent 800 power plant wiring repair data and procedures.

B. RB 211 Trent 800 Power Plant Wiring Repair Data and Procedures

Table 1
WIRING REPAIR DATA AND PROCEDURES

Wiring Repair Data or Procedure	Location
Connectors	Subject 20-23-01
Wire and Cable Types	Subject 20-23-03
Wiring Repair	Subject 20-23-15
Repair of Wire Harness Identification	Subject 20-23-16
Repair of Shielded Cables	Subject 20-23-17
Repair of Alternator Lead Wires	Subject 20-23-19
Wire Harness Disassembly and Assembly	Subject 20-23-30
Assembly of Terminal Lugs	Subject 20-23-32
Connector Disassembly and Assembly	Subject 20-23-37
Assembly of Backshells	Subject 20-23-39

RB 211 TRENT 800 POWER PLANT: CONNECTORS

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RB 211 TRENT 800 POWER PLANT: CONNECTORS

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

2. PART NUMBERS AND DESCRIPTIONS

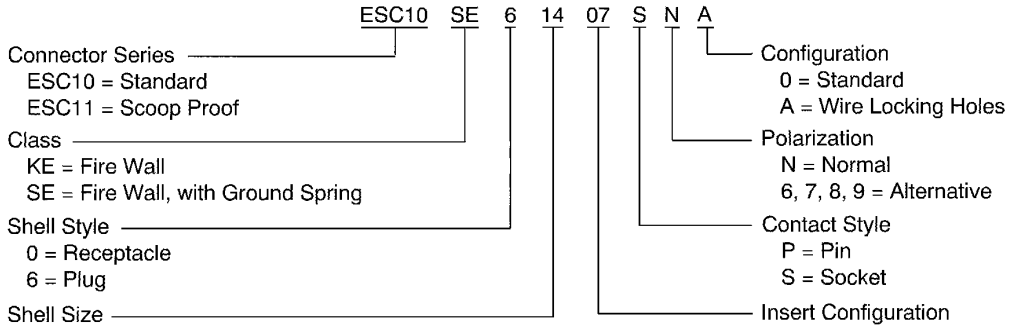
A. Connector Part Numbers

Table 1
CONNECTOR PART NUMBERS

Part Number	Contact Retention	Supplier
ESC10( )	Rear Release	QPL
ESC11( )	Rear Release	QPL
CA66279-106	Front Release	ITT Cannon

Table 2
APPROVED SUPPLIERS OF ESC10() AND ESC11() CONNECTORS

Standard	Supplier
ESC10()	Amphenol
	Deutsch
	Souriau
ESC11()	Amphenol
	Deutsch
	Souriau



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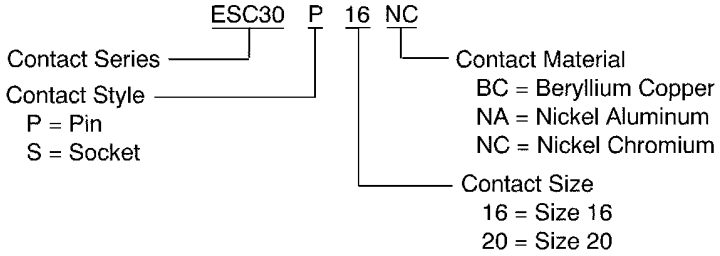
ESC10 AND ESC11 CONNECTOR PART NUMBER STRUCTURE
Figure 1

B. ESC30() Contact Part Numbers

To find the contact part numbers, refer to the Aircraft Illustrated Parts Catalogue (AIPC).

Table 3
APPROVED SUPPLIERS

Standard	Supplier
ESC30()	Amphenol
	Deutsch
	Souriau



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ESC30() CONTACT PART NUMBER STRUCTURE
Figure 2

Table 4
CONTACT ENGAGING END SIZE AND CRIMP BARREL SIZES

Contact Size	Engaging End Size	Crimp Barrel Size
16	16	16
20	20	20

C. CA66279-106 Contact Part Numbers

To find the contact part numbers, refer to the Aircraft Illustrated Parts Catalogue (AIPC).

D. ESC36() Seal Plug Part Numbers

Table 5
ESC() SEAL PLUG PART NUMBERS

Part Number	Contact Cavity Size	Supplier
ESC3620	20	QPL
ESC3616	16	QPL

Table 6
APPROVED SUPPLIERS OF ESC36() SEAL PLUGS

Standard	Supplier
ESC36()	Amphenol
	Deutsch
	Souriau

3. INSERT CONFIGURATIONS

A. ESC10 and ESC11 Connectors

NOTE: The contact cavity size that is specified in Table 7 is equivalent to the size of the engaging end of the contact.

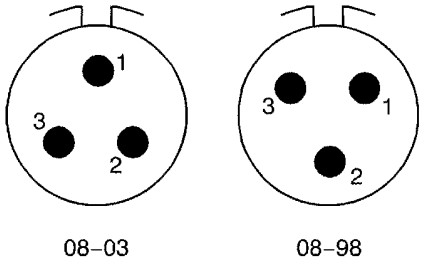
Table 7
CONNECTOR INSERT CONFIGURATIONS

Insert Configuration	Contact Cavity		Reference
	Quantity	Size	
08-03	3	20	Figure 3
08-98	3	20	Figure 3
10-05	5	20	Figure 4
12-03	3	16	Figure 5
12-12	12	20	Figure 5
14-07	7	16	Figure 6
14-15	15	20	Figure 6
16-10	10	16	Figure 7

Table 7 CONNECTOR INSERT CONFIGURATIONS (Continued)

Insert Configuration	Contact Cavity		Reference
	Quantity	Size	
16-24	24	20	Figure 7
18-14	14	16	Figure 8
18-31	31	20	Figure 8
20-39	2	16	Figure 9
	37	20	Figure 9
20-41	41	20	Figure 9
22-19	19	16	Figure 10
22-55	55	20	Figure 10
24-30	30	16	Figure 11
24-61	61	20	Figure 11
28-42	42	16	Figure 12

NOTE: Figure 3 through Figure 12 show the rear face of an insert that has sockets. The view of the rear face of an insert that has pins is the mirror image of this view.



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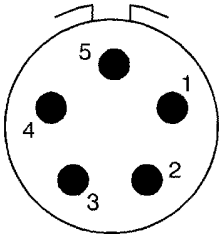
08-() INSERT CONFIGURATIONS
Figure 3



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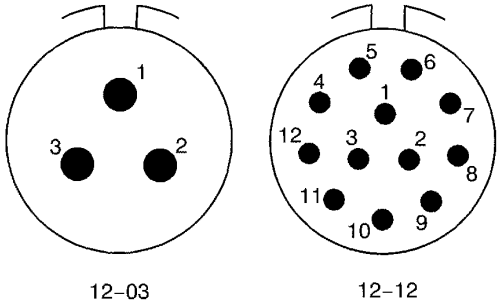
10-() INSERT CONFIGURATIONS
Figure 4



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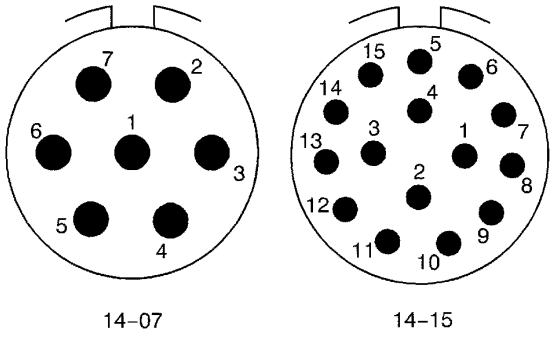
12-() INSERT CONFIGURATIONS
Figure 5



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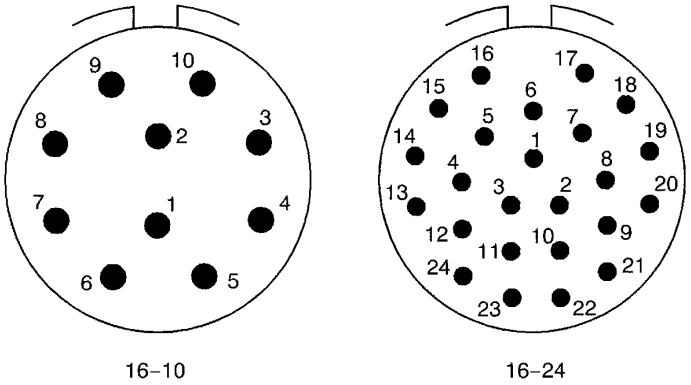
14-() INSERT CONFIGURATIONS
Figure 6



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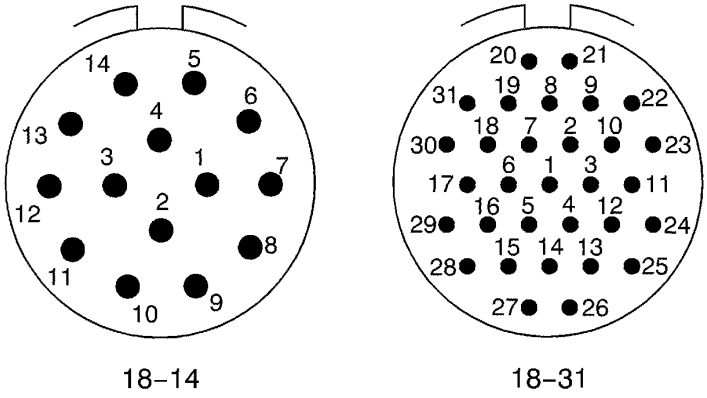
16-() INSERT CONFIGURATIONS
Figure 7



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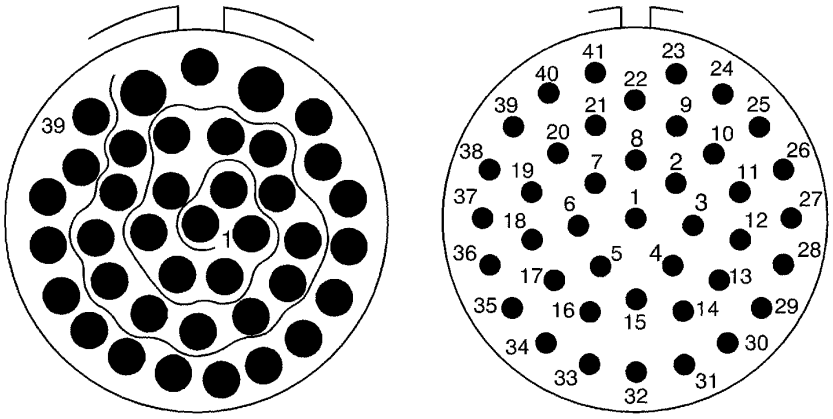
18-() INSERT CONFIGURATIONS
Figure 8



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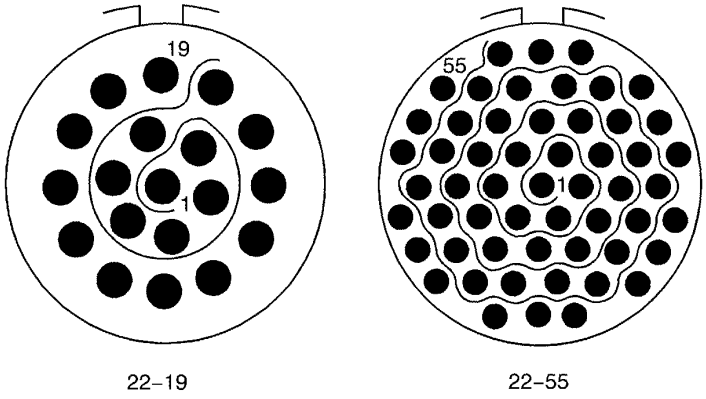
20-() INSERT CONFIGURATIONS
Figure 9



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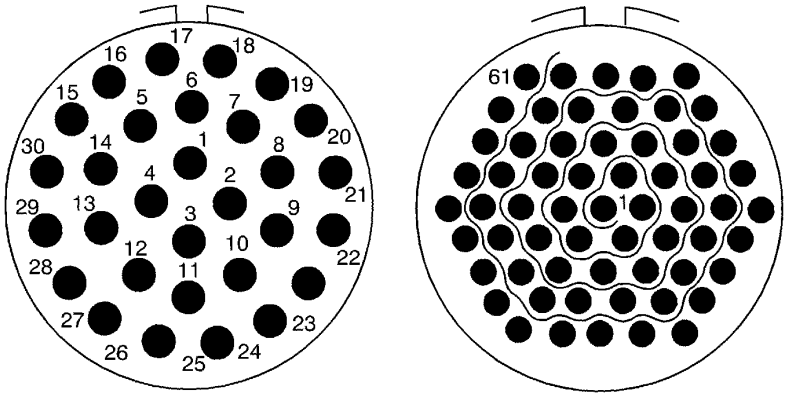
22-() INSERT CONFIGURATIONS
Figure 10



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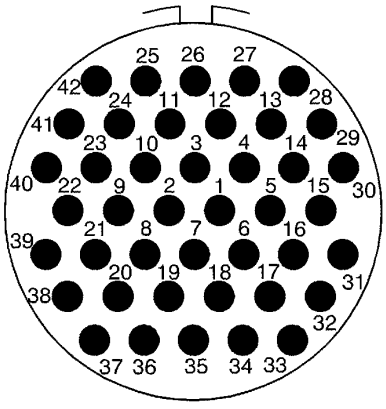
24-() INSERT CONFIGURATIONS
Figure 11



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28-() INSERT CONFIGURATIONS
Figure 12

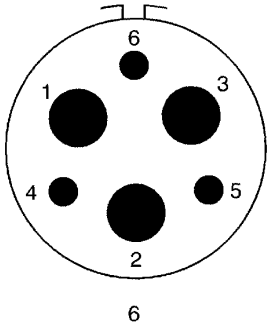
B. ITT Cannon CA66279-106 Connector

NOTE: The contact cavity size that is specified in Table 8 is equivalent to the size of the engaging end of the contact.

Table 8
CONNECTOR INSERT CONFIGURATIONS

Insert Configuration	Contact Cavity		Reference
	Quantity	Size	
6	3	4	Figure 13
	3	16	Figure 13

NOTE: Figure 13 shows the rear face of an insert that has sockets. The view of the rear face of an insert that has pins is the mirror image of this view.



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INSERT CONFIGURATION 6
Figure 13

RB 211 TRENT 800 POWER PLANT: WIRE AND CABLE TYPES

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RB 211 TRENT 800 POWER PLANT: WIRE AND CABLE TYPES

This Subject gives the wire part number data of the RB 211 Trent 800 power plant wiring.

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

2. WIRE SPECIFICATIONS

A. Specified Wire Part Numbers and Description

Table 1
SPECIFIED WIRES

Wire Specification	Conductors	Wire Size (AWG)	Material	Note
ESW1200-010-006	1	20	High Strength Copper Alloy	Fire Resistant
ESW1202-022-006	2	20	High Strength Copper Alloy	Fire Resistant, Twisted, 1 Shield
ESW1202-032-006	3	20	High Strength Copper Alloy	Fire Resistant, Twisted, 1 Shield
ESW1202-032-012	3	16	High Strength Copper Alloy	Fire Resistant, Twisted, 1 Shield
ESW1602-022-006	2	20	1 Alumel, 1 Chromel	Fire Resistant, Twisted, 1 Shield
Low Noise Cable	-	-	-	-
MI Cable	-	-	-	-
RTS71445	2	18	Nickel Clad Copper	Fire Resistant, Twisted, 1 Shield
RTS71446	3	18	Nickel Clad Copper	Fire Resistant, Twisted, 1 Shield
RTS77084	1	16	High Strength Copper Alloy	Fire Resistant, Shield
RTS77086	3	20	High Strength Copper Alloy	Twisted, 2 Shields
RTS77161	3	8	Nickel Clad copper	Twisted

B. Alternative Wires

Table 2
ALTERNATIVE WIRES

Specified Wire	Alternative Wire	
	Specification or Part Number	Supplier
ESW1200-010-006	BMS 13-55 Type II Class 1	Boeing
ESW1202-022-006	BMS 13-55 Type IV Class 2	Boeing
ESW1202-032-006	BMS 13-55 Type IV Class 3	Boeing
ESW1202-032-012	BMS 13-55 Type IV Class 3	Boeing
ESW1602-022-006	-	-
Low Noise Cable	-	-
MI Cable	-	-

RB 211 TRENT 800 POWER PLANT: WIRE AND CABLE TYPES

Table 2 ALTERNATIVE WIRES (Continued)

Specified Wire	Alternative Wire	
	Specification or Part Number	Supplier
RTS71445	BMS 13-55 Type III Class 2	Boeing
RTS71446	BMS 13-55 Type III Class 3	Boeing
RTS77084	BMS 13-55 Type IV Class 1	Boeing
RTS77086	-	-
RTS77161	BMS 13-58 Type I Class 3	Boeing

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

TABLE OF CONTENTS

RB 211 TRENT 800 POWER PLANT: WIRING REPAIR

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

B. Damage and Repair Conditions

Table 1
LOCATION OF DAMAGE AND REPAIR CONDITIONS

Component	Location
Alternator Lead Wire	Table 2
Connector	Table 3
Identification Marker	Table 4
Shielded Cable	Table 5
Terminal Lug	Table 6

Table 2
DAMAGE AND REPAIR CONDITIONS - ALTERNATOR LEAD WIRE

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the shield	The shield is not in its original configuration	Replacement of the alternator	AMM
Damage that goes through the jacket	The area is more than 50 percent of the circumference of the cable	Replacement of the alternator	Subject 20-23-17
	The length is more than 2 inches (50 millimeters)	Replacement of the alternator	AMM
	The length is less than 2 inches (50 millimeters)	Repair of the jacket	Subject 20-23-17
		Replacement of the alternator	AMM
	The area is less than 50 percent of the circumference of the cable	Repair of the jacket	Subject 20-23-17
		Replacement of the alternator	AMM

Table 3
DAMAGE AND REPAIR CONDITIONS - CONNECTOR COMPONENTS

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the backshell	The backshell has corrosion	Replacement of the backshell	Paragraph 2.B.
	The backshell is not in its initial configuration	Replacement of the backshell	Paragraph 2.B.
Damage to the contact	The contact is not in its initial configuration	Replacement of the contact	Paragraph 2.D.
	The contact has corrosion	Replacement of the contact	Paragraph 2.D.

Table 3 DAMAGE AND REPAIR CONDITIONS - CONNECTOR COMPONENTS (Continued)

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the connector shell	The connector shell is not in its initial configuration	Replacement of the connector	Paragraph 2.C.
	The connector shell has corrosion	Replacement of the connector	Paragraph 2.C.
Damage to the connector grommet	The grommet is oil soaked	Replacement of the connector	Paragraph 2.C.
	The grommet is swollen	Replacement of the connector	Paragraph 2.C.
The connector has contamination	The contamination cannot be removed	Replacement of the connector	Paragraph 2.C.
	The contamination can be removed	Cleaning of the connector	Paragraph 3.A.

Table 4
DAMAGE AND REPAIR CONDITIONS - IDENTIFICATION MARKER

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the identification marks	The marks cannot be read	Marker Replacement	Subject 20-23-16

Table 5
DAMAGE AND REPAIR CONDITIONS - SHIELDED CABLE

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the insulation of the component wire	The insulation of the component wires are have damage	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
Damage to the shield	The area of damage on the jacket is equal to or more than 50 percent of the circumference of the cable	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
	The area is less than 50 percent of the circumference of the cable	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17

Table 5 DAMAGE AND REPAIR CONDITIONS - SHIELDED CABLE (Continued)

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage that goes through the jacket	The length is equal to or more than 2 inches (50 millimeters)	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
	The area is equal to or more than 50 percent of the circumference of the cable	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
	The length is less than 2 inches (50 millimeters)	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
		Repair of the jacket	Subject 20-23-17
	The area is less than 50 percent of the circumference of the cable	Replacement of the cable without removal of the old cable	Paragraph 2.F.
		Replacement of the cable with removal of the old cable	Paragraph 2.G.
		Splice of the cable	Subject 20-23-17
		Repair of the jacket	Subject 20-23-17

Table 6
DAMAGE AND REPAIR CONDITIONS - TERMINAL LUG

Type of Damage	Damage Condition	Repair Condition	Procedure
Damage to the terminal lug	The terminal lug is not in its initial configuration	Replacement of the terminal lug	Paragraph 2.E.
	The terminal lug has corrosion	Replacement of the terminal lug	Paragraph 2.E.

2. WIRING COMPONENT REPLACEMENT

A. Applicable Conditions for the Replacement of a Wiring Component

If it is necessary to replace a component, the component must be replaced with a component that:

- Has the same part number
- Is a specified alternative component
- Is an equivalent component.

Refer to the WDM equipment list to find:

- The connector part number
- The backshell part number.

Refer to the WDM wire list to find:

- The wire type
- The wire size
- The wire color
- The wire length.

NOTE: For alternative wires and cables, refer to Subject 20-23-03.

Refer to the Aircraft Illustrated Parts Catalog (AIPC) to find:

- The contact part numbers
- The support bushing part numbers
- The part numbers of alternative connectors.

B. Replacement of a Contact

For the general conditions that are applicable for the replacement of a wiring component, refer to Paragraph 2.A.

(1) Find the contact part number.

Refer to:

- The WDM to find the connector equipment number
- The Aircraft Illustrated Parts Catalog (AIPC) for the contact part number.

(2) Cut the contact at the center of the crimp barrel.

(3) Remove the remaining length of the contact crimp barrel from the end of the wire.

(4) Examine the length of the wire.

(5) If a wire is too short to install a new contact assembly in the connector, replace the wire or cable.

For the replacement of a shielded cable as:

- A temporary repair, refer to Paragraph 2.F.
- A permanent repair, refer to Paragraph 2.G.

NOTE: As an alternative, a new length of wire or cable can be added to the wire or cable with a splice. Refer to Subject 20-23-17.

(6) Assemble the contact. Refer to Subject 20-23-37.

C. Replacement of a Connector

For the general conditions that are applicable for the replacement of a wiring component, refer to Paragraph 2.A.

(1) Find the connector part number.

Refer to:

- The WDM for the part number
- The Aircraft Illustrated Parts Catalog (AIPC) for the alternative connector part number.

(2) Disassemble the connector. Refer to Subject 20-23-37.

(3) Assemble the new connector. Refer to Subject 20-23-37.

D. Replacement of a Backshell

For the general conditions that are applicable for the replacement of a wiring component, refer to Paragraph 2.A.

(1) Find the backshell part number.

Refer to:

- The WDM for the part number
- The Aircraft Illustrated Parts Catalog (AIPC) for the alternative backshell part number.

(2) Disassemble the backshell. Refer to Subject 20-23-37.

(3) Assemble the new backshell. Refer to Subject 20-23-39.

E. Replacement of a Terminal Lug

For the general conditions that are applicable for the replacement of a wiring component, refer to Paragraph 2.A.

(1) Find the terminal lug part number. Refer to the WDM.

(2) Remove the installation nut or the installation bolt that holds the terminal lug.

(3) Remove the heat shrinkable sleeve from the terminal lug and the wire.

(4) Cut the terminal lug at the center of the crimp barrel.

(5) Carefully remove the remaining length of the terminal lug crimp barrel from the conductor.

(6) Examine the length of the wire.

(7) If the wire is too short to install a new terminal lug assembly on the stud, replace the wire or the cable.

For the replacement of a shielded cable as:

- A temporary repair, refer to Paragraph 2.F.
- A permanent repair, refer to Paragraph 2.G.

(8) Assemble the new terminal lug on the wire. Refer to Subject 20-23-32.

F. Replacement of a Shielded Cable - Temporary Repair

For the general conditions that are applicable for this procedure, refer to Paragraph 2.A.

This Paragraph gives the procedure to replace a cable as a temporary repair. For the procedure to replace a cable as a permanent repair, refer to Paragraph 2.G.

CAUTION: REPLACEMENT OF A CABLE WITHOUT REMOVAL OF THE OLD CABLE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED AT THE SUBSEQUENT SCHEDULED AIRPLANE MAINTENANCE.

Table 7
NECESSARY MATERIALS

Material	Specification	Description	Supplier
Tape	A-A-5479	PTFE, Pressure Sensitive	An available source

(1) Make a selection of a tape from Table 7.

NOTE: An equivalent tape is a satisfactory alternative.

(2) Find the identification of the cable with damage.

(3) Find the part numbers of the contacts.

Refer to:

- The WDM to for the connector equipment number
- The Aircraft Illustrated Parts Catalog (AIPC) for the contact part numbers.

(4) Find the cable part number.

For wire type, wire class, wire size and wire length data, refer to the WDM.

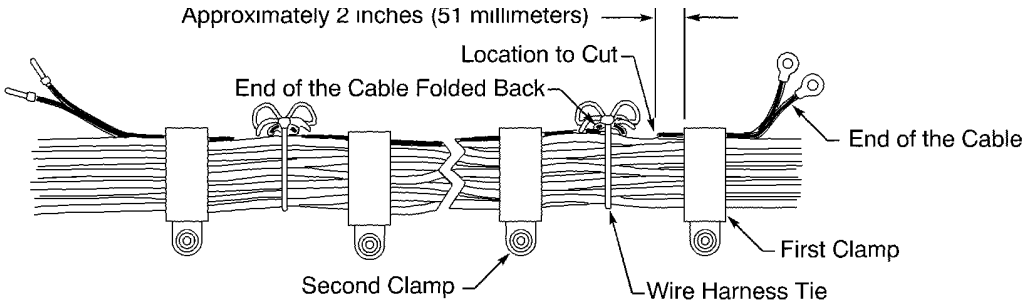
NOTE: An equivalent cable is a satisfactory alternative. Refer to Subject 20-23-03.

NOTE: It is not necessary to have the same wire color.

(5) Disassemble the connector on one end of the cable. Refer to Subject 20-23-37.

(6) Remove the wire harness ties between the end of the cable and the first wire harness clamp.

(7) Cut the cable between the first and second wire harness clamp approximately two inches (51 millimeters) from the first clamp. Refer to Figure 1.



LOCATION TO CUT THE SHIELDED CABLE
Figure 1

(8) Remove the end of cable held by the first clamp.

(9) Wind two layers of tape around the remaining end of the cable.

(10) Fold the end of the cable back on the wire harness.

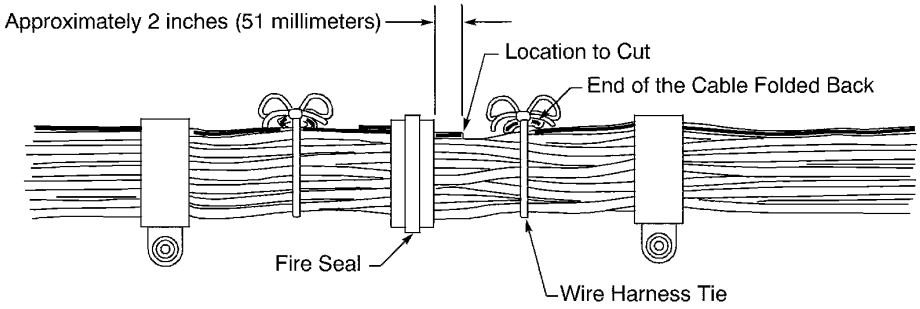
(11) Assemble a wire harness tie on the cable to hold it in its position. Refer to Subject 20-23-30.

(12) Do Step 2.F.(5) through Step 2.F.(11) again for the other end of the cable.

(13) If the damaged cable goes through a fire seal and it is known where the damaged cable goes through the seal:

(a) Remove the wire harness ties between one side of the seal and the first wire harness clamp.

(b) Cut the cable approximately 2 inches (51 millimeters) from the seal. Refer to Figure 2.



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LOCATION TO CUT THE SHIELDED CABLE AT A FIRE SEAL
Figure 2

(c) Wind two layers of tape around the end of the cable.

(d) Fold the end of the wire back against the wire harness.

(e) Assemble a wire harness tie on the end of the cable and the wire harness to hold the end of the cable in its position. Refer to Subject 20-23-30.

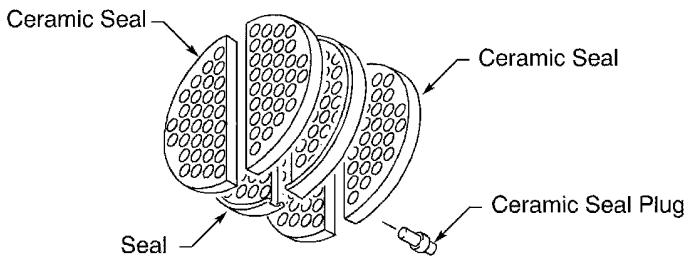
(f) Do Step (a) through Step (e) again on the other side of the seal.

(g) Remove the short piece of cable from the seal.

(h) Put the new cable through the hole in the seal.

(14) If the damaged cable goes through a fire seal and it is not known where the cable goes through the seal:

(a) Disassemble the seal. Refer to Figure 3.



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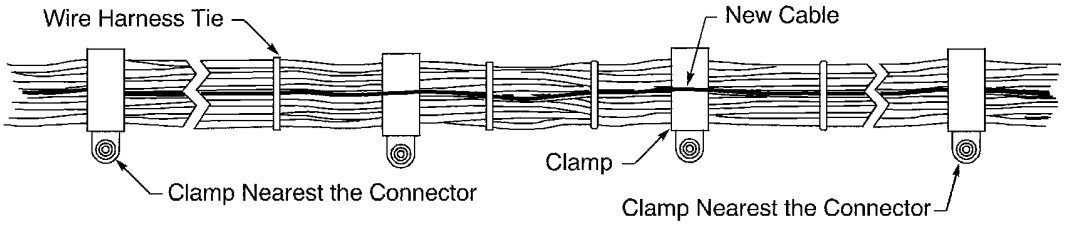
DISASSEMBLY OF THE FIRE SEAL
Figure 3

(b) Remove a ceramic seal plug from the seal. Refer to Figure 3.

(c) Assemble the seal.

(d) Put the new cable through the hole in the seal.

(15) Attach the new cable to the wire harness. Refer to Figure 4.



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INSTALLATION OF A NEW CABLE
Figure 4

(a) Put the new cable along the outer surface of the wire harness and the wire harness clamps.

Make sure that the cable does not touch adjacent components and cannot rub against them.

(b) Put each end of the new cable through the clamp that is nearest the connector at each end of the cable.

(c) Assemble wire harness ties along the new cable. Refer to Subject 20-23-30.

NOTE: It is not necessary to assemble a wire harness tie at a clamp.

(16) Prepare one end of the new cable.

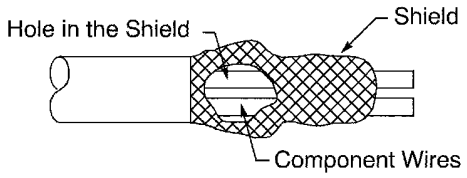
(a) Remove necessary length of the cable jacket.

Make sure that the length of jacket that is removed on the new cable is the same as the length of jacket that is removed on the damaged cable.

(b) Push the shield rearward to expand it at the end of the jacket.

(c) Make a hole in the shield near the end of the cable jacket with a nylon tool. Refer to Figure 5.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE INSULATION OF THE WIRES. DAMAGE TO THE INSULATION CAN CAUSE A SHORT TO OCCUR.



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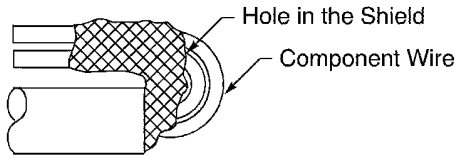
PREPARATION OF THE HOLE IN THE SHIELD
Figure 5

(d) Carefully bend the cable until the component wires can be seen in the hole. Refer to Figure 6.



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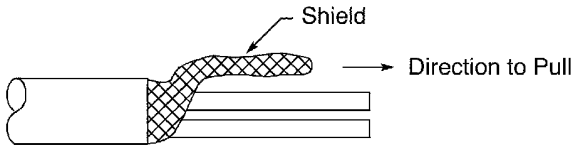
POSITION OF THE COMPONENT WIRES
Figure 6

(e) Pull one wire at a time through the hole in the shield.

(f) Pull the shield tight to make a flat conductor. Refer to Figure 7.



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PREPARATION OF THE SHIELD GROUND WIRE
Figure 7

(g) Assemble the new contacts. Refer to Subject 20-23-37.

(h) Remove the identification marker for each contact from the old wires.

(i) Put the identification marker for each contact on the new wires.

(17) Assemble the connectors at each end of the new cable. Refer to Subject 20-23-37.

G. Replacement of a Shielded Cable - Permanent Repair

For the general conditions that are applicable for this procedure, refer to Paragraph 2.A.

This Paragraph gives the procedure to replace a cable as a permanent repair. For the procedure to replace a cable as a temporary repair, refer to Paragraph 2.F.

(1) Find the identification of the cable that has damage.

(2) Find the part numbers of the contacts.

Refer to:

- The WDM to for the connector equipment number
- The Aircraft Illustrated Parts Catalog (AIPC) for the contact part numbers.

(3) Find the cable part number.

For wire type, wire class, wire size, wire color, and wire length data, refer to the WDM.

Make sure that the new cable is a minimum of 0.75 inch (19 millimeters) longer than the length necessary to connect the connectors on the ends of the cable.

NOTE: An equivalent cable is a satisfactory alternative. Refer to Subject 20-23-03.

(4) Remove the black equipment identification marker from the wire harness.

Make sure to put the identification marker in a safe place.

(5) Disassemble the connector on one end of the cable. Refer to Subject 20-23-37.

(6) Remove the damaged cable from the backshell and the support bushing.

(7) Prepare one end of the new cable.

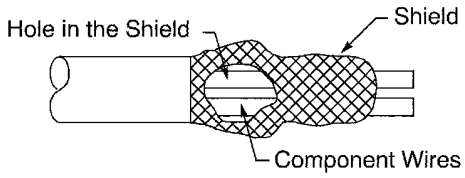
(a) Remove necessary length of the cable jacket.

Make sure that the length of jacket that is removed is the same as the length of jacket that is removed on the damaged cable.

(b) Push the shield rearward to expand it at the end of the jacket.

(c) Make a hole in the shield near the end of the cable jacket with a nylon tool. Refer to Figure 8.

CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE INSULATION OF THE WIRES. DAMAGE TO THE INSULATION CAN CAUSE A SHORT TO OCCUR.



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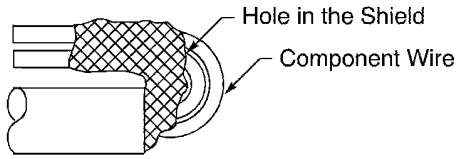
PREPARATION OF THE HOLE IN THE SHIELD
Figure 8

(d) Carefully bend the cable until the component wires can be seen in the hole. Refer to Figure 9.



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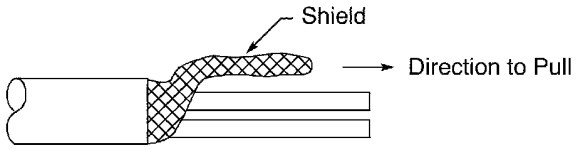
POSITION OF THE COMPONENT WIRES
Figure 9

(e) Pull one wire at a time through the hole in the shield.

(f) Pull the shield tight to make a flat conductor. Refer to Figure 10.



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PREPARATION OF THE SHIELD GROUND WIRE
Figure 10

(g) Assemble the new contacts. Refer to Subject 20-23-37.

(h) Remove the identification marker of each contact from the old wires.

(i) Put the identification marker of each contact on the new wires.

(8) Remove the necessary length of cable from the other end of the cable.

(9) Do Step 2.G.(7) again to prepare the other end of the cable.

(10) Put the ends of the cable through the backshell and the support bushing of each connector.

(11) Assemble the connector. Refer to Subject 20-23-37.

(12) Assemble the backshell. Refer to Subject 20-23-39.

(13) Remove the damaged cable from the wire harness. Refer to Subject 20-23-30.

(14) Install the new cable in the wire harness. Refer to Subject 20-23-30.

(15) Install the black identification marker on the wire harness.

(16) Install the receptacles in the engine bracket. Refer to Subject 20-23-37.

(17) Connect the plug and the receptacle. Refer to Subject 20-23-37.

(18) Do the necessary tests. Refer to the AMM.

3. CLEANING OF ELECTRICAL CONNECTORS

A. Removal of Liquid and Solid Contamination

Table 8
NECESSARY TOOLS

Tool	Specification	Description	Supplier
Brush	-	Solvent Resistant	An available source
Wiper	A-A-59323	Cloth, Lint Free	An available source
Spray Equipment	-	For solvent	An available source

Table 9
SOLVENTS

Specification	Description	Supplier
BDH 10224	Isopropanol, Analar Grade	An available source

(1) Make a selection of these tools from Table 8:

- A wiper
- A brush or a spray equipment.

NOTE: An equivalent tool is a satisfactory alternative.

(2) Make a selection of a solvent from Table 9.

NOTE: An equivalent solvent is a satisfactory alternative.

(3) Apply the solvent to the contamination.

(4) Use the brush or the solvent spray to remove the contamination.

(5) Use a wiper to absorb the used solvent.

NOTE: Clean, dry compressed air is a satisfactory alternative to remove the remaining solvent.

CAUTION: DO NOT USE A COMPRESSED AIR SUPPLY WITH A PRESSURE THAT IS MORE THAN 15 POUNDS PER SQUARE INCH (1.03 BAR). DAMAGE TO THE CONNECTOR CAN OCCUR.

(6) Dry the connector with clean, dry, compressed air.

CAUTION: DO NOT USE A COMPRESSED AIR SUPPLY WITH A PRESSURE THAT IS MORE THAN 15 POUNDS PER SQUARE INCH (1.03 BAR). DAMAGE TO THE CONNECTOR CAN OCCUR.

(7) Examine the connector for remaining contamination.

(8) If the connector has remaining contamination:

(a) Do Step 3.A.(4) through Step 3.A.(6) again.

(b) Examine the connector.

(c) If the connector has remaining contamination, replace the connector. Refer to Paragraph 2.C.

RB 211 TRENT 800 POWER PLANT: REPAIR OF WIRE HARNESS IDENTIFICATION

TABLE OF CONTENTS

RB 211 TRENT 800 POWER PLANT: REPAIR OF WIRE HARNESS IDENTIFICATION

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data of this Subject, refer to Subject 20-23-00.

2. REPLACEMENT OF A DISCONNECT OR A WIRE HARNESS MARKER

A. Location of a Marker

A marker for:

- A disconnect identification that is on the harness near each connector and backshell assembly
- A harness identification marker that is on the wire harness assembly at one location.

B. Replacement of a Marker

Table 1
NECESSARY MATERIALS

Description	Part Number	Supplier
Tape, Electrical, White Glass Cloth	Scotch 69	3M

Table 2
NECESSARY TOOLS

Description	Specification	Supplier
Pen, Ball Point, Black	DIN 16554/2	An available source

(1) Make a selection of a tape from Table 1.

NOTE: An equivalent tape is a satisfactory alternative.

(2) Make a selection of a pen from Table 2.

NOTE: An equivalent pen is a satisfactory alternative.

(3) Record the identification number that is printed on the marker.

(4) Cut the marker along the longitudinal axis of the marker.

(5) Remove the marker.

(6) Put two layers of tape on the wire harness assembly at the location of the old marker.
Make sure that:

- The edge of the tape is perpendicular to the longitudinal axis of the wire harness assembly
- Each layer of tape makes a 100 percent overlap.

(7) Put the identification mark from the old marker on the tape with the pen.

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

TABLE OF CONTENTS

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

1. GENERAL DATA

A. General Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

B. Applicable Conditions for the Repair of a Cable with a Splice

These conditions are applicable for the new length of cable of a splice assembly:

- The cable must be the same type of cable as the initial cable
- The cable have the same color as the initial cable
- The cable can be a specified alternative; refer to Subject 20-23-03.

A splice of a cable is not permitted:

- In a drip loop
- In a generator feeder cable
- In a location where a clamp holds the wire harness
- In a location that makes it necessary to change the position of the wire harness
- At a distance of less than 6.0 inches (150 millimeters) from the strain relief clamp of the connector backshell.

CAUTION: IF THE SPLICE OF A CABLE IS NOT A PERMITTED REPAIR, THE CABLE MUST BE REPLACED.

2. REPAIR OF A CABLE JACKET

A. Repair of the Cable Jacket with Tape

For the conditions that are applicable for this procedure, refer to Subject 20-23-15.

CAUTION: REPAIR OF THE CABLE JACKET IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED AT THE NEXT ENGINE SHOP VISIT.

Table 1
NECESSARY TOOLS

Tool	Description	Part Number or Specification	Supplier
Wiper	Disposable Tissue	7105 Kimwipes	Kimberly-Clark

Table 2
SOLVENTS

Description	Part Number or Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

Table 3
TAPES

Description	Part Number or Specification	Supplier
Polyimide, 1 inch width	Scotch 92	3M
PTFE, 1 inch width	Scotch 62	3M

(1) Make a selection of a wiper from Table 1.

NOTE: An equivalent tool is a satisfactory alternative.

(2) Make a selection of a solvent from Table 2.

NOTE: An equivalent solvent is a satisfactory alternative.

(3) Make a selection of these tapes from Table 3:

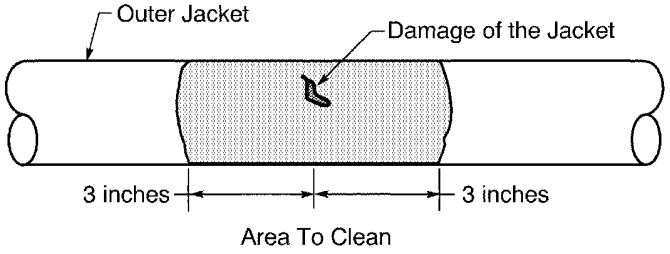
- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

(4) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.

(5) Clean the area of the cable that has damage with solvent and a wiper. Refer to Figure 1.

Make sure to clean a minimum of 3.0 inches (75 millimeters) on each side of the damage.



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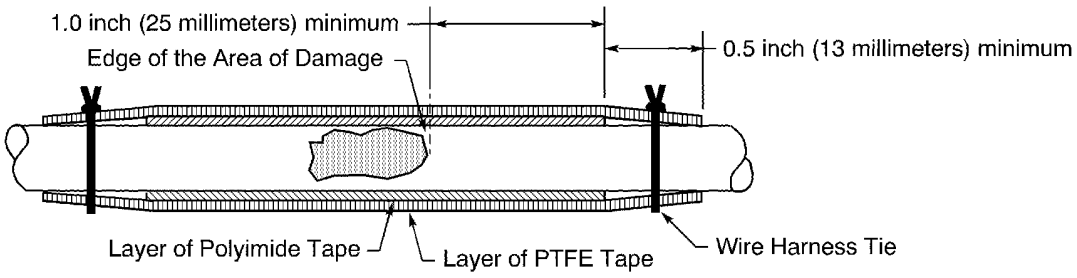
AREA TO CLEAN
Figure 1

(6) Dry the solvent with a wiper.

(7) Wind one layer of polyimide tape on the area with damage. Refer to Figure 2.

Make sure that the layer of tape:

- Starts a minimum of 1.0 inch (25 millimeters) from one side of the damage
- Stops a minimum of 1.0 inch (25 millimeters) from the other side of the damage
- Makes a 20 percent overlap.



INSTALLATION OF THE FIRST LAYER OF TAPE
Figure 2

(8) Wind one layer of PTFE tape on the polyimide tape. Refer to Figure 2.
Make sure that the layer of tape:
- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 20 percent overlap.

(9) Assemble a wire harness tie on each end of the second layer of tape.
Refer to:
- Figure 2
- Subject 20-23-30 for the procedure to assemble a wire harness tie.

(10) Put the wire harness in its initial configuration.

(11) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.

(12) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

3. SELECTION OF A SPLICE ASSEMBLY

A. Selection of a Splice Assembly Configuration

For the conditions that are applicable for:
- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

Table 4
SPLICE ASSEMBLY CONFIGURATIONS

Cable Class	Splice Assembly Configuration	Procedure
1	New length of cable with the connector on the end	Paragraph 4.A.
	New length of cable between the connectors	Paragraph 4.B.
2	New length of cable with the connector on the end	Paragraph 4.C.
	New length of cable between the connectors	Paragraph 4.D.

Table 4 SPLICE ASSEMBLY CONFIGURATIONS (Continued)

Cable Class	Splice Assembly Configuration	Procedure
3	New length of cable with the connector on the end	Paragraph 4.E.
	New length of cable between the connectors	Paragraph 4.F.

B. Splice Component Part Numbers

Table 5
MECHANICAL FERRULE PART NUMBERS

Wire			Inner Ferrule	Outer Ferrule
Part Number or Specification	Size (AWG)	Class		
ESW()-022-006	20	2	BACS13S187BNP	BACS13S281CNP
ESW()-032-006	20	3	BACS13S205BNP	BACS13S312CNP
ESW()-032-012	16	3	BACS13S232BNP	BACS13S348CNP
RTS77084	16	1	BACS13S149BNP	BACS13S232CNP
RTS71445	18	2	BACS13S232BNP	BACS13S348CNP
RTS71446	18	3	BACS13S250BNP	BACS13S375CNP

Table 6
SPLICE PART NUMBERS

Crimp Barrel Size	Part Number	Supplier
22-16	322325	AMP

Table 7
THERMOCOUPLE SPLICE PART NUMBERS

Crimp Barrel Size	Wire Conductor Material	Splice	
		Part Number	Supplier
22-16	Alumel	1-322325-0	AMP
22-16	Chromel	1-322325-1	AMP

C. Necessary Materials

Table 8
SOLVENTS

Description	Part Number or Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

RB 211 TRENT 800 POWER PLANT: REPAIR OF SHIELDED CABLES

Table 9
TAPES

Description	Part Number or Specification	Supplier
Polyimide, 1 inch width	Scotch 92	3M
PTFE, 1 inch width	Scotch 62	3M

Table 10
SHIELD TAPE MATERIAL

Description	Type	Width (inch)	Part Number or Specification	Supplier
Copper Foil Tape	EMI/RFI Foil Shield Tape, conductive adhesive	1 inch	Scotch 1181	3M

Table 11
FIRE RESISTANT SLEEVES

Sleeve	Wire Size (AWG)	Part Number	Supplier
Inner	20	EXSH-1	Raychem
		EXSH-2	Raychem
		TSX 1	Bently Harris
		TSX 2	Bently Harris
		TSX 4	Bently Harris
	18	EXSH-2	Raychem
		TSX 2	Bently Harris
		TSX 4	Bently Harris
	16	EXSH-2	Raychem
		TSX 2	Bently Harris
		TSX 4	Bently Harris
Outer	20	EXSH-2	Raychem
		TSX 2	Bently Harris
		TSX 6	Bently Harris
	18	EXSH-3	Raychem
		TSX 3	Bently Harris
		TSX 6	Bently Harris
	16	EXSH-3	Raychem
		TSX 3	Bently Harris
		TSX 6	Bently Harris

D. Necessary Tools

Table 12
NECESSARY TOOLS

Tool	Description	Part Number or Specification	Supplier
Wiper	Disposable Tissue	7105 Kimwipes	Kimberly-Clark

Table 13
INSULATION REMOVAL TOOLS

Wire Size (AWG)	Removal Tool	
	Part Number	Supplier
22-10	45-092	Ideal

Table 14
FERRULE CRIMP TOOLS

Ferrule	Crimp Tool		
	Basic Unit	Die	
		Die Part Number	Cavity
BACS13S149BNP	M22520/5-01	M22520/5-37	B
BACS13S187BNP	M22520/5-01	M22520/5-43	B
BACS13S205BNP	M22520/5-01	M22520/5-19	B
BACS13S232BNP	M22520/5-01	M22520/5-45	A
BACS13S232CNP	M22520/5-01	M22520/5-45	A
BACS13S250BNP	M22520/5-01	M22520/5-45	A
BACS13S281CNP	M22520/5-01	M22520/5-41	A
BACS13S312CNP	M22520/5-01	M22520/5-39	A
BACS13S348CNP	M22520/5-01	M22520/5-35	A
BACS13S375CNP	M22520/5-01	M22520/5-47	A

Table 15
SPLICE CRIMP TOOLS

Crimp Barrel Size	Crimp Tool	Supplier
22-18	46673	AMP

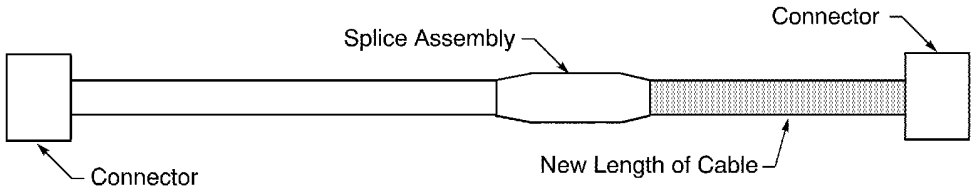
4. REPAIR OF A SHIELDED CABLE WITH A SPLICE

A. Class 1 Cable - New Length of Cable with the Connector on the End

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.



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SPLICE WITH A NEW LENGTH OF CABLE WITH THE CONNECTOR ON THE END
Figure 3

Refer to Figure 3.

(1) Find the cable part number. Refer to the WDM.

NOTE: For alternative cables, refer to Subject 20-23-03.

(2) Make a selection of a wiper from Table 12.

NOTE: An equivalent wiper is a satisfactory alternative.

(3) Make a selection of a solvent from Table 8.

NOTE: An equivalent solvent is a satisfactory alternative.

(4) Make a selection of a shield tape material from Table 10.

NOTE: An equivalent shield tape material is a satisfactory alternative.

(5) Make a selection of these tapes from Table 9:

- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

(6) Make a selection these fire resistant sleeves from Table 11:

- An inner sleeve
- An outer sleeve.

NOTE: An equivalent sleeve is a satisfactory alternative.

(7) Make a selection of two inner ferrules and two outer ferrules from Table 5.

(8) Make a selection of a insulation removal tool from Table 13.

(9) Make a selection of a ferrule crimp tool from Table 14.

(10) Make a selection of a splice crimp tool from Table 15.

(11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.

(12) Find the location on the damaged cable to put the cable splice.

Make sure that the location of the splice is in a permitted location; refer to Subject 20-23-15.

(13) Cut the cable.

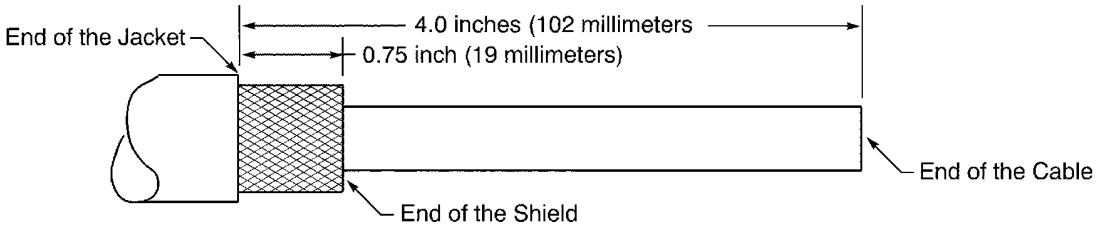
Make sure that area of the cable with damage is fully removed.

(14) Clean the end of the cable with solvent and a wiper.

Make sure to clean a minimum of 12.0 inches (305 millimeters) from the end of the cable.

(15) Prepare the end of the damaged cable.

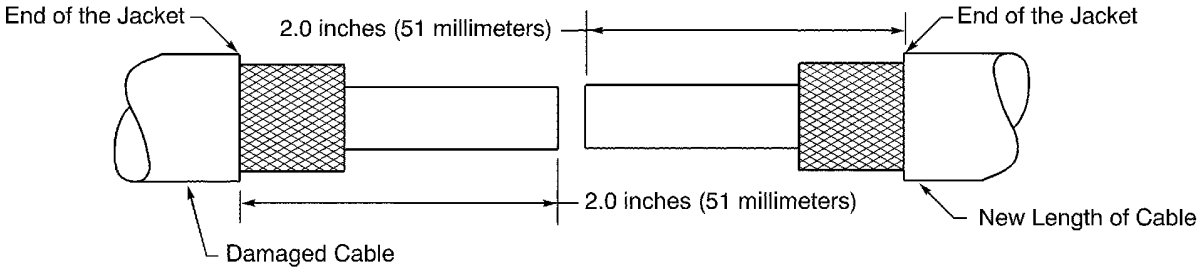
(a) Remove 4.0 inches (102 millimeters) of the jacket from the end of the cable. Refer to Figure 4.



JACKET REMOVAL
Figure 4

(b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 4.

(c) Remove the necessary length of the component wire to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 5.



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CABLE PREPARATION
Figure 5

(16) Do Step 4.A.(15) again for one end of the new length of cable.

(17) Put the mechanical ferrules on the cables.

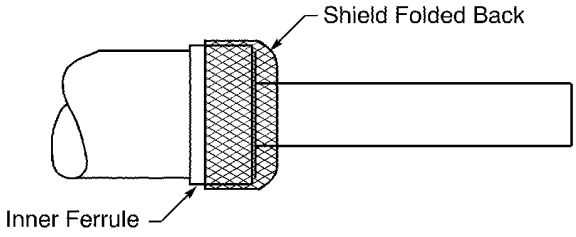
(a) Put the inner and outer ferrules on the end of each cable in this sequence:

- The outer ferrule
- The inner ferrule.

(b) Move the outer ferrules back on the cable away from the splice area.

(18) Install the inner ferrule on the end of the cable.

(a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 6.



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INSTALLATION OF THE INNER FERRULE
Figure 6

(b) Crimp the inner ferrule.

(19) Fold the shield back on the inner ferrule.

Make sure that:

- The shield is smooth
- The strands are symmetrical around the circumference of the ferrule.

(20) Do Step 4.A.(18) through Step 4.A.(19) again for each inner ferrule on each cable.

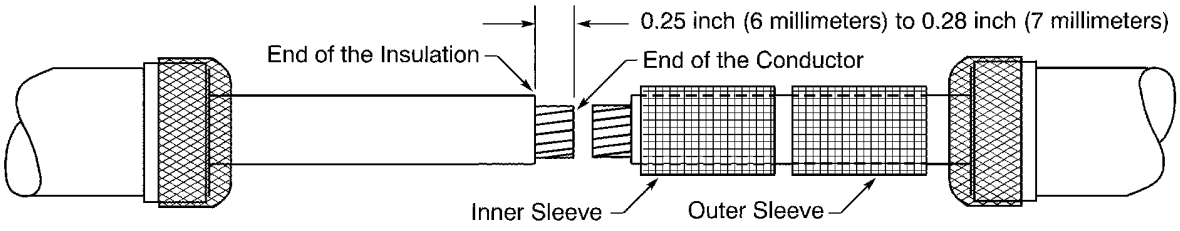
(21) Put the fire resistant sleeves on the component wire in this sequence:

- The inner sleeve
- The outer sleeve.

Refer to Figure 7.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient to extend farther than each end of the splice.



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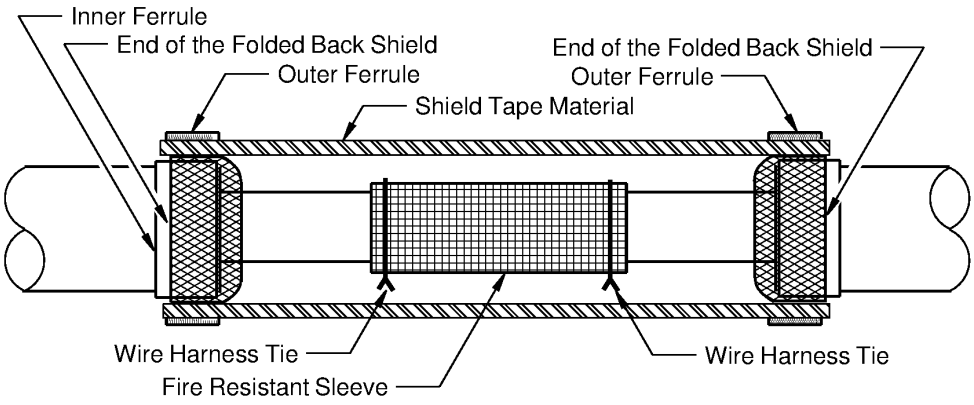
WIRE PREPARATION
Figure 7

(22) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end of the component wire. Refer to Figure 7.

(23) Put the new length of cable in its position for the assembly of the cable splice.

(24) Assemble a splice of the each component wire. Refer to Figure 8.



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ASSEMBLY OF THE CONDUCTOR SPLICE
Figure 8

(a) Put a conductor in each end of the splice.

Make sure all of the strands are in the crimp barrel.

(b) Crimp the splice.

(c) Lightly pull each conductor to make sure that they are held tightly in the splice.

(d) Move the inner fire resistant sleeve on the splice.

Make sure that the center of the sleeve is aligned with the center of the splice.

(e) Move the outer fire resistant sleeve on the inner sleeve.

Make sure that the center of the sleeve is aligned with the center of the splice.

(f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(25) Wind a layer of shield tape material on the splice area. Refer to Figure 8.

Make sure that the layer of shield tape material:

- Starts at the end of the folded back shield on one end of the splice assembly
- Ends at the end of the folded back shield on the other end of the splice assembly
- Makes a 0.5 inch (13 millimeters) overlap.

(26) Move the outer ferrule into its position on the inner ferrule.

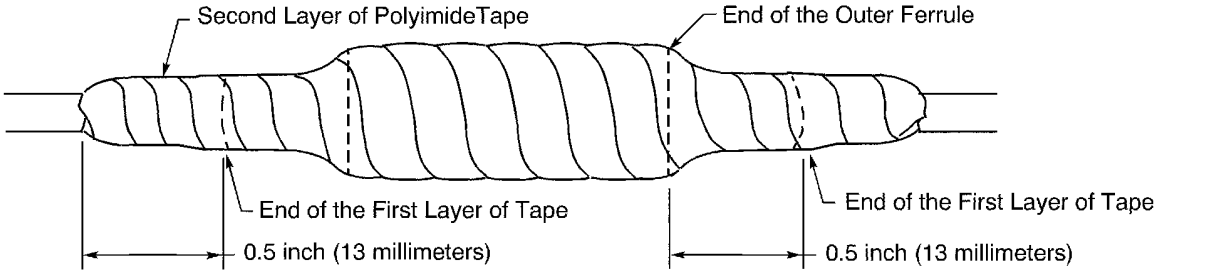
(27) Crimp the outer ferrule.

(28) Remove the shield tape material that extends farther than the rear end of each outer ferrule.

(29) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 9.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
- Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
- Makes a 50 percent overlap.



2447840 S00061544824_V1

INSTALLATION OF THE LAYERS OF POLYIMIDE TAPE
Figure 9

(30) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 9.

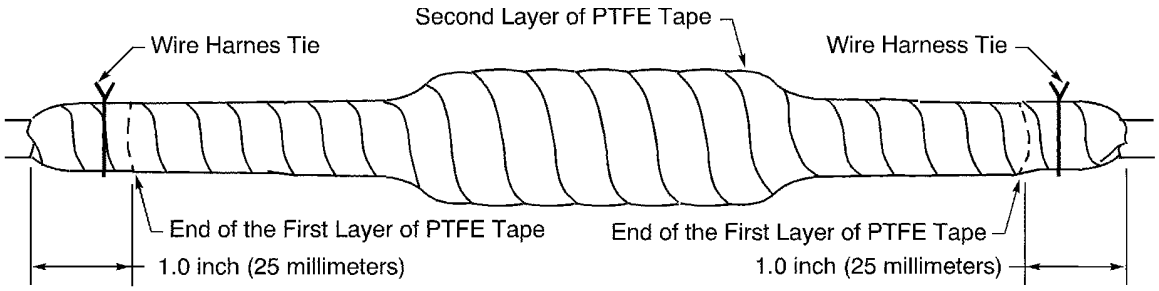
Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

(31) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 10.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the one end of the layer of the polyimide tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the layer of polyimide tape
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF PTFE TAPE
Figure 10

(32) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 10.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of PTFE tape
- Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
- Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
- Makes a 50 percent overlap.

(33) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(34) Put the wire harness in its initial configuration.

(35) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.

(36) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

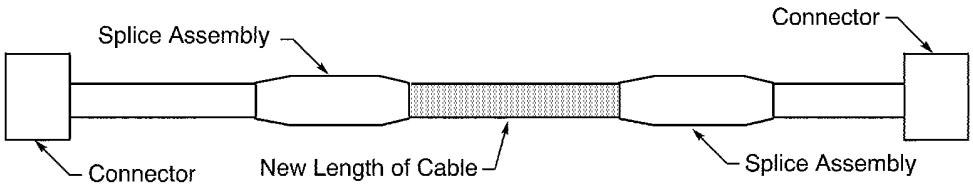
B. Class 1 Cable - New Length of Cable Between the Connectors

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.

NOTE: The procedure to assemble a splice with a new length of cable with the connector on the end is a satisfactory alternative to this procedure. Refer to Paragraph 4.A.



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SPLICE WITH A NEW LENGTH OF CABLE BETWEEN THE CONNECTORS
Figure 11

Refer to Figure 11.

(1) Find the cable part number. Refer to the WDM.

NOTE: For alternative cables, refer to Subject 20-23-03.

(2) Make a selection of a wiper from Table 12.

NOTE: An equivalent wiper is a satisfactory alternative.

(3) Make a selection of a solvent from Table 8.

NOTE: An equivalent solvent is a satisfactory alternative.

(4) Make a selection of a shield tape material from Table 10.

NOTE: An equivalent shield tape material is a satisfactory alternative.

(5) Make a selection of these tapes from Table 9:

- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

(6) Make a selection these fire resistant sleeves from Table 11:

- An inner sleeve
- An outer sleeve.

NOTE: An equivalent sleeve is a satisfactory alternative.

(7) Make a selection of four inner ferrules and four outer ferrules from Table 5.

(8) Make a selection of a insulation removal tool from Table 13.

(9) Make a selection of a ferrule crimp tool from Table 14.

(10) Make a selection of a splice crimp tool from Table 15.

(11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.

(12) Find the location on the damaged cable to put the cable splice.

Make sure that the location of the splice on each end of the splice assembly is in a permitted location; refer to Subject 20-23-15.

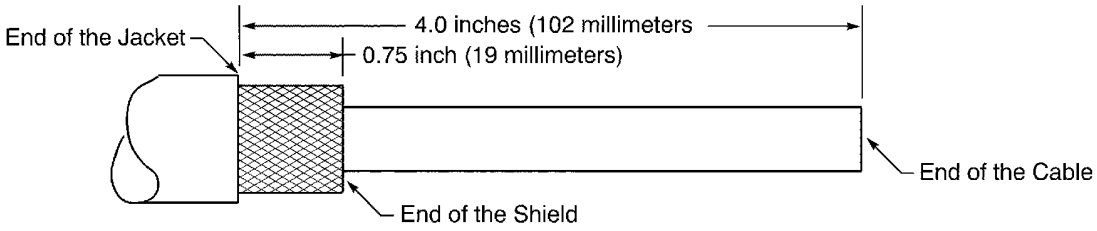
(13) Cut the cable on each side of the area with damage.

(14) Clean the ends of the cable with solvent and a wiper.

Make sure to clean a minimum of 12.0 inches (305 millimeters) from the end of the cable.

(15) Prepare the ends of the damaged cable and the new length of cable.

(a) Remove 4.0 inches (102 millimeters) of the jacket from the end of the cable. Refer to Figure 12.

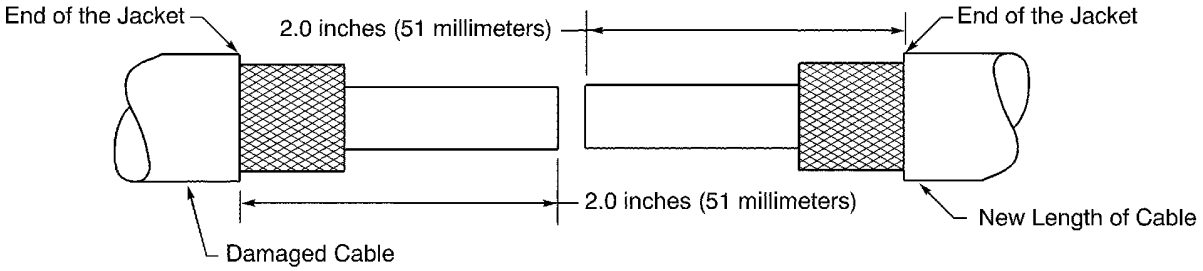


2447854 S00061544819_V1

JACKET REMOVAL
Figure 12

(b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 12.

(c) Remove the necessary length of the component wire to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 13.



2447855 S00061544820_V1

CABLE PREPARATION
Figure 13

(d) Do Step (a) through Step (c) again for the other end of the damaged cable and the ends of the new length of cable.

(16) Put the mechanical ferrules on the cables.

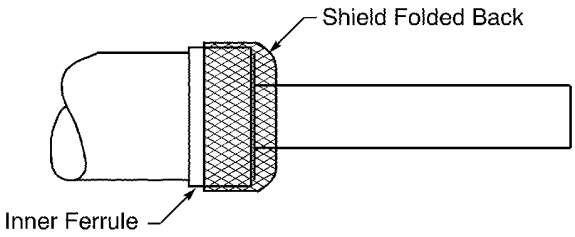
(a) Put an inner and outer ferrule on the end of each cable in this sequence:

- The outer ferrule
- The inner ferrule.

(b) Move the outer ferrules back on the cables away from the splice area.

(17) Install the inner ferrule on the end of the cable.

(a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 14.



2447860 S00061544821_V1

INSTALLATION OF THE INNER FERRULE
Figure 14

(b) Crimp the inner ferrule.

(18) Fold the shield back on the inner ferrule.

Make sure that:

- The shield is smooth
- The strands are symmetrical around the circumference of the ferrule.

(19) Do Step 4.B.(17) through Step 4.B.(18) again for each inner ferrule on each cable.

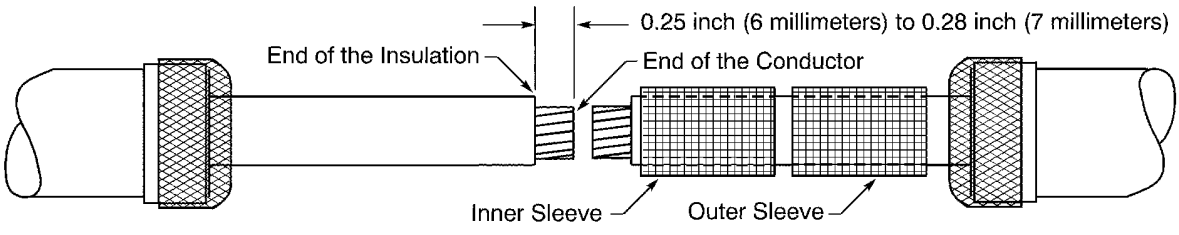
(20) Put necessary length of fire resistant sleeves on the component wire in this sequence:

- The outer sleeve
- The inner sleeve.

Refer to Figure 15.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.



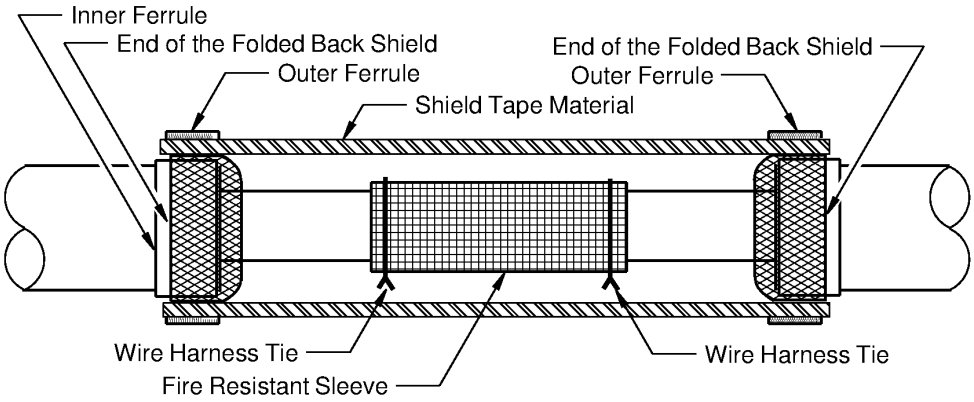
2447856 S00061544822_V1

WIRE PREPARATION
Figure 15

(21) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end of the component wire. Refer to Figure 15.

(22) Put the new length of cable in its position for the cable splice.

(23) Assemble a splice of the component wire. Refer to Figure 16.



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ASSEMBLY OF THE CONDUCTOR SPLICE
Figure 16

(a) Put a conductor in each end of the splice.

Make sure that all of the strands are in the crimp barrel.

(b) Crimp the splice.

(c) Lightly pull each conductor to make sure that they are held tightly in the splice.

(d) Move the inner fire resistant sleeve on the splice.

Make sure that the center of the sleeve is aligned with the center of the splice.

(e) Move the outer fire resistant sleeve on the inner sleeve.

Make sure that the center of the sleeve is aligned with the center of the splice.

(f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(24) Wind a layer of shield tape material on the splice area. Refer to Figure 16.

Make sure that the layer of shield tape material:

- Starts at the end of the folded back shield on one end of the splice
- Ends at the end of the folded back shield on the other end of the splice assembly
- Makes a 0.5 inch (13 millimeters) overlap.

(25) Move the outer ferrule into its position on the inner ferrule.

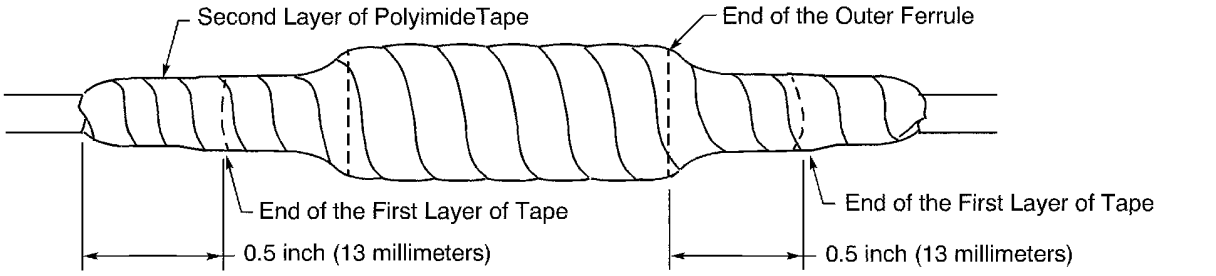
(26) Crimp the outer ferrule.

(27) Remove the shield tape material that extends farther than the rear end of each outer ferrule.

(28) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 17.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
- Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
- Makes a 50 percent overlap.



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INSTALLATION OF THE LAYERS OF POLYIMIDE TAPE
Figure 17

(29) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 17.

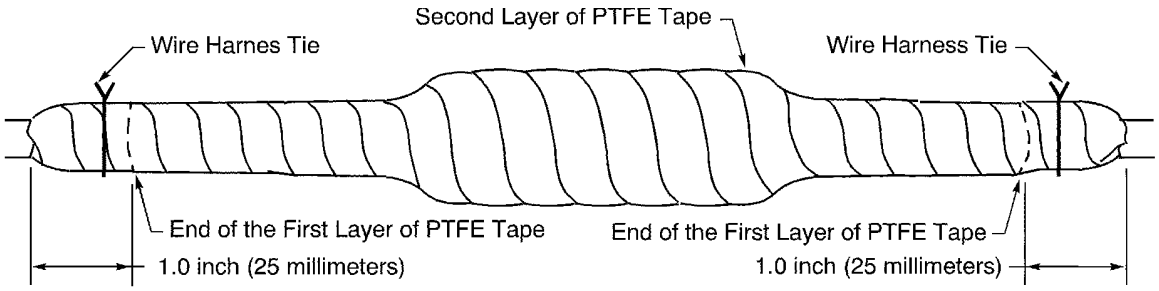
Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

(30) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 18.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the end of the layer of polyimide tape at one end of the splice assembly
- Stops a minimum of 0.5 inch (13 millimeters) from the end of the polyimide tape at the other end of the splice assembly
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF PTFE TAPE
Figure 18

(31) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 18.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of PTFE tape
- Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
- Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
- Makes a 50 percent overlap.

(32) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(33) Put the wire harness in its initial configuration.

(34) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.

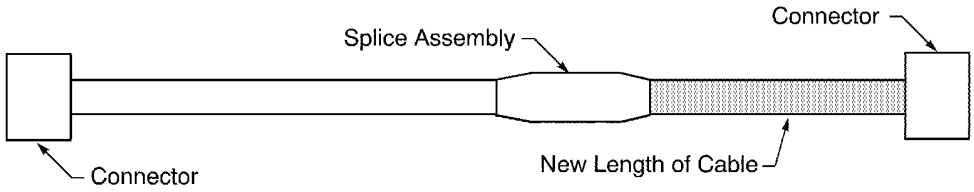
(35) Do an insulation resistance of the component wires in the cable. Refer to Paragraph 5.B.

C. Class 2 Cable - New Length of Cable with the Connector on the End

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.



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SPLICE WITH A NEW LENGTH OF CABLE WITH THE CONNECTOR ON THE END
Figure 19

Refer to Figure 19.

(1) Find the cable part number. Refer to the WDM.

NOTE: For alternative cables, refer to Subject 20-23-03.

(2) Make a selection of a wiper from Table 12.

NOTE: An equivalent wiper is a satisfactory alternative.

(3) Make a selection of a solvent from Table 8.

NOTE: An equivalent solvent is a satisfactory alternative.

(4) Make a selection of a shield tape material from Table 10.

NOTE: An equivalent shield tape material is a satisfactory alternative.

(5) Make a selection of these tapes from Table 9:

- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

(6) Make a selection these fire resistant sleeves from Table 11:

- An outer sleeve
- An inner sleeve.

NOTE: An equivalent sleeve is a satisfactory alternative.

(7) Make a selection of two inner ferrules and two outer ferrules from Table 5.

(8) Make a selection of a insulation removal tool from Table 13.

(9) Make a selection of a ferrule crimp tool from Table 14.

(10) Make a selection of a splice crimp tool from Table 15.

(11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.

(12) Find the location on the damaged cable to put the cable splice.

Make sure that the location of the splice on each end of the splice assembly is in a permitted location; refer to Subject 20-23-15.

(13) Cut the cable.

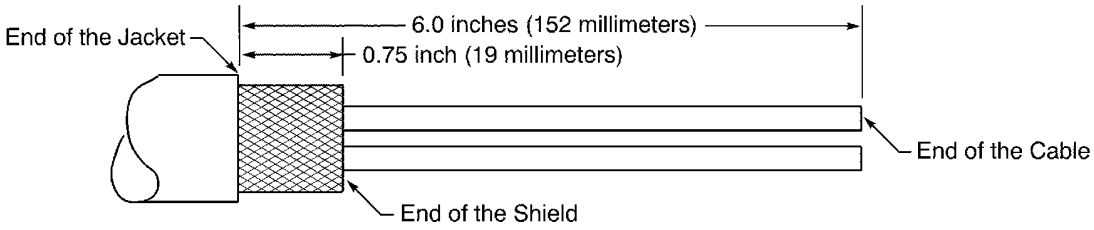
Make sure that area of the cable with damage is removed.

(14) Clean the end of the cable with solvent and a wiper.

Make sure to clean a minimum of 12.0 inches (305 millimeters) from the end of the cable.

(15) Prepare the ends of the damaged cable.

(a) Remove 6.0 inches (152 millimeters) of the jacket from the end of the cable. Refer to Figure 20.



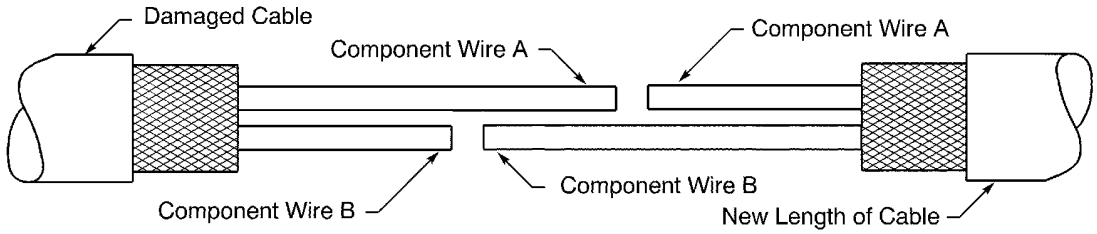
2447836 S00061544827_V1

JACKET REMOVAL
Figure 20

(b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 20.

(c) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 21 and Figure 22.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



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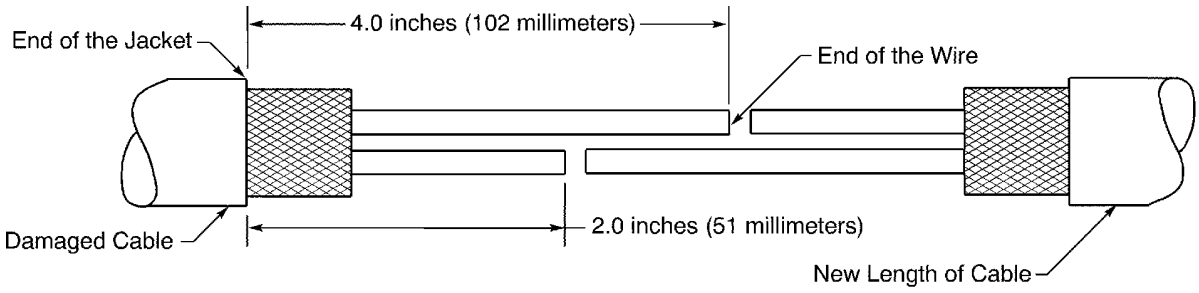
COMPONENT WIRE CONFIGURATION
Figure 21



CABLE PREPARATION
Figure 22

(d) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 21 and Figure 22.

(16) Prepare the new length of cable.

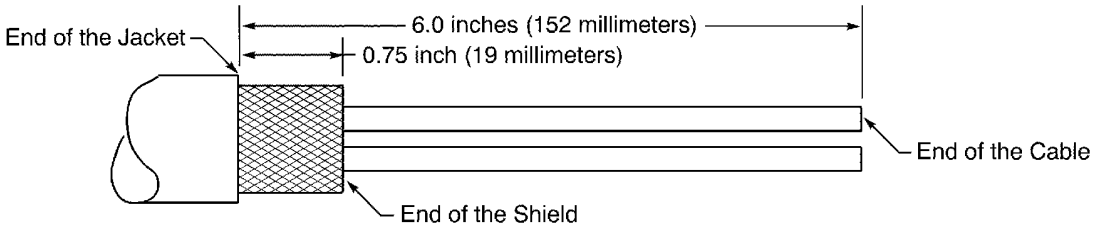
(a) Cut the necessary length of cable.

Make sure that the length is 12.0 inches (305 millimeters) longer than the distance between the two ends of the damaged cable.

(b) Clean the ends of the cable with solvent and a wipe.

Make sure to clean a minimum of 12.0 inches (305 millimeters) from each end of the cable.

(c) Remove 6.0 inches (152 millimeters) of the jacket from the end of the cable. Refer to Figure 23.

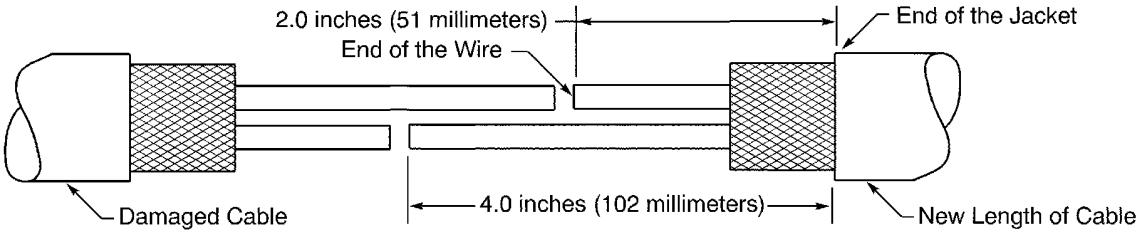


JACKET REMOVAL
Figure 23

(d) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 23.

(e) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 21 and Figure 24.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



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CABLE PREPARATION
Figure 24

(f) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 21 and Figure 24.

(17) Put the mechanical ferrules on the end of each cable.

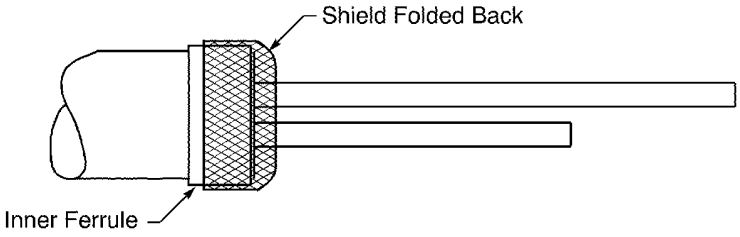
(a) Put the ferrules on the end of the cables in this sequence:

- The outer ferrule
- The inner ferrule.

(b) Move the ferrules back on the cable away from the splice area.

(18) Install the inner ferrule on the end of the cable.

(a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 25.



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INSTALLATION OF THE INNER FERRULE
Figure 25

(b) Crimp the inner ferrule.

(19) Fold the shield back on the inner ferrule.

Make sure that:

- The shield is smooth
- The strands are symmetrical around the circumference of the ferrule.

(20) Do Step 4.C.(18) through Step 4.C.(19) again for the inner ferrule on each cable.

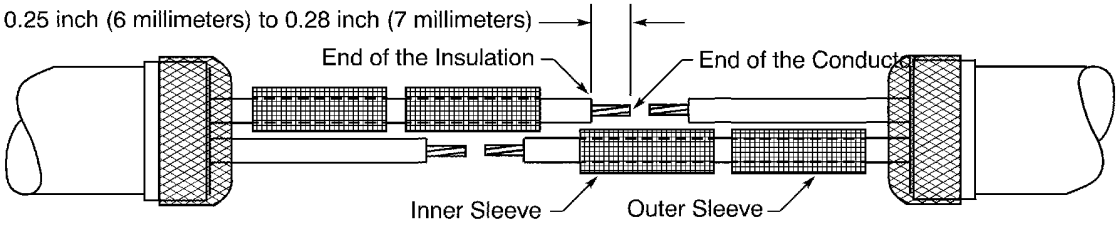
(21) Put the necessary lengths of fire resistant sleeves on the longest component wire of the new length of cable in this sequence:

- The outer layer
- The inner layer.

Refer to Figure 26.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient to extend farther than each end of the splice.



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POSITION OF THE FIRE RESISTANT SLEEVES
Figure 26

(22) Put the necessary lengths of fire resistant sleeves on the longest component wire of the damaged cable in this sequence:

- The outer layer
- The inner layer.

Refer to Figure 26.

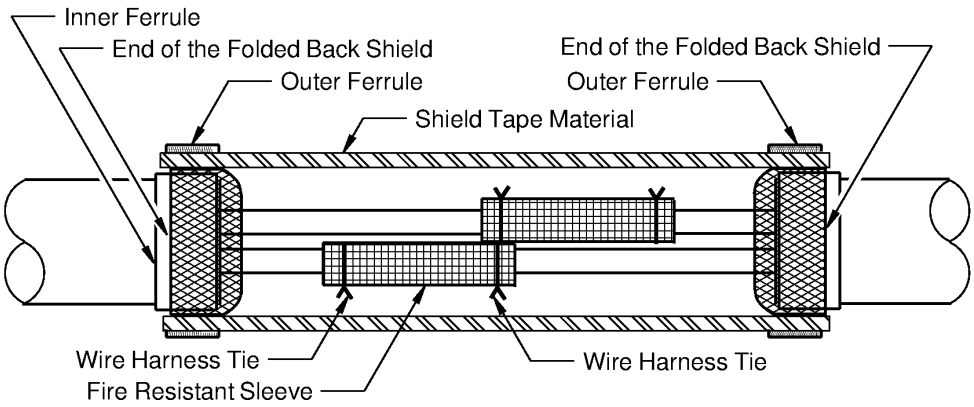
Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient to extend farther than each end of the splice.

(23) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end of each component wire. Refer to Figure 26.

(24) Put the new length of cable in position for the assembly of the cable splice.

(25) Assemble a splice of the each component wire. Refer to Figure 27.



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ASSEMBLY OF THE CONDUCTOR SPLICE
Figure 27

(a) Put a conductor in each end of the splice.

Make sure all of the strands are in the crimp barrel.

(b) Crimp the splice.

(c) Lightly pull each conductor to make sure that they are held tightly in the splice.

(d) Move the inner fire resistant sleeve on the splice.

Make sure that the center of the sleeve is aligned with the center of the splice.

(e) Move the outer fire resistant sleeve on the inner sleeve.

Make sure that the center of the sleeve is aligned with the center of the splice.

(f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(26) Wind a layer of shield tape material on the splice area. Refer to Figure 27.

Make sure that the layer of shield tape material:

- Starts at the end of the folded back shield on one end of the splice
- Ends at the end of the folded back shield on the other end of the splice assembly
- Makes a 0.5 inch (13 millimeters) overlap.

(27) Move the outer ferrule into its position on the inner ferrule.

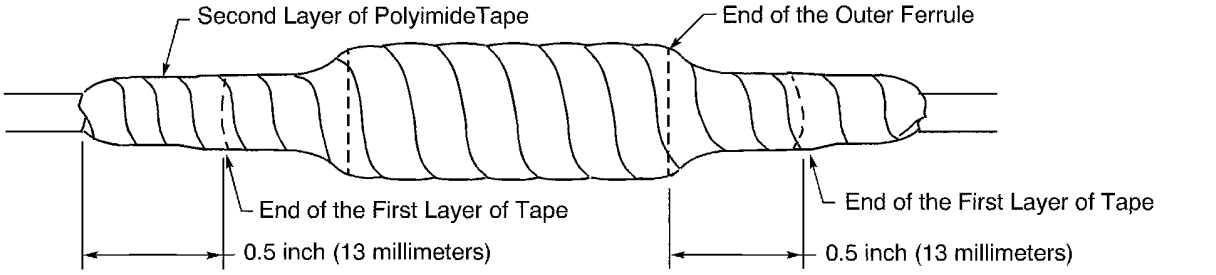
(28) Crimp the outer ferrule.

(29) Remove the shield tape material that extends farther than the rear end of each outer ferrule.

(30) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 28.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
- Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
- Makes a 50 percent overlap.



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INSTALLATION OF THE LAYERS OF POLYIMIDE TAPE
Figure 28

(31) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 28.

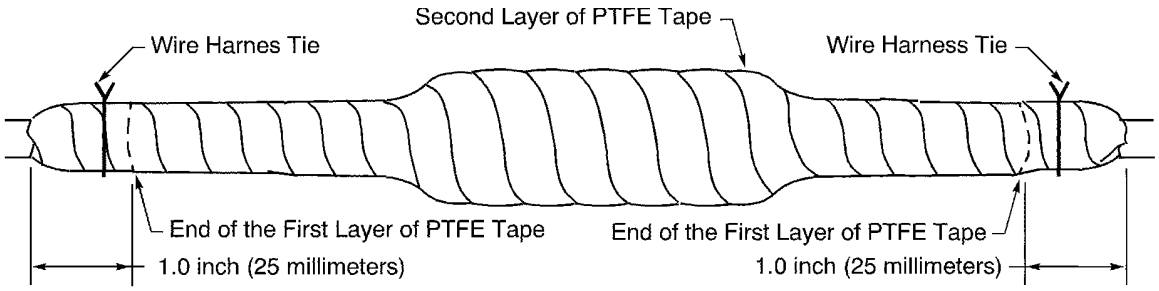
Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

(32) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 29.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the end of the layer of polyimide tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the layer of polyimide tape
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF PTFE TAPE
Figure 29

(33) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 29.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of PTFE tape
- Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
- Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
- Makes a 50 percent overlap.

(34) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(35) Prepare the end of the new length of cable.

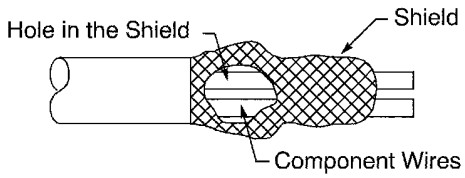
(a) Remove necessary length of the cable jacket.

Make sure that the length of jacket that is removed on the new cable segment is the same as the length of jacket that is removed on the damaged cable.

(b) Push the shield rearward to expand it at the end of the jacket.

(c) Make a hole in the shield near the end of the cable jacket with a nylon tool. Refer to Figure 30.

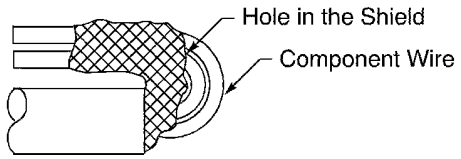
CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE INSULATION OF THE WIRES. DAMAGE TO THE INSULATION CAN CAUSE A SHORT TO OCCUR.



2447822 S00061544808_V1

PREPARATION OF THE HOLE IN THE SHIELD
Figure 30

(d) Carefully bend the cable until the component wires can be seen in the hole. Refer to Figure 31.

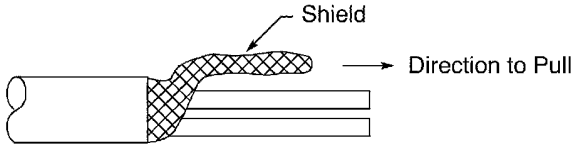


2447823 S00061544809_V1

POSITION OF THE COMPONENT WIRES
Figure 31

(e) Pull one wire at a time through the hole in the shield.

(f) Pull the shield tight to make a flat conductor. Refer to Figure 32.



2447824 S00061544810_V1

PREPARATION OF THE SHIELD GROUND WIRE
Figure 32

(g) Assemble the new contacts. Refer to Subject 20-23-37.

(h) Remove the identification marker for each contact from the old wires.

(i) Put the identification marker for each contact on the new wires.

(36) Disassemble the connector on the end of the damaged cable. Refer to Subject 20-23-37.

(37) Remove the damaged cable from the wire harness clamps.

(38) Put the wire harness in its initial configuration.

(39) Assemble the connector. Refer to Subject 20-23-37.

(40) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.

(41) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

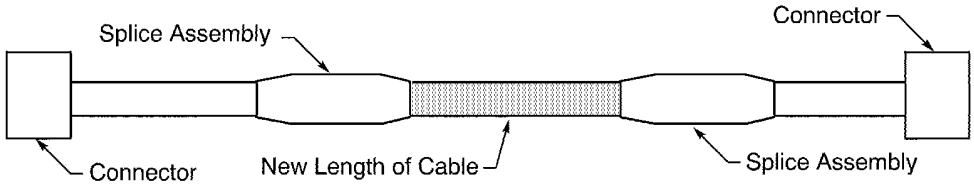
D. Class 2 Cable - New Length of Cable Between the Connectors

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.

NOTE: The procedure to assemble a splice with a new length of cable with the connector on the end is a satisfactory alternative to this procedure. Refer to Paragraph 4.C.



2447887 S00061544826_V1

SPLICE WITH A NEW LENGTH OF CABLE BETWEEN THE CONNECTORS
Figure 33

Refer to Figure 33.

(1) Find the cable part number. Refer to the WDM.

NOTE: For alternative cables, refer to Subject 20-23-03.

(2) Make a selection of a wiper from Table 12.

NOTE: An equivalent wiper is a satisfactory alternative.

(3) Make a selection of a solvent from Table 8.

NOTE: An equivalent solvent is a satisfactory alternative.

(4) Make a selection of a shield tape material from Table 10.

NOTE: An equivalent shield tape material is a satisfactory alternative.

(5) Make a selection of these tapes from Table 9:

- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

(6) Make a selection these fire resistant sleeves from Table 11:

- An inner sleeve
- An outer sleeve.

NOTE: An equivalent sleeve is a satisfactory alternative.

(7) Make a selection of four inner ferrules and four outer ferrules from Table 5.

(8) Make a selection of a insulation removal tool from Table 13.

(9) Make a selection of a ferrule crimp tool from Table 14.

(10) Make a selection of a splice crimp tool from Table 15.

(11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.

(12) Find the location on the damaged cable to put the cable splice.

Make sure that the location of the splice on each end of the splice assembly is in a permitted location; refer to Subject 20-23-15.

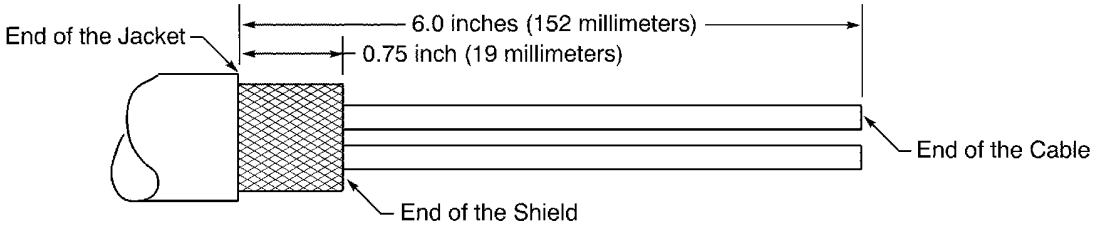
(13) Cut the damaged cable on each side of the area with damage.

(14) Clean the ends of the damaged cable with solvent and a wiper.

Make sure to clean a minimum of 12.0 inches (305 millimeters) from each end of the cable.

(15) Prepare the ends of the damaged cable.

(a) Remove 6.0 inches (152 millimeters) of the jacket from the end of the cable. Refer to Figure 34.



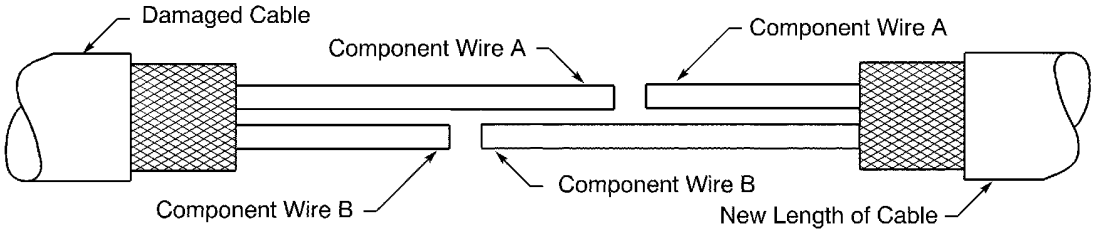
2447836 S00061544827_V1

JACKET REMOVAL
Figure 34

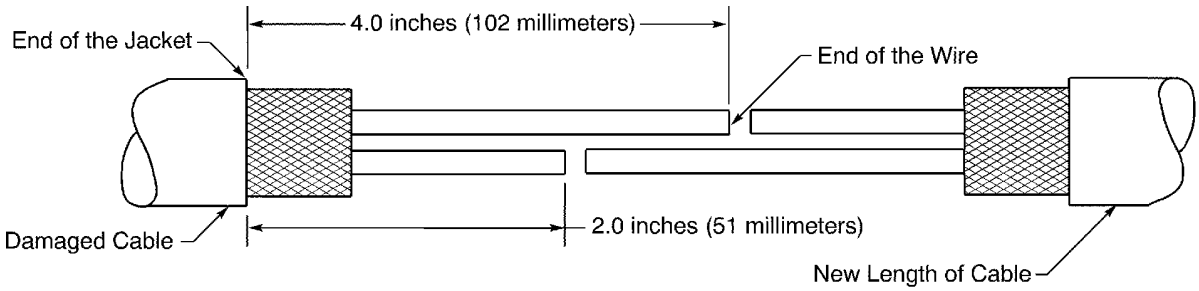
(b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 34.

(c) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 35 and Figure 36.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



COMPONENT WIRE CONFIGURATION
Figure 35



CABLE PREPARATION
Figure 36

(d) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 35 and Figure 36.

(e) Do Step (a) through Step (d) again for the other end of the cable.

(16) Prepare the new length of cable. Refer to Figure 34.

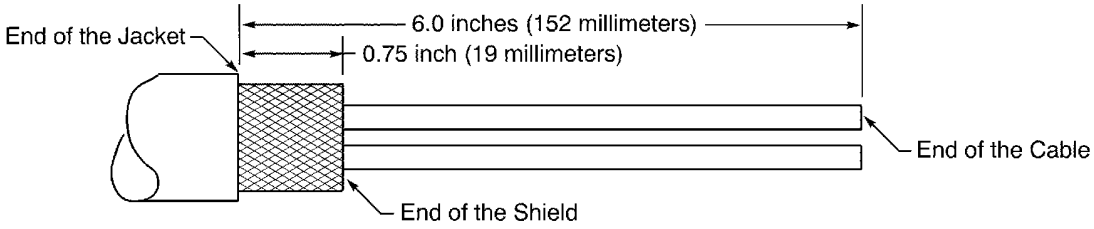
(a) Cut the necessary length of cable.

Make sure that the length is 12.0 inches (305 millimeters) longer than the distance between the two ends of the damaged cable.

(b) Clean the ends of the cable with solvent and a wiper.

Make sure to clean a minimum of 12.0 inches (305 millimeters) from each end of the cable.

(c) Remove 6.0 inches (152 millimeters) of the jacket from the end of the cable. Refer to Figure 37.

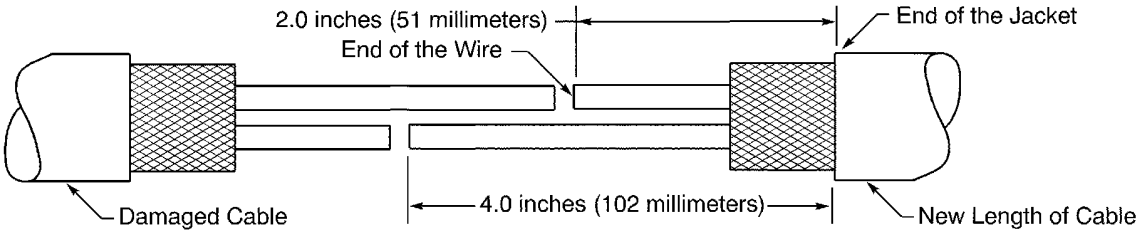


JACKET REMOVAL
Figure 37

(d) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 34.

(e) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 35 and Figure 38.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



CABLE PREPARATION
Figure 38

(f) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 35 and Figure 38.

(g) Do Step (c) through Step (f) again for the other end of the new length of cable.

(17) Put the mechanical ferrules on the cables.

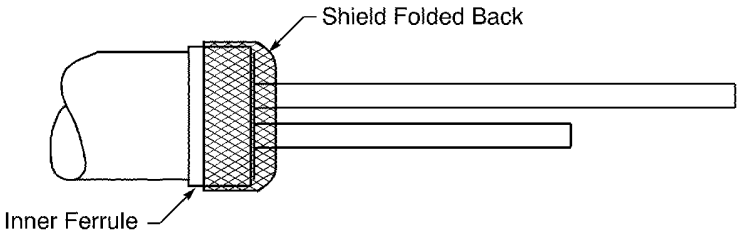
(a) Put an inner and outer ferrule on the end of each cable in this sequence:

- The outer ferrule
- The inner ferrule.

(b) Move the outer ferrules back on the cables away from the splice area.

(18) Install the inner ferrule on the end of the cable.

(a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 39.



2447846 S00061544831_V1

INSTALLATION OF THE INNER FERRULE
Figure 39

(b) Crimp the inner ferrule.

(19) Fold the shield back on the inner ferrule.

Make sure that:

- The shield is smooth
- The strands are symmetrical around the circumference of the ferrule.

(20) Do Step 4.D.(18) through Step 4.D.(19) again for each inner ferrule on each cable.

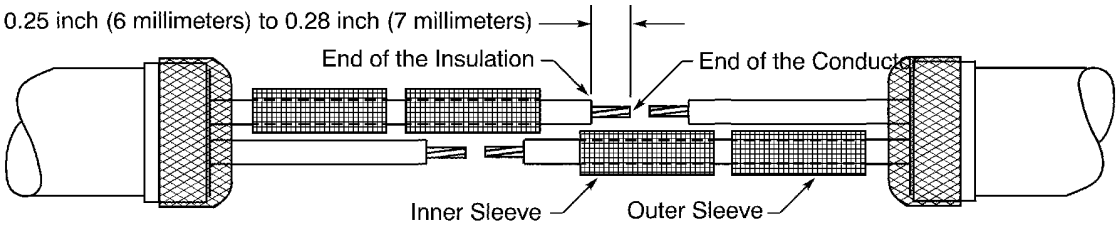
(21) Put necessary length of fire resistant sleeves on the component wire of the new length of cable in this sequence:

- The outer sleeve
- The inner sleeve.

Refer to Figure 40.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.



2447838 S00061544832_V1

POSITION OF THE FIRE RESISTANT SLEEVES
Figure 40

(22) Put necessary length of fire resistant sleeves on the component wire of the damaged cable in this sequence:

- The outer sleeve
- The inner sleeve.

Refer to Figure 40.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.

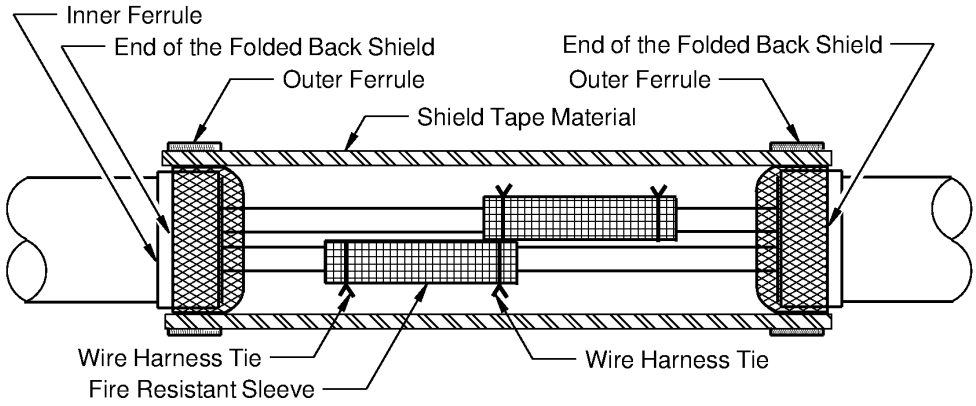
(23) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end of the component wire. Refer to Figure 40.

(24) Put the new length of cable in its position for the assembly of the cable splice.

Make sure that:

- The component wires on the new length of cable are aligned with the same color of the component wires of the damaged cable
- The shorter component wire of the new length of cable is aligned with the longer component wire of the damaged cable.

(25) Assemble a splice of each component wire. Refer to Figure 41.



2447839 S00061544833_V1

ASSEMBLY OF THE CONDUCTOR SPLICE
Figure 41

(a) Put a conductor in each end of the splice.

Make sure all of the strands are in the crimp barrel.

(b) Crimp the splice.

(c) Lightly pull each conductor to make sure that they are held tightly in the splice.

(d) Move the inner fire resistant sleeve on the splice.

Make sure that the center of the sleeve is aligned with the center of the splice.

(e) Move the outer fire resistant sleeve on the inner sleeve.

Make sure that the center of the sleeve is aligned with the center of the splice.

(f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(26) Wind a layer of shield tape material on the splice area. Refer to Figure 41.

Make sure that the layer of shield tape material:

- Starts at the end of the folded back shield on one end of the splice
- Ends at the end of the folded back shield on the other end of the splice assembly
- Makes a 0.5 inch (13 millimeters) overlap.

(27) Move the outer ferrule into its position on the inner ferrule.

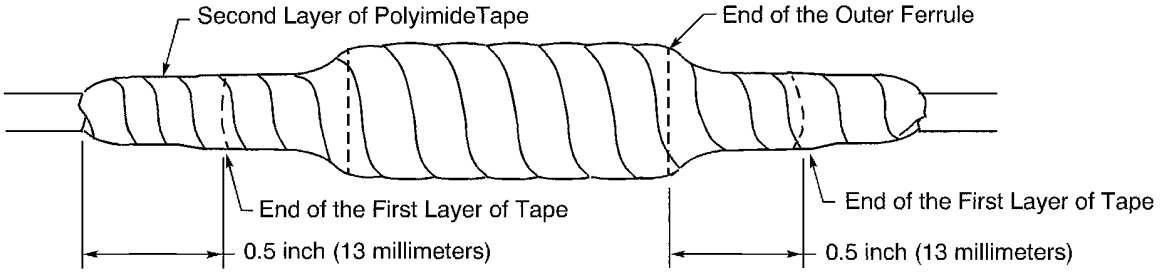
(28) Crimp the outer ferrule.

(29) Remove the shield tape material that extends farther than the rear end of each outer ferrule.

(30) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 42.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
- Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF TAPE
Figure 42

(31) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 42.

Make sure that the layer of tape:

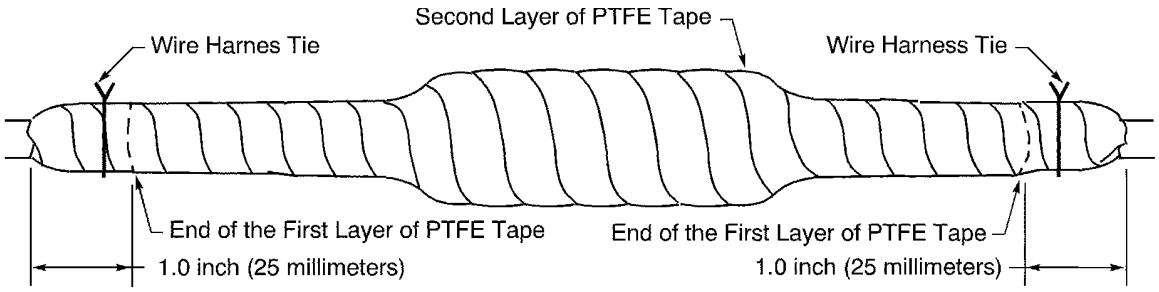
- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape

- Makes a 50 percent overlap.

(32) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 43.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from one end of the layer of polyimide tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of layer of polyimide tape
- Makes a 50 percent overlap.



2447852 S00061544825_V1

INSTALLATION OF THE LAYERS OF PTFE TAPE
Figure 43

(33) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 43.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of PTFE tape
- Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
- Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
- Makes a 50 percent overlap.

(34) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(35) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.

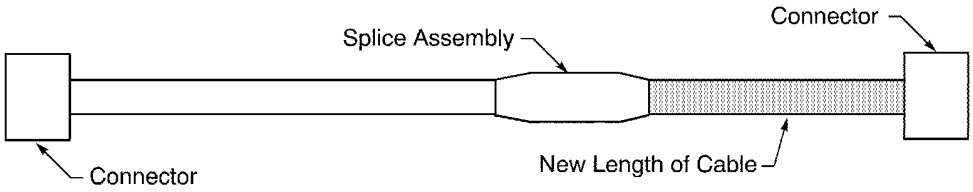
(36) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

E. Class 3 Cable - New Length of Cable with the Connector on the End

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.



2447851 S00061544818_V1

SPLICE WITH A NEW LENGTH OF CABLE WITH THE CONNECTOR ON THE END
Figure 44

Refer to Figure 44.

(1) Find the cable part number. Refer to the WDM.

NOTE: For alternative cables, refer to Subject 20-23-03.

(2) Make a selection of a wiper from Table 12.

NOTE: An equivalent wiper is a satisfactory alternative.

(3) Make a selection of a solvent from Table 8.

NOTE: An equivalent solvent is a satisfactory alternative.

(4) Make a selection of a shield tape material from Table 10.

NOTE: An equivalent shield tape material is a satisfactory alternative.

(5) Make a selection of these tapes from Table 9:

- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

(6) Make a selection these fire resistant sleeves from Table 11:

- An inner sleeve
- An outer sleeve.

NOTE: An equivalent sleeve is a satisfactory alternative.

(7) Make a selection of two inner ferrules and two outer ferrules from Table 5.

(8) Make a selection of a insulation removal tool from Table 13.

(9) Make a selection of a ferrule crimp tool from Table 14.

(10) Make a selection of a splice crimp tool from Table 15.

(11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.

(12) Find the location on the damaged cable to put the cable splice.

Make sure that the location of the splice on each end of the splice assembly is in a permitted location; refer to Subject 20-23-15.

(13) Cut the cable.

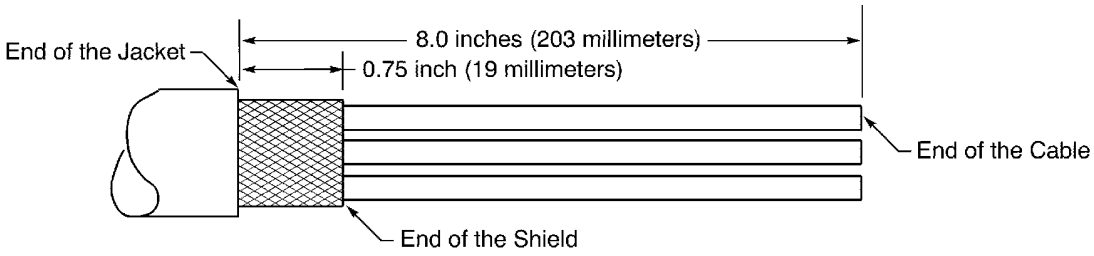
Make sure that area with damage is on the end of the cable that is replaced.

(14) Clean the end of the cable with solvent and a wiper.

Make sure to clean a minimum of 16 inches (406 millimeters) from the end of the cable.

(15) Prepare the ends of the damaged cable.

(a) Remove 8.0 inches (203 millimeters) of the jacket from the end of the cable. Refer to Figure 45.



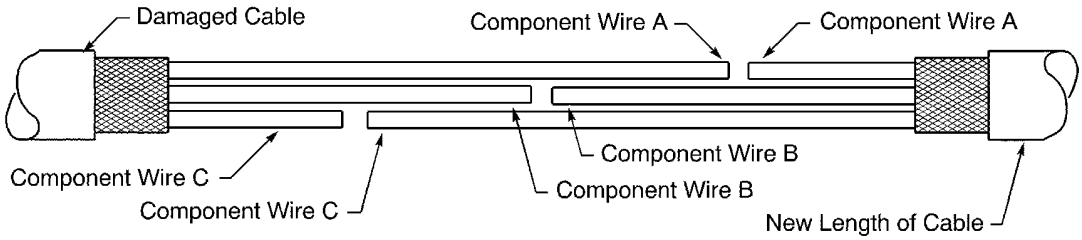
2447857 S00061544834_V1

JACKET REMOVAL
Figure 45

(b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of shield equal to 0.75 inch (19 millimeters). Refer to Figure 45.

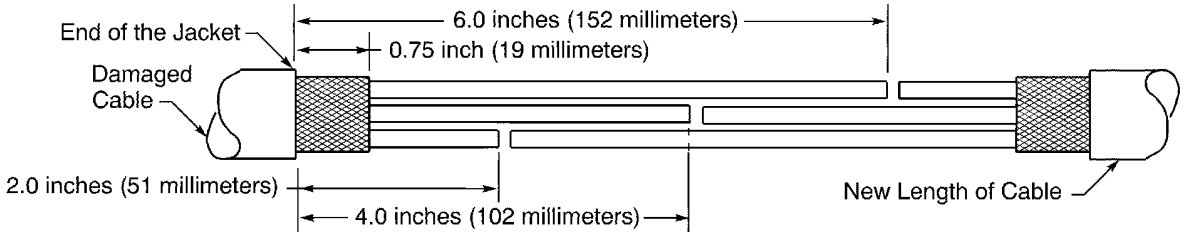
(c) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 6.0 inches (152 millimeters). Refer to Figure 46 and Figure 47.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



2447871 S00061544835_V1

COMPONENT WIRE CONFIGURATION
Figure 46



CABLE PREPARATION
Figure 47

(d) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 46 and Figure 47.

(e) Remove the necessary length of component wire C to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 46 and Figure 47.

(16) Prepare the new length of cable.

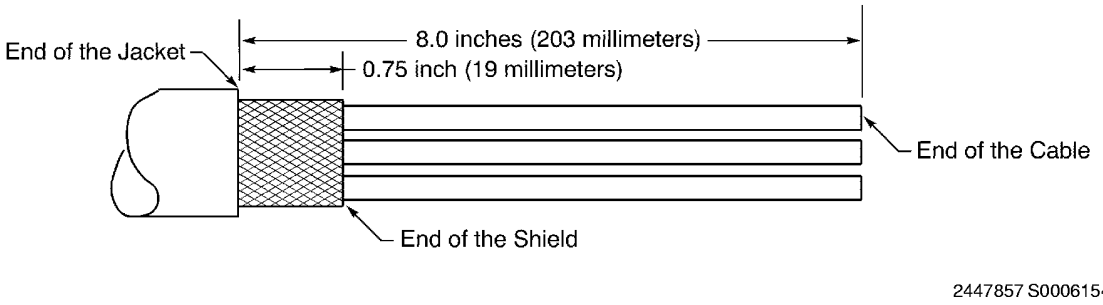
(a) Cut the necessary length of cable.

Make sure that the length is 8.0 inches (203 millimeters) longer than the distance from the end of the damaged cable to the location of the connector on the end of the cable.

(b) Clean the ends of the cable with solvent and a wiper.

Make sure to clean a minimum of 16.0 inches (406 millimeters) from each end of the cable.

(c) Remove 8.0 inches (203 millimeters) of the jacket from the end of the cable. Refer to Figure 48.

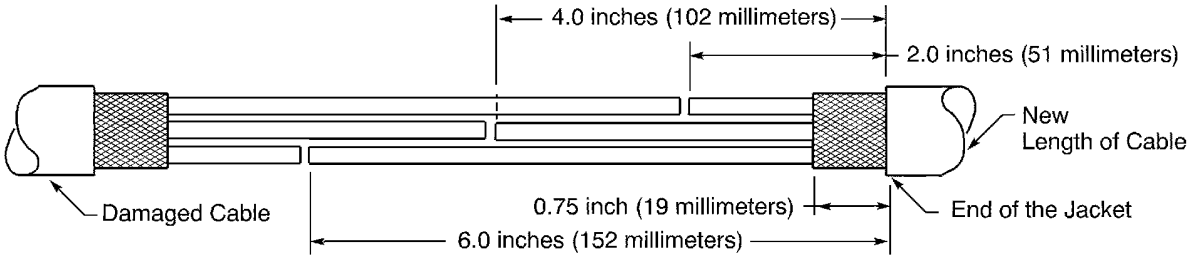


JACKET REMOVAL
Figure 48

(d) Remove the necessary length of shield to make the distance from the end of the jacket to the end of shield equal to 0.75 inch (19 millimeters). Refer to Figure 48.

(e) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 46 and Figure 49.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



CABLE PREPARATION
Figure 49

(f) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 46 and Figure 49.

(g) Remove the necessary length of component wire C to make the distance from the end of the jacket to the end of the wire equal to 6.0 inches (152 millimeters). Refer to Figure 46 and Figure 49.

(17) Put the mechanical ferrules on the end of each cable.

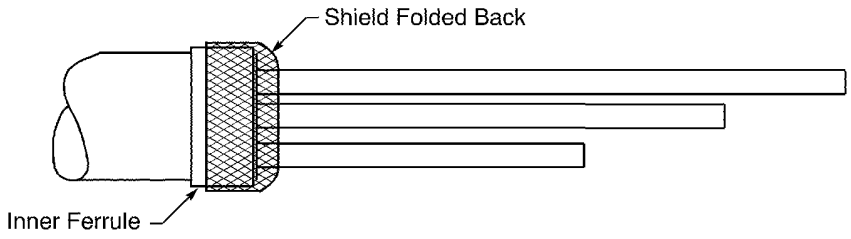
(a) Put the ferrules on the end of the cables in this sequence:

- The outer ferrule
- The inner ferrule.

(b) Move the ferrules back on the cable away from the splice area.

(18) Install the inner ferrule on the end of the cable.

(a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 50.



2447861 S00061544838_V1

INSTALLATION OF THE INNER FERRULE
Figure 50

(b) Crimp the inner ferrule.

(19) Fold the shield back on the inner ferrule.

Make sure that:

- The shield is smooth
- The strands are symmetrical around the circumference of the ferrule.

(20) Do Step 4.E.(18) through Step 4.E.(19) again for the inner ferrule on each cable.

(21) Put the necessary length of fire resistant sleeves on the longest component wire of the new cable segment in this sequence:

- The outer sleeve
- The inner sleeve.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.

(22) Put the necessary length of fire resistant sleeves on the two longest component wires of the damaged cable in this sequence:

- The outer sleeve
- The inner sleeve.

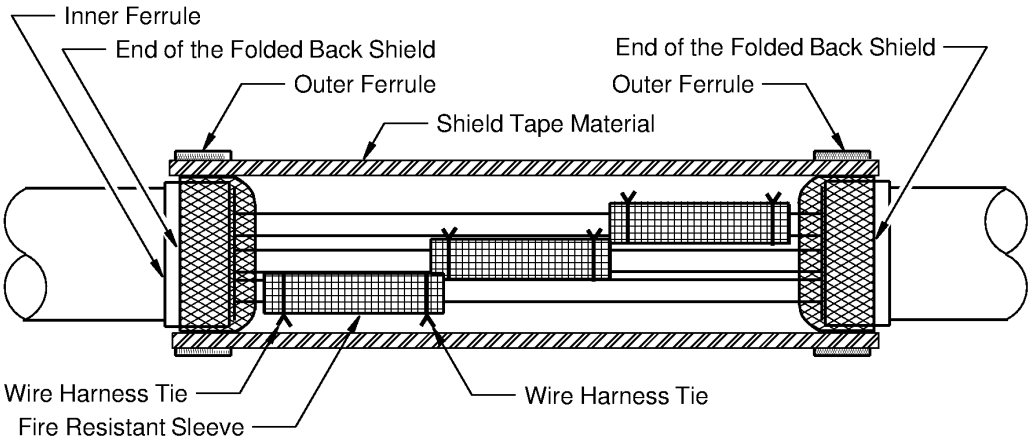
Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.

(23) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end of each component wire.

(24) Put the new length of cable in position for the assembly of the cable splice.

(25) Assemble a splice of each component wire. Refer to Figure 51.



2447859 S00061544839_V1

ASSEMBLY OF THE CONDUCTOR SPLICE
Figure 51

(a) Put a conductor in each end of the splice.

Make sure that all of the strands are in the crimp barrel.

(b) Crimp the splice.

(c) Lightly pull each conductor to make sure that they are held tightly in the splice.

(d) Move the inner fire resistant sleeve on the splice.

Make sure that the center of the sleeve is aligned with the center of the splice.

(e) Move the outer fire resistant sleeve on the inner sleeve.

Make sure that the center of the sleeve is aligned with the center of the splice.

(f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(26) Wind a layer of shield tape material on the splice area. Refer to Figure 51.

Make sure that the layer of shield tape material:

- Starts at the end of the folded back shield on one end of the splice
- Ends at the end of the folded back shield on the other end of the splice assembly
- Makes a 0.5 inch (13 millimeters) overlap.

(27) Move the outer ferrule into its position on the inner ferrule.

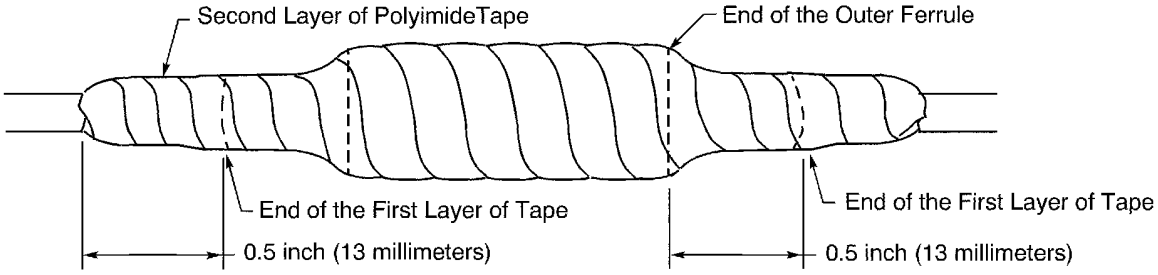
(28) Crimp the outer ferrule.

(29) Remove the shield tape material that extends farther than the rear end of each outer ferrule.

(30) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 52.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
- Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
- Makes a 50 percent overlap.



2447840 S00061544824_V1

INSTALLATION OF THE LAYERS OF POLYIMIDE TAPE
Figure 52

(31) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 52.

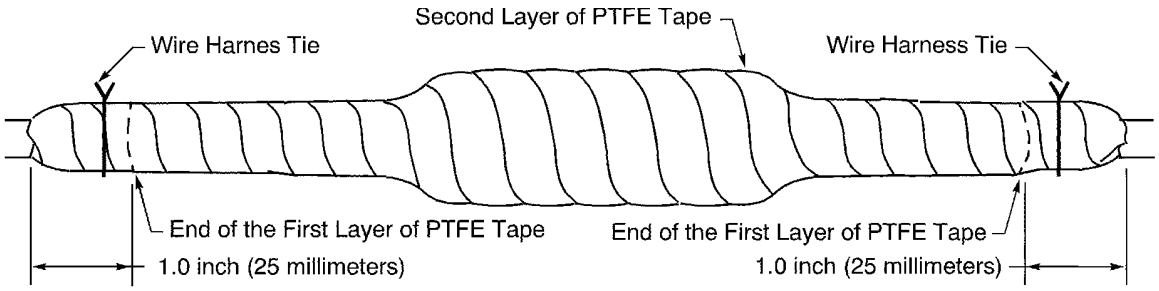
Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

(32) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 53.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from one end of the layer of polyimide tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the layer of polyimide tape
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF PTFE TAPE
Figure 53

(33) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 53.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of PTFE tape
- Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
- Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
- Makes a 50 percent overlap.

(34) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(35) Prepare the end of the new length of cable.

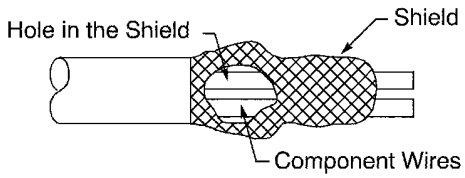
(a) Remove necessary length of the cable jacket.

Make sure that the length of jacket removed on the new cable segment is the same as the length of jacket that is removed on the damaged cable segment.

(b) Push the shield rearward to expand it at the end of the jacket.

(c) Make a hole in the shield near the end of the cable jacket with a nylon tool. Refer to Figure 54.

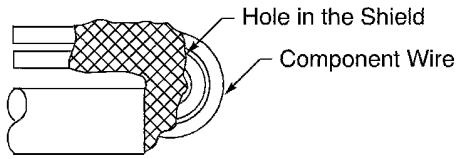
CAUTION: DO NOT CUT OR CAUSE DAMAGE TO THE INSULATION OF THE WIRES. DAMAGE TO THE INSULATION CAN CAUSE A SHORT TO OCCUR.



2447822 S00061544808_V1

PREPARATION OF THE HOLE IN THE SHIELD
Figure 54

(d) Carefully bend the cable until the component wires can be seen in the hole. Refer to Figure 55.



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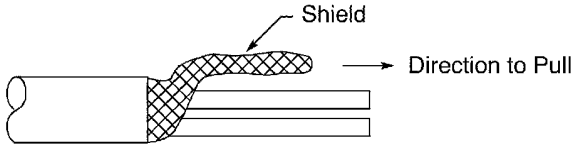
POSITION OF THE COMPONENT WIRES
Figure 55

(e) Pull one wire at a time through the hole in the shield.

(f) Pull the shield tight to make a flat conductor. Refer to Figure 56.



2447824 S00061544810_V1

PREPARATION OF THE SHIELD GROUND WIRE
Figure 56

(g) Assemble the new contacts on the wires. Refer to Subject 20-23-37.

(h) Remove the identification marker for each contact from the old wires.

(i) Put the identification marker for each contact on the new wires.

(36) Disassemble the connector on the end of the damaged cable. Refer to Subject 20-23-37.

(37) Remove the damaged cable from the wire harness clamps.

(38) Put the wire harness in its initial configuration.

(39) Assemble the connector. Refer to Subject 20-23-37.

(40) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.

(41) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

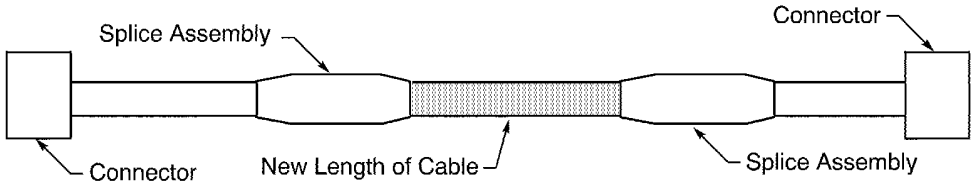
F. Class 3 Cable - New Length of Cable Between the Connectors

For the conditions that are applicable for:

- The damage and repair of shielded cables, refer to Subject 20-23-15
- The repair of a cable with a splice, refer to Paragraph 1.B.

CAUTION: REPAIR OF A CABLE WITH A SPLICE IS A TEMPORARY REPAIR. THE CABLE MUST BE REPLACED WHEN THE SUBSEQUENT, SCHEDULED ENGINE MAINTENANCE IS DONE.

NOTE: The procedure to assemble a splice with a new length of cable with the connector on the end is a satisfactory alternative to this procedure. Refer to Paragraph 4.E.



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SPLICE WITH A NEW LENGTH OF CABLE BETWEEN THE CONNECTORS
Figure 57

Refer to Figure 57.

(1) Find the cable part number. Refer to the Subject 20-23-15 and the WDM.

NOTE: For alternative cables, refer to Subject 20-23-03.

(2) Make a selection of a wiper from Table 12.

NOTE: An equivalent wiper is a satisfactory alternative.

(3) Make a selection of a solvent from Table 8.

NOTE: An equivalent solvent is a satisfactory alternative.

(4) Make a selection of a shield tape material from Table 10.

NOTE: An equivalent shield tape material is a satisfactory alternative.

(5) Make a selection of these tapes from Table 9:

- A polyimide tape
- A PTFE tape.

NOTE: An equivalent tape is a satisfactory alternative.

(6) Make a selection these fire resistant sleeves from Table 11:

- An inner sleeve
- An outer sleeve.

NOTE: An equivalent sleeve is a satisfactory alternative.

(7) Make a selection of four inner ferrules and four outer ferrules from Table 5.

(8) Make a selection of a insulation removal tool from Table 13.

(9) Make a selection of a ferrule crimp tool from Table 14.

(10) Make a selection of a splice crimp tool from Table 15.

(11) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the cable that has damage.

(12) Find the location on the damaged cable to put the cable splice.

Make sure that the location of the splice on the cable is in a permitted location; refer to Subject 20-23-15.

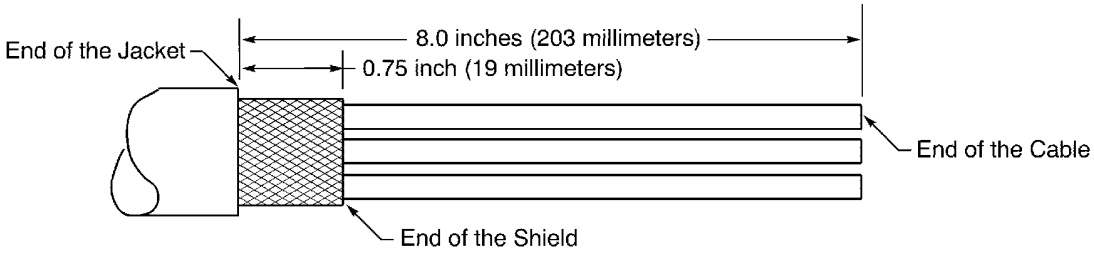
(13) Cut the damaged cable on each side of the area with damage.

(14) Clean the ends of the damaged cable with solvent and a wiper.

Make sure to clean a minimum of 16.0 inches (406 millimeters) from each end of the cable.

(15) Prepare the ends of the damaged cable.

(a) Remove 8.0 inches (203 millimeters) of the jacket from the end of the cable. Refer to Figure 58.

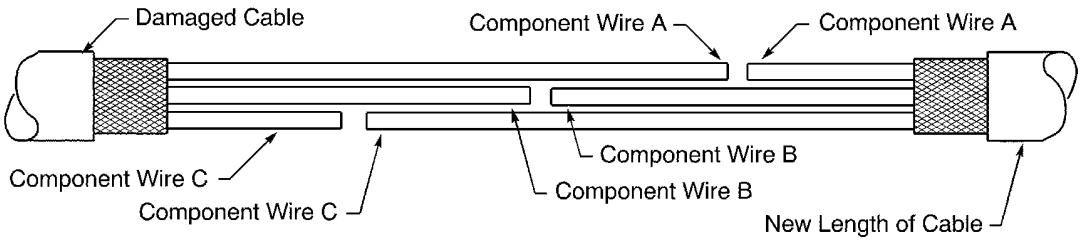


JACKET REMOVAL
Figure 58

(b) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 58.

(c) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 6.0 inches (152 millimeters). Refer to Figure 59 and Figure 60.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



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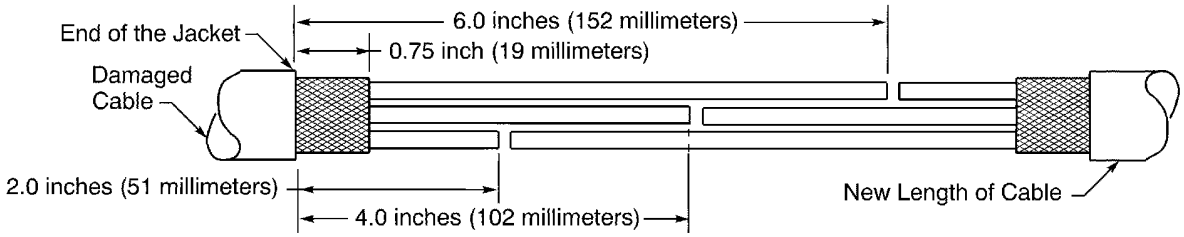
COMPONENT WIRE CONFIGURATION
Figure 59



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CABLE PREPARATION
Figure 60

(d) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 59 and Figure 60.

(e) Remove the necessary length of component wire C to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 59 and Figure 60.

(f) Do Step (a) through Step (d) again for the other end of the cable.

(16) Prepare the length of new length of cable.

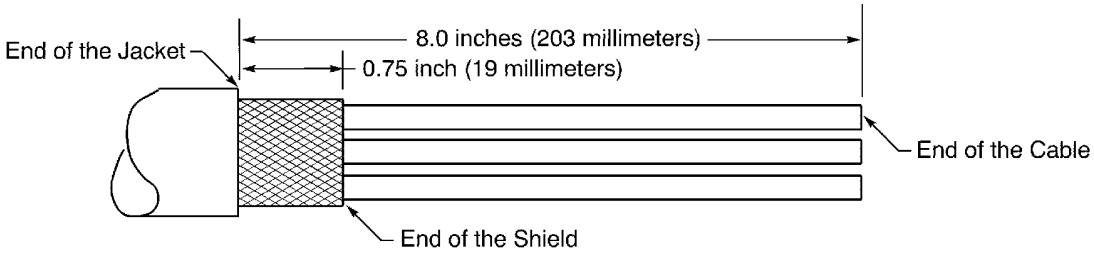
(a) Cut the necessary length of cable.

Make sure that the length is 16.0 inches (406 millimeters) longer than the distance between the two ends of the damaged cable.

(b) Clean the ends of the cable with solvent and a wiper.

Make sure to clean a minimum of 12.0 inches (305 millimeters) from each end of the cable.

(c) Remove 8.0 inches (203 millimeters) of the jacket from the end of the cable. Refer to Figure 61.

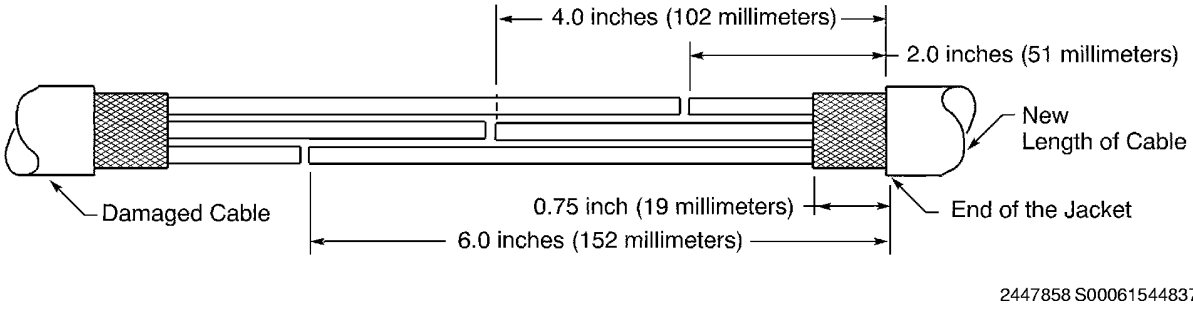


JACKET REMOVAL
Figure 61

(d) Remove the necessary length of shield to make the distance from the end of the jacket to the end of the shield equal to 0.75 inch (19 millimeters). Refer to Figure 61.

(e) Remove the necessary length of component wire A to make the distance from the end of the jacket to the end of the wire equal to 2.0 inches (51 millimeters). Refer to Figure 59 and Figure 62.

NOTE: The component wires have been given letters to help make sure that the same wires are cut to the correct length on the end of each cable.



CABLE PREPARATION
Figure 62

(f) Remove the necessary length of component wire B to make the distance from the end of the jacket to the end of the wire equal to 4.0 inches (102 millimeters). Refer to Figure 59 and Figure 62.

(g) Remove the necessary length of component wire C to make the distance from the end of the jacket to the end of the wire equal to 6.0 inches (152 millimeters). Refer to Figure 59 and Figure 62.

(h) Do Step (c) through Step (f) again for the other end of the new cable segment.

(17) Put the mechanical ferrules on the cables.

(a) Put an inner and outer ferrule on the end of each cable in this sequence:

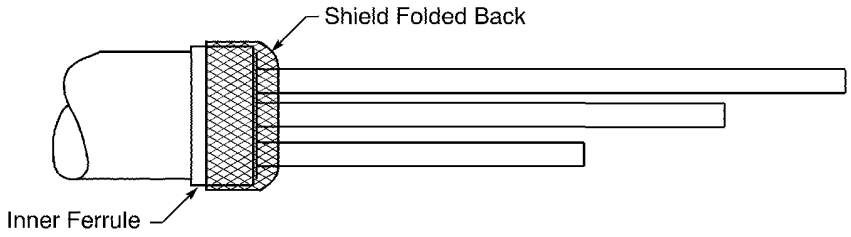
- The outer ferrule

- The inner ferrule.

(b) Move the outer ferrules back on the cables away from the splice area.

(18) Install the inner ferrule on the end of the cable.

(a) Push the inner ferrule forward on the cable until the forward end of the inner ferrule is aligned with the end of the jacket. Refer to Figure 63.



2447861 S00061544838_V1

INSTALLATION OF THE INNER FERRULE
Figure 63

(b) Crimp the inner ferrule.

(19) Fold the shield back on the inner ferrule. Refer to Figure 63.

Make sure that:

- The shield is smooth
- The strands are symmetrical around the circumference of the ferrule.

(20) Do Step 4.F.(18) through Step 4.F.(19) again for each inner ferrule on each cable.

(21) Put the necessary lengths of fire resistant sleeves on the longest component wire of the new length of cable in this sequence:

- The outer sleeve
- The inner sleeve.

Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.

(22) Put the necessary lengths of fire resistant sleeves on the two longest component wires of the damaged cable in this sequence:

- The outer sleeve
- The inner sleeve.

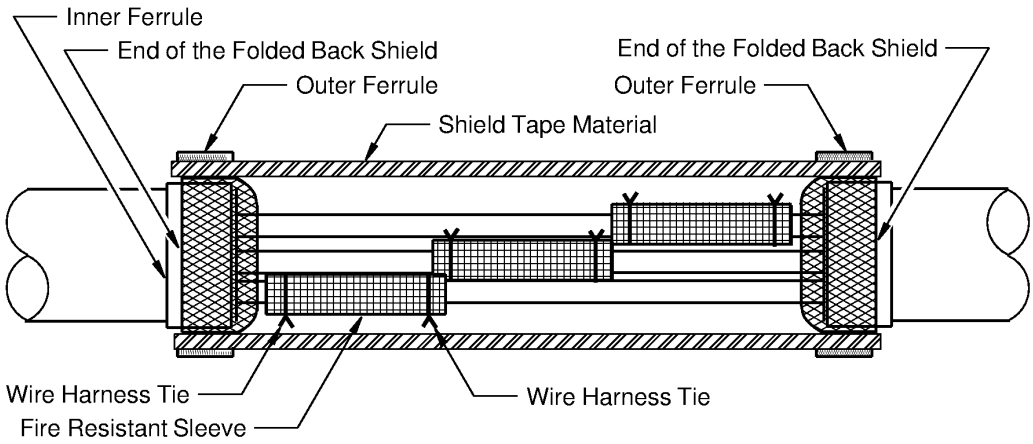
Make sure that:

- The sleeve is expanded
- The length of the sleeve is sufficient extend farther than each end of the splice.

(23) Remove 0.25 inch (6 millimeters) to 0.28 inch (7 millimeters) of insulation from the end each the component wire.

(24) Put the new length of cable in its position for the assembly of the cable splice.

(25) Assemble a splice of the each component wire. Refer to Figure 64.



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ASSEMBLY OF THE CONDUCTOR SPLICE
Figure 64

(a) Put a conductor in each end of the splice.

Make sure all of the strands are in the crimp barrel.

(b) Crimp the splice.

(c) Lightly pull each conductor to make sure that they are held tightly in the splice.

(d) Move the inner fire resistant sleeve on the splice.

Make sure that the center of the sleeve is aligned with the center of the splice.

(e) Move the outer fire resistant sleeve on the inner sleeve.

Make sure that the center of the sleeve is aligned with the center of the splice.

(f) Assemble a wire harness tie on each end of the sleeves. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(26) Wind a layer of shield tape material on the splice area. Refer to Figure 64.

Make sure that the layer of shield tape material:

- Starts at the end of the folded back shield on one end of the splice
- Ends at the end of the folded back shield on the other end of the splice assembly
- Makes a 0.5 inch (13 millimeters) overlap.

(27) Move the outer ferrule into its position on the inner ferrule.

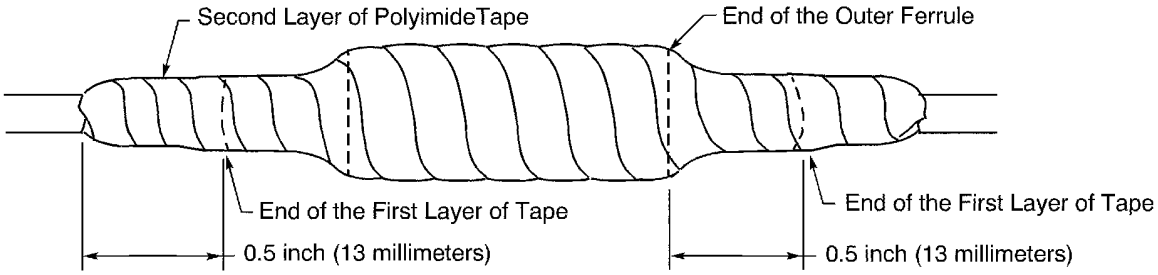
(28) Crimp the outer ferrule.

(29) Remove the shield tape material that extends farther than the rear end of each outer ferrule.

(30) Tightly wind a layer of polyimide tape on the splice assembly. Refer to Figure 65.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at one end of the splice assembly
- Stops a minimum of 0.5 inch (13 millimeters) from the rear of outer ferrule at the other end of the splice assembly
- Makes a 50 percent overlap.



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INSTALLATION OF THE LAYERS OF POLYIMIDE TAPE
Figure 65

(31) Tightly wind a second layer of polyimide tape on the splice assembly. Refer to Figure 65.

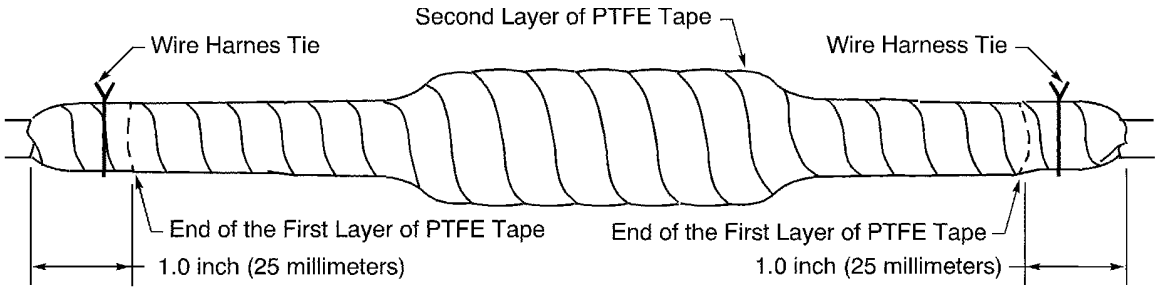
Make sure that the layer of tape:

- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 50 percent overlap.

(32) Tightly wind a layer of PTFE tape on the splice assembly. Refer to Figure 66.

Make sure that the layer of tape:

- Starts a minimum of 0.5 inch (13 millimeters) from the end of the layer of polyimide tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the layer of polyimide tape
- Makes a 50 percent overlap.



INSTALLATION OF THE LAYERS OF PTFE TAPE
Figure 66

(33) Tightly wind a second layer of PTFE tape on the splice assembly. Refer to Figure 66.

Make sure that the layer of tape:

- Is in the opposite direction of the first layer of PTFE tape
- Starts a minimum of 1.0 inch (25 millimeters) from one end of the first layer of PTFE tape
- Stops a minimum of 1.0 inch (25 millimeters) from the other end of the first layer of PTFE tape
- Makes a 50 percent overlap.

(34) Assemble a wire harness tie approximately 1 inch (25 millimeters) from each end of the splice assembly. Refer to Subject 20-23-30 for the procedure to assemble a wire harness tie.

(35) Do a wire continuity check of the component wires in the cable. Refer to Paragraph 5.A.

(36) Do an insulation resistance check of the component wires in the cable. Refer to Paragraph 5.B.

5. WIRE CHECKS

A. Wire Continuity Check

(1) Find the wire termination data. Refer to the WDM.

(2) Disconnect each connector on the circuit that must have a wire continuity check.

CAUTION: EACH CONNECTOR ON THE CIRCUIT THAT MUST HAVE A TEST MUST BE DISCONNECTED. IF THE CONNECTORS ARE NOT DISCONNECTED, UNSATISFACTORY RESISTANCE INDICATIONS OR DAMAGE TO THE CONNECTOR CAN OCCUR.

(3) Measure the resistance on all wires.

Make sure that each circuit has continuity from one end of the wire to the other end of the wire.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

B. Insulation Resistance Check

(1) Make a selection of a multimeter.

WARNING: DO NOT USE A MEGOHMETER FOR THE INSULATION RESISTANCE TEST OF THE ON-WING WIRING REPAIR. INJURY TO PERSONNEL OR DAMAGE TO THE AIRPLANE CAN OCCUR.

(2) Set the meter to the 100 megohm scale.

(3) Attach one meter test lead to the contact assembly on the connector.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

(4) Attach the other meter test lead to a contact assembly on a wire that does not connect to the same circuit.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

(5) Read the meter.

Make sure that the resistance is a minimum of 100 megohm.

(6) Do Step 5.B.(3) through Step 5.B.(5) for each contact in the connector.

(7) Attach the one meter test lead to the backshell.

(8) Attach the other meter test lead to the contact assembly on the wire that must have a test.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

(9) Read the meter.

Make sure that the resistance is a minimum of 100 megohm.

(10) Do Step 5.B.(8) through Step 5.B.(9) for each wire that must have a test.

6. APPROVED TOOL SUPPLIERS

A. Ferrule Crimp Tools

Table 16
MECHANICAL FERRULE CRIMP TOOL SUPPLIERS

Crimp Tool	Supplier
M22520/5-01	QPL
M22520/5-19	QPL
M22520/5-35	QPL
M22520/5-37	QPL
M22520/5-39	QPL
M22520/5-41	QPL

Table 16 MECHANICAL FERRULE CRIMP TOOL SUPPLIERS (Continued)

Crimp Tool	Supplier
M22520/5-43	QPL
M22520/5-45	QPL
M22520/5-47	QPL

RB 211 TRENT 800 POWER PLANT: REPAIR OF ALTERNATOR LEAD WIRES

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RB 211 TRENT 800 POWER PLANT: REPAIR OF ALTERNATOR LEAD WIRES

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data of this Subject, refer to Subject 20-23-00.

2. ALTERNATOR LEAD WIRE REPAIR

A. Cable Jacket Repair

For the conditions that are applicable for this procedure, refer to Subject 20-23-15.

Table 1
SOLVENTS

Description	Specification	Supplier
Alcohol, Isopropyl	TT-I-735	An available source

Table 2
TAPES

Description	Part Number	Supplier
Polyimide, 1 inch width	Scotch 62	3M
PTFE, 1 inch width	Scotch 92	3M

Table 3
NECESSARY TOOLS

Description	Part Number	Supplier
Disposable Tissue	Kimwipe 7105	Kimberly-Clark

(1) Make a selection of a solvent from from Table 1.

NOTE: An equivalent solvent is a satisfactory alternative.

(2) Make a selection of a wiper from Table 3.

NOTE: An equivalent wiper is a satisfactory alternative.

(3) Make a selection of these tapes from Table 2:

- A polyimide tape
- A PTFE tape.

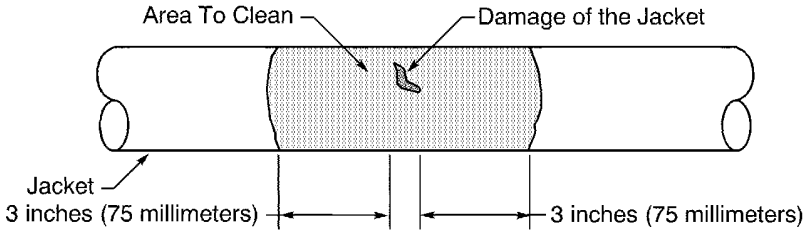
NOTE: An equivalent tape is a satisfactory alternative.

(4) Remove the necessary wire harness support clamps and wire harness ties to get access to the area of the wire that has damage.

(5) Clean the area of the cable that has damage with solvent and a wiper. Refer to Figure 1.

Make sure to clean a minimum of 3.0 inches (75 millimeters) on each side of the damage.

RB 211 TRENT 800 POWER PLANT: REPAIR OF ALTERNATOR LEAD WIRES



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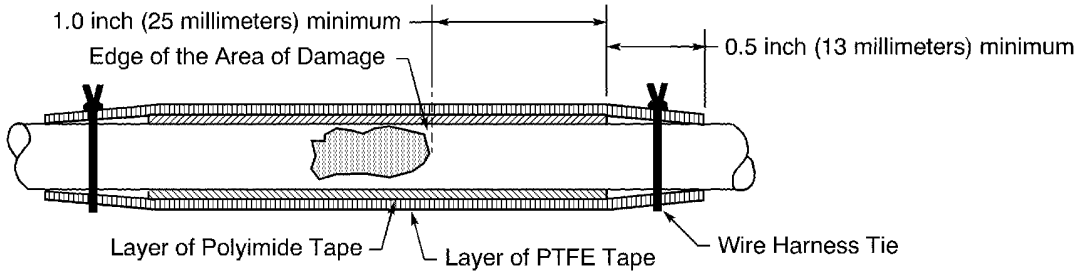
AREA TO CLEAN
Figure 1

(6) Dry the solvent with a wiper.

(7) Wind one layer of polyimide tape on the area with damage. Refer to Figure 2.
Make sure that the layer of tape:
- Starts a minimum of 1.0 inch (25 millimeters) from one side of the damage
- Stops a minimum of 1.0 inch (25 millimeters) from the other side of the damage
- Makes a 20 percent overlap.



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INSTALLATION OF THE FIRST LAYER OF TAPE
Figure 2

(8) Wind one layer of PTFE tape on the polyimide tape. Refer to Figure 2.
Make sure that the layer of tape:
- Is in the opposite direction of the first layer of tape
- Starts a minimum of 0.5 inch (13 millimeters) from one end of the first layer of tape
- Stops a minimum of 0.5 inch (13 millimeters) from the other end of the first layer of tape
- Makes a 20 percent overlap.

(9) Assemble a wire harness tie on each end of the second layer of tape. Refer to Subject 20-23-30.

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

TABLE OF CONTENTS

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

2. WIRE HARNESS DISASSEMBLY

A. Replacement of a Damaged Cable

(1) Loosen the first wire harness clamp that is next to the connector on one end of the wire harness.

(2) Remove all of the wire harness ties between the first clamp and the second clamp.

(3) Remove the damaged cable from the first clamp.

(4) Put the new cable in its position in the first clamp.

(5) Fully install the first clamp.

(6) Assemble wire harness ties on the wire harness between the first clamp and the second clamp. Refer to Paragraph 3.C. for the procedure to assemble a wire harness tie.

Make sure that a new wire harness tie is assembled at the same position as the wire harness tie that is removed.

(7) Loosen the second wire harness clamp.

(8) Remove all of the wire harness ties between the second clamp and the third clamp.

(9) Remove the damaged cable from the third clamp.

(10) Put the new cable in its position in the second clamp.

(11) Fully install the second clamp.

(12) Assemble wire harness ties on the wire harness between the first clamp and the second clamp. Refer to Paragraph 3.C. for the procedure to assemble a wire harness tie.

Make sure that a new wire harness tie is assembled at the same position as the wire harness tie that is removed.

(13) Do Step 2.A.(7) through Step 2.A.(9) again for each clamp location until the damaged cable is fully removed and the new cable is fully installed.

Make sure that a new wire harness tie is assembled at the same position as the wire harness tie that is removed.

3. WIRE HARNESS ASSEMBLY

A. General Conditions

These conditions are applicable for the location of a wire harness tie:

- A replacement wire harness tie must be assembled at the same location as the initial wire harness tie that was removed
- A wire harness tie must be assembled at a maximum distance of 2 inches (51 millimeters) from an adjacent wire harness tie.

These conditions are applicable for the assembly of a wire harness tie:

- All wires must be parallel before the wire harness tie is assembled on the wire harness

• A wire harness tie must be assembled on two or more wires or cables that are together.

B. Wire Harness Tie Materials

Table 1
LACING TAPE PART NUMBERS

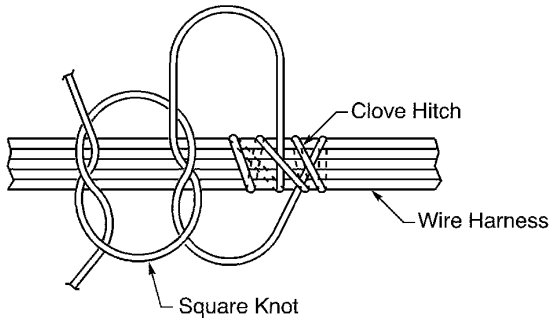
Part Number or Specification	Description	Supplier
BMS13-54 Type III Finish C	Nomex, flat braid; 0.110 inch ±0.010 inch wide, 0.014 inch ±0.003 inch thick	Gudebrod
		Western Filament
ESW-1900	Nomex, flat braid; 0.110 inch ±0.010 inch wide, 0.014 inch ±0.003 inch thick	Polamco
MIL-T-43435 Type V Finish C	Nomex, flat braid; 0.110 inch ±0.010 inch wide, 0.014 inch ±0.003 inch thick	QPL
T085	Nomex, flat braid; 0.110 inch ±0.010 inch wide, 0.014 inch ±0.003 inch thick	Raydex/CDT

C. Assembly of a Wire Harness Tie

This paragraph gives the procedure to assemble a wire harness tie when no special conditions occur.

For the procedures to assemble a wire harness tie:

- Where a wire harness tie goes across a different wire harness, refer to Paragraph 3.D.
- At a junction, refer to Paragraph 3.E.
- At a 90 degree branch, refer to Paragraph 3.F.
- At a branch, refer to Paragraph 3.G.



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ASSEMBLY OF A WIRE HARNESS TIE
Figure 1

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

Refer to Figure 1.

(1) Make a selection of a lacing tape from Table 1.

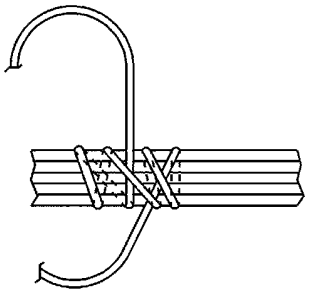
NOTE: An equivalent lacing tape is a satisfactory alternative.

(2) Make the wires parallel with a minimum number of twists.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

(3) Make a clove hitch knot on the wire harness. Refer to Figure 2.

CAUTION: DO NOT CAUSE DEFORMATION OF THE INSULATION OF THE WIRE OR THE CABLE DURING THE ASSEMBLY OF THE CLOVE HITCH. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.



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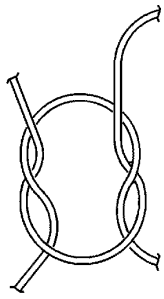
CLOVE HITCH KNOT
Figure 2

(4) Make a square knot on top of the clove hitch knot. Refer to Figure 3.

CAUTION: MAKE SURE THAT THE TIE IS NOT TOO TIGHT. DAMAGE TO THE WIRE INSULATION CAN OCCUR.



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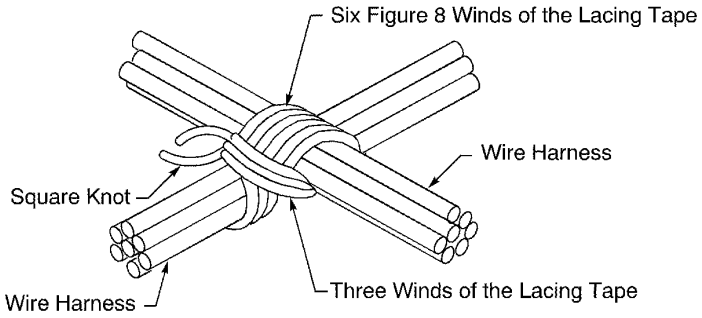
SQUARE KNOT
Figure 3

(5) Cut each end of the lacing tape.

Make sure that the distance from the knot to the end of the lacing tape is between 0.25 inch (6 millimeters) and 0.50 inch (13 millimeters).

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

D. Assembly of a Wire Harness Tie Where a Wire Harness Goes Across a Different Wire Harness



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CONFIGURATION OF TWO WIRE HARNESSES THAT GO ACROSS EACH OTHER
Figure 4

Refer to Figure 4.

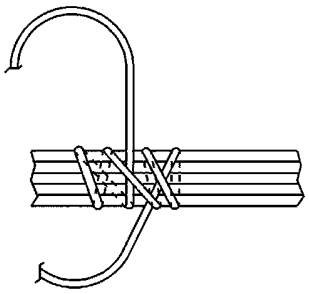
(1) Make a selection of a lacing tape from Table 1.

(2) Make the wires parallel with minimum of twists.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

(3) Assemble a clove hitch on one wire harness where the wire harnesses goes across the other wire harness. Refer to Figure 5.

CAUTION: DO NOT CAUSE DEFORMATION OF THE INSULATION OF THE WIRE OR THE CABLE DURING THE ASSEMBLY OF THE CLOVE HITCH. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.



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CLOVE HITCH
Figure 5

(4) Make a figure 8 wind around the wire harnesses.

(5) Pull the lacing tape tight.

(6) Do Step 3.D.(4) through Step 3.D.(5) again 5 times.

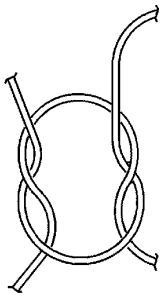
(7) Make a wind around the lacing tape between the two wire harnesses.

(8) Pull the lacing tape tight.

(9) Do Step 3.D.(7) through Step 3.D.(8) again 2 times.

(10) Make a square knot. Refer to Figure 6.

CAUTION: MAKE SURE THAT THE TIE IS NOT TOO TIGHT. DAMAGE TO THE WIRE INSULATION CAN OCCUR.



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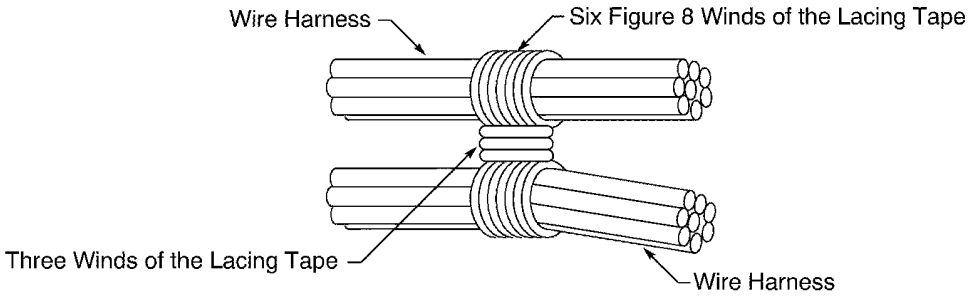
SQUARE KNOT
Figure 6

(11) Cut each end of the lacing tape.

Make sure that the distance from the knot to the end of the lacing tape is between 0.25 inch (6 millimeters) and 0.50 inch (13 millimeters).

E. Assembly of a Wire Harness Tie at a Junction



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CONFIGURATION OF A WIRE HARNESS JUNCTION
Figure 7

Refer to Figure 7.

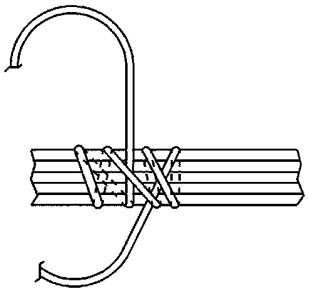
(1) Make a selection of a lacing tape from Table 1.

(2) Make the wires parallel with a minimum number of twists.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

(3) Assemble a clove hitch on one wire harness. Refer to Figure 8.

CAUTION: DO NOT CAUSE DEFORMATION OF THE INSULATION OF THE WIRE OR THE CABLE DURING THE ASSEMBLY OF THE CLOVE HITCH. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.



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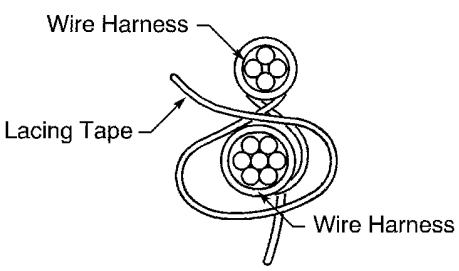
CLOVE HITCH
Figure 8

(4) Make a figure 8 wind around the wire harnesses. Refer to Figure 9.



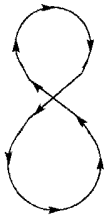


Figure 8 Winds
of the Lacing Tape

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FIGURE 8 WINDS OF THE LACING TAPE
Figure 9

(5) Pull the lacing tape tight.

(6) Do Step 3.E.(4) and Step 3.E.(5) again 5 times.

(7) Put the one end of the lacing tape through the two harnesses.

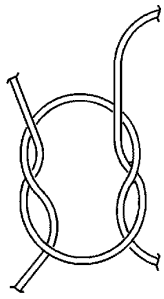
(8) Make a wind around the lacing tape between the branches.

(9) Pull the lacing tape tight.

(10) Do Step 3.E.(8) through Step 3.E.(9) again 2 times.

(11) Assemble a square knot. Refer to Figure 10.

CAUTION: DO NOT CAUSE DEFORMATION OF THE WIRE OR THE CABLE DURING ASSEMBLY OF THE SQUARE KNOT. DAMAGE TO THE WIRE OR CABLE CAN OCCUR.



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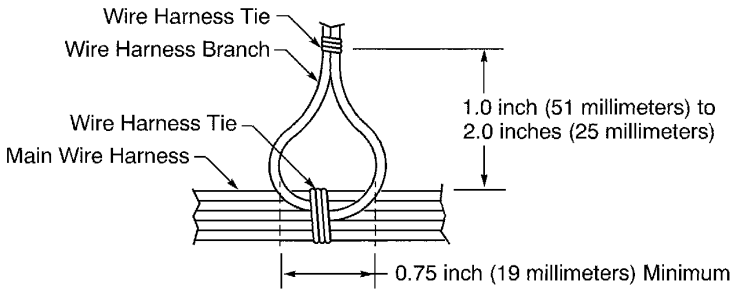
SQUARE KNOT
Figure 10

(12) Cut each end of the lacing tape.

Make sure that the distance from the knot to the end of the lacing tape is between 0.25 inch (6 millimeters) and 0.50 inch (13 millimeters).

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

F. Assembly of a Wire Harness Tie at a 90 Degree Branch



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CONFIGURATION OF A 90 DEGREE WIRE HARNESS BRANCH
Figure 11

Refer to Figure 11.

(1) Make a selection of a lacing tape from Table 1.

(2) Make the wires parallel with a minimum number of twists.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

(3) Assemble a wire harness tie at the location of the branch. Refer to Paragraph 3.C. for the procedure to assemble a wire harness tie.

(4) Move each wire to make a 90 degree branch.

Make sure that:

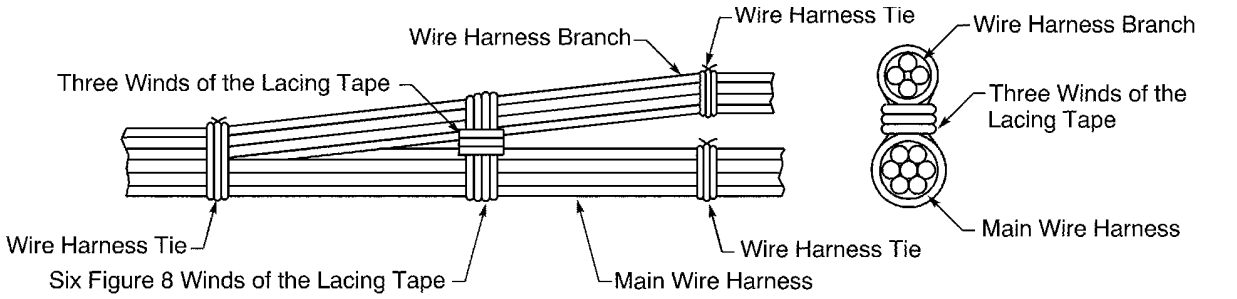
- Each side of the branch has an equal number of wires
- The distance between the wires on one side of the tie are a 0.75 inch (19 millimeters) minimum from wires on the other side of the tie.

(5) Assemble a wire harness tie on the branch between 1 inch (25 millimeters) and 2 inches (51 millimeters) from the main wire harness. Refer to Paragraph 3.C. for the procedure to assemble a wire harness tie.

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

G. Assembly of a Wire Harness Tie at a Branch

This paragraph gives the procedure to assemble a wire harness tie at a branch that is not 90 degrees. For the procedure to assemble a wire harness tie at a 90 degree branch, refer to Paragraph 3.F.



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CONFIGURATION OF A WIRE HARNESS BRANCH THAT IS NOT 90 DEGREES
Figure 12

Refer to Figure 12.

(1) Make a selection of a lacing tape from Table 1.

(2) Make the wires parallel with a minimum number of twists.

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

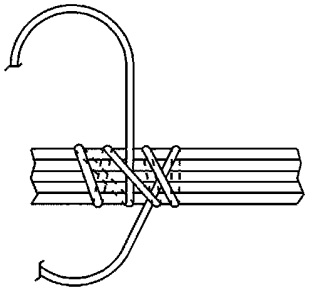
(3) Assemble a wire harness tie on the main wire harness branch a maximum of 2 inches (51 millimeters) before the branch. Refer to Paragraph 3.C. for the procedure to assemble a wire harness tie.

(4) Assemble a wire harness tie on the main wire harness a maximum of 2 inches (51 millimeters) from the location of the wire harness branch.

Refer to:

- Figure 13
- Paragraph 3.C. for the procedure to assemble a wire harness tie.

(5) Assemble a clove hitch on the main wire harness at the location of the wire harness branch. Refer to Figure 13.



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CLOVE HITCH
Figure 13

RB 211 TRENT 800 POWER PLANT: WIRE HARNESS DISASSEMBLY AND ASSEMBLY

(6) Make a figure 8 wind around the wire harnesses Refer to Figure 14.

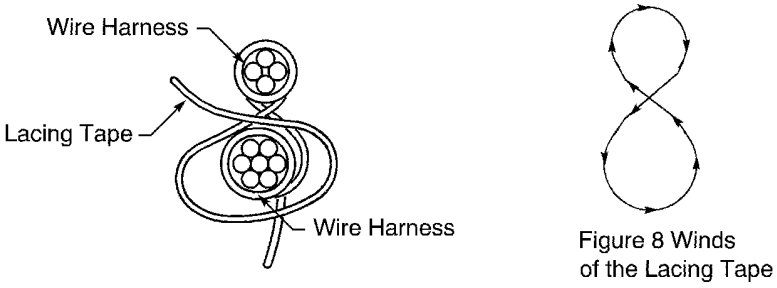


FIGURE 8 WINDS OF THE LACING TAPE
Figure 14

(7) Pull the lacing tape tight.

(8) Do Step 3.G.(6) and Step 3.G.(7) again 5 times.

(9) Put the one end of the lacing tape through the two harnesses.

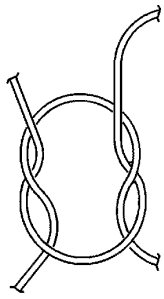
(10) Make a wind around the strands of the lacing tape between the branches.

(11) Pull the lacing tape tight.

(12) Do Step 3.G.(10) through Step 3.G.(11) again 2 times.

(13) Assemble a square knot. Refer to Figure 15.

CAUTION: DO NOT CAUSE DEFORMATION OF THE WIRE OR THE CABLE DURING ASSEMBLY OF THE SQUARE KNOT. DAMAGE TO THE WIRE OR CABLE CAN OCCUR.



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SQUARE KNOT
Figure 15

(14) Cut each end of the lacing tape.

Make sure that the distance from the knot to the end of the lacing tape is between 0.25 inch (6 millimeters) and 0.50 inch (13 millimeters).

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF TERMINAL LUGS

TABLE OF CONTENTS

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF TERMINAL LUGS

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

2. TERMINAL LUG ASSEMBLY

A. Assembly of Terminal Lugs

Table 1
NECESSARY MATERIALS

Material	Specification	Description	Supplier
Tape	A-A-59474	TFE, Pressure Sensitive	An available source

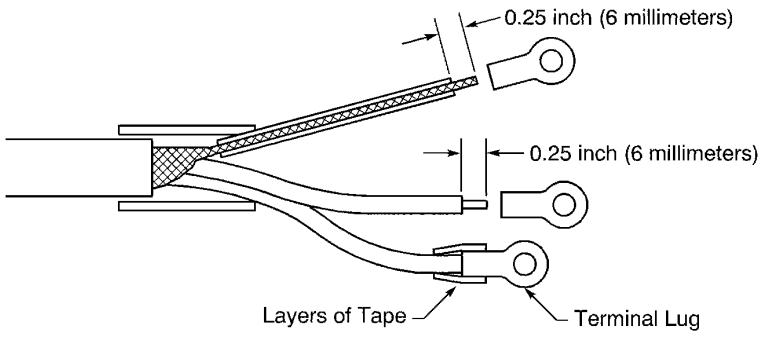
Table 2
INSULATION REMOVAL TOOLS

Wire Size (AWG)	Removal Tool	
	Part Number	Supplier
22-10	45-092	Ideal

Table 3
CRIMP TOOLS

Crimp Barrel Size	Crimp Tool	
	Part Number	Supplier
22-16	46673	AMP

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF TERMINAL LUGS



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TERMINAL LUG ASSEMBLY
Figure 1

Refer to Figure 1.

(1) Make a selection of an insulation removal tool from Table 2.

(2) Make a selection of crimp tool from Table 3.

(3) Make a selection of a tape from Table 1.

NOTE: An equivalent tape is a satisfactory alternative.

(4) Remove 0.25 inch (6 millimeters) of the length of the insulation from the end of the wire.

(5) Put the end of the wire in the crimp barrel of the terminal lug.
Make sure that the end of the conductor can be seen at the front of the crimp barrel.

(6) Crimp the terminal lug.

(a) Align the number printed on the terminal lug with the number printed on the jaws of the crimp tool.

(b) Put the terminal lug in the center of the jaws of the crimp tool.

(c) Move the crimp tool handles together until the ratchet releases.

(d) Pull gently on the wire to make sure that the wire is held tightly in the terminal lug.

(7) Do a continuity test:

(a) Set the multimeter to the 100 ohm scale.

(b) Attach one meter test lead to a backshell in the wire harness.

(c) Insert the other meter test lead to the terminal lug.

(d) Measure the resistance.

Make sure that the resistance is less than 1 ohm.

(8) Wind two layers of tape on the crimp barrel and the wire.

3. TERMINAL LUG INSTALLATION

A. Installation on a Stud

(1) Put the terminal lug on the stud.

(2) If a washer is specified, put the washer on the stud.

(3) Fully engage the threads of the nut and the threads of the stud.

(4) Tighten the nut to the specified torque. Refer to the AMM.

(5) Do the necessary tests. Refer to the AMM.

B. Installation with a Nut and a Bolt

(1) Put the terminal lug in its position on the engine bracket.

(2) Install the boot on the terminal lug.

(3) If a washer is specified, put the washer on the bolt.

(4) Put the bolt through the hole in the terminal lug and the bracket.

(5) Tighten the nut to the specified torque. Refer to the AMM.

(6) Do the necessary tests. Refer to the AMM.

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

TABLE OF CONTENTS

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable to the data and procedures of this Subject, refer to Subject 20-23-00.

2. CONNECTOR DISASSEMBLY OF THE ESC() CONNECTORS

A. Separation of the ESC() Plug and Receptacle

NOTE: If disassembly of the backshell of the plug is necessary, the plug must stay connected to the receptacle.

Table 1
NECESSARY TOOLS

Tool	Part Number	Supplier
Pliers, Soft Jaw	BT-SJ-468	Daniels
	TG69	Daniels
		Glenair

(1) Make a selection of pliers from Table 1.

(2) Disengage the threads of the coupling ring of the plug connector and the receptacle with the pliers.

(3) Pull the plug from the receptacle.

B. Removal of an ESC() Receptacle from a Bracket

NOTE: If disassembly of the backshell of the receptacle is necessary, the receptacle must stay installed in the bracket.

Table 2
NECESSARY TOOLS

Tool	Part Number	Supplier
Marker	Sharpie	Sanford
Screwdriver, Number 3 Phillips	-	An available source

(1) Make a selection of a screwdriver from Table 2.

(2) For a connector that has a 90 degree backshell or a 45 degree backshell:

(a) Make a selection of a marker from Table 2.

NOTE: An equivalent marker is a satisfactory alternative.

(b) Make a mark on the engine bracket on the same side as the keyway of the connector.

NOTE: This records the master keyway clock position on the engine bracket.

(3) Remove the nuts and the bolts that attach the receptacle to the engine bracket.

(4) Remove the receptacle from the engine bracket.

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

C. Disassembly of a ESC() Plug Connector

NOTE: For the removal of the strain relief backshell or the backshell extension, the plug must be connected to the receptacle.

Table 3
NECESSARY TOOLS

Tool	Part Number	Supplier
Marker	Sharpie	Sanford
Pliers, Soft Jaw	BT-SJ-468	Daniels
	TG69	Daniels
		Glenair
Screwdriver, Number 3 Phillips	-	An available source

(1) Make a selection of pliers from Table 3:

NOTE: An equivalent pliers is a satisfactory alternative.

(2) Make a selection of a screwdriver from Table 3:

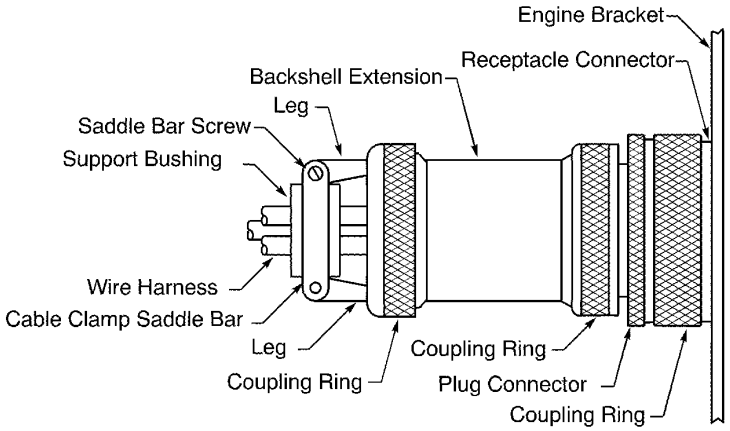
NOTE: An equivalent screwdriver is a satisfactory alternative.

(3) Examine the plug and the receptacle.

Make sure that:

- The receptacle connector is attached to the engine bracket
- The plug and the receptacle are connected.

(4) Loosen the saddle bar screws sufficiently to let the support bushing move rearward on the wire harness. Refer to Figure 1.



ESC() CONNECTOR AND BACKSHELL DISASSEMBLY
Figure 1

(5) If the saddle bars do not let the bushing move rearward on the harness, remove the screws and the saddle bars. Refer to Figure 1.

(6) If the saddle bars are removed, put these strain relief assembly components in a safe place:

- The screws
- The washers
- The saddle bars.

NOTE: These components are necessary to assemble the backshell again.

(7) Push the support bushing rearward on the wire harness. Refer to Figure 1.

(8) Loosen the coupling ring of the strain relief backshell with the pliers. Refer to Figure 1.

(9) Loosen the coupling ring of the backshell extension with the pliers. Refer to Figure 1.

Make sure that you do not turn the backshell extension if the backshell is a 45 degree or a 90 degree backshell.

NOTE: The position of the angled backshell extension is the backshell clock position.

(10) Disengage the threads of the coupling ring of the plug connector and the receptacle with the pliers. Refer to Figure 1.

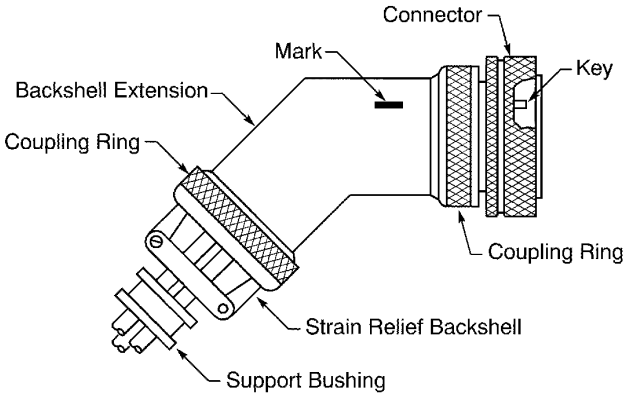
(11) Pull the plug from the receptacle.

(12) For a 45 degree or a 90 degree backshell, record the backshell clock position. Refer to Figure 2.

(a) Make a selection of a marker from Table 3.

NOTE: An equivalent marker is a satisfactory alternative.

(b) Make a mark on the backshell extension on the same side as the master key of the connector.



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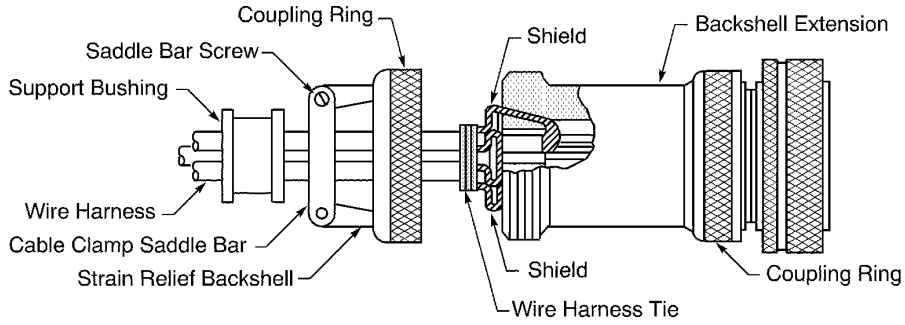
THE POSITION OF THE MARK ON THE ESC() BACKSHELL EXTENSION
Figure 2

NOTE: This records the backshell clock position on the backshell extension.

(13) Disengage the threads of the coupling ring of the strain relief backshell from the backshell extension. Refer to Figure 3.



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DISASSEMBLY OF THE ESC() STRAIN RELIEF BACKSHELL
Figure 3

(14) Carefully push the strain relief backshell rearward on the wire harness. Refer to Figure 3.

(15) Carefully cut the wire harness tie that holds the shields. Refer to Figure 3.

CAUTION: DO NOT CAUSE DAMAGE TO THE WIRES, CABLES OR SHIELDS OF THE WIRE HARNESS.

(16) Push the ground ring rearward on the wire harness.

(17) Fold the shields rearward on the wire harness.

(18) Disengage the threads of the coupling ring of the backshell extension from the connector.

(19) Push the backshell extension rearward on the wire harness, away from the connector.

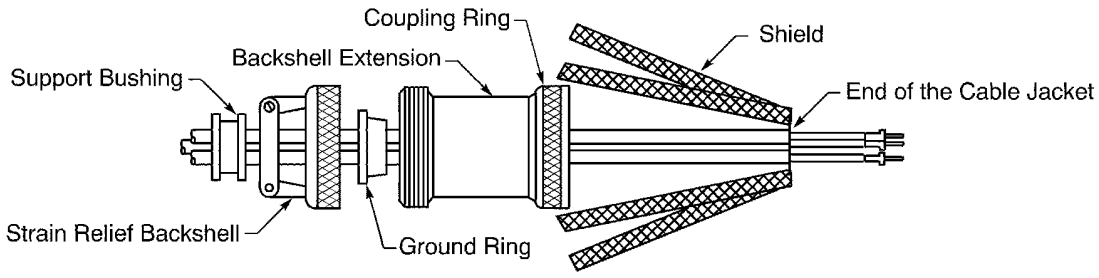
CAUTION: DO NOT CAUSE DAMAGE TO THE WIRES, CABLES OR SHIELDS OF THE WIRE HARNESS.

(20) Remove the contacts from the connector. Refer to Paragraph 2.F.

(21) Remove these backshell components from the end of the harness:

- The backshell extension
- The ground ring
- The backshell strain relief clamp
- The support bushing.

Refer to Figure 4.



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THE POSITION OF THE ESC() BACKSHELL EXTENSION, THE GROUND RING, THE STRAIN RELIEF BACKSHELL, AND THE SUPPORT BUSHING
Figure 4

D. Disassembly of a ESC() Receptacle Connector

NOTE: For the removal of the strain relief backshell or the backshell extension, the receptacle must be installed in the engine bracket.

Table 4
NECESSARY TOOLS

Tool	Part Number	Supplier
Marker	Sharpie	Sanford
Pliers, Soft Jaw	TG69	Glenair
		Daniels
	BT-SJ-468	Daniels
Screwdriver, Number 3 Phillips	-	An available source

(1) Make a selection of pliers from Table 4:

NOTE: An equivalent pliers is a satisfactory alternative.

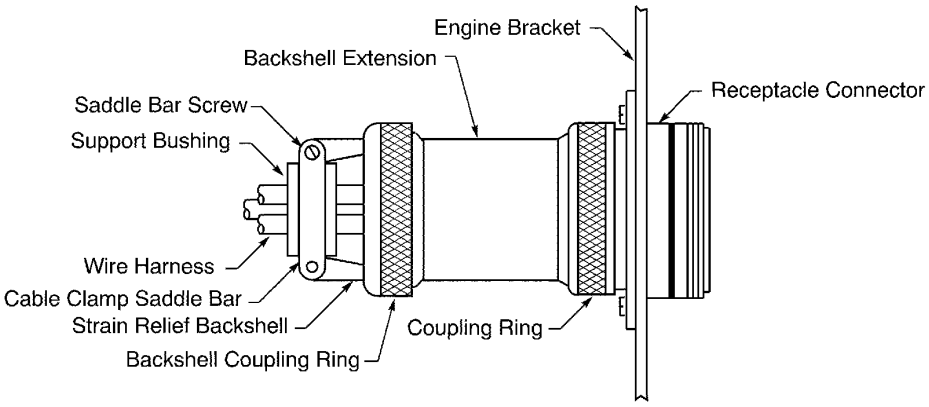
(2) Make a selection of a screwdriver from Table 4:

NOTE: An equivalent screwdriver is a satisfactory alternative.

(3) Examine the receptacle.

Make sure that the receptacle connector is attached to the engine bracket.

(4) Loosen the saddle bar screws sufficiently to let the support bushing move rearward on the wire harness. Refer to Figure 5.



ESC() CONNECTOR AND BACKSHELL DISASSEMBLY
Figure 5

(5) If the saddle bars do not let the bushing move rearward on the harness, remove the screws and the saddle bars. Refer to Figure 5.

(6) If the saddle bars are removed, put these strain relief assembly components in a safe place:

- The screws
- The washers
- The saddle bars.

NOTE: These components are necessary to assemble the backshell again.

(7) Push the support bushing rearward on the wire harness. Refer to Figure 5.

(8) Loosen the coupling ring of the strain relief backshell with the pliers. Refer to Figure 5.

(9) Loosen the coupling ring of the backshell extension with the pliers. Refer to Figure 5.

Make sure that you do not turn the backshell extension if the backshell is a 45 degree or a 90 degree backshell.

NOTE: The position of the angled backshell extension is the backshell clock position.

(10) Disengage the threads of the coupling ring of the plug connector and the receptacle with the pliers. Refer to Figure 5.

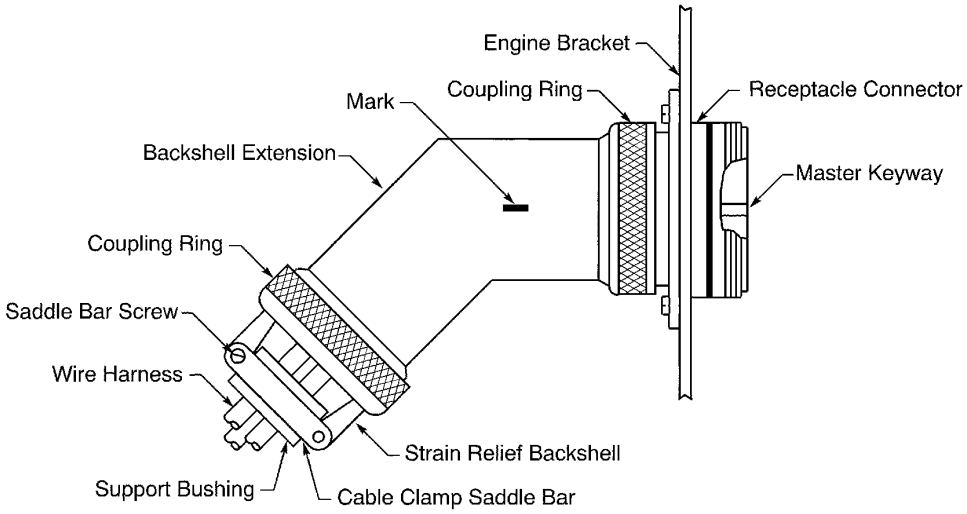
(11) Pull the plug from the receptacle.

(12) For a 45 degree or a 90 degree backshell, record the backshell clock position. Refer to Figure 6.

(a) Make a selection of a marker from Table 4.

NOTE: An equivalent marker is a satisfactory alternative.

(b) Make a mark on the backshell extension on the same side as the master keyway of the connector.



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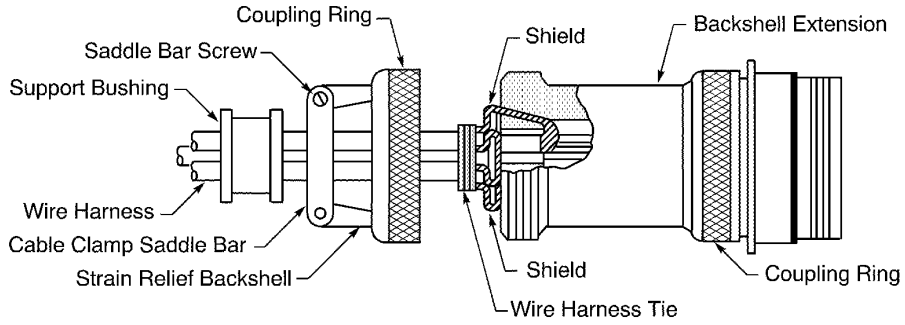
THE POSITION OF THE MARK ON THE ESC() BACKSHELL EXTENSION
Figure 6

NOTE: This records the backshell clock position on the backshell extension.

(13) Remove the receptacle from the engine bracket. Refer to Paragraph 2.B.

(14) Disengage the threads of the coupling ring of the strain relief backshell from the backshell extension. Refer to Figure 7.



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DISASSEMBLY OF THE ESC() STRAIN RELIEF BACKSHELL
Figure 7

(15) Carefully push the strain relief backshell rearward on the wire harness. Refer to Figure 7.

(16) Carefully cut the wire harness tie that holds the shields. Refer to Figure 7.

CAUTION: DO NOT CAUSE DAMAGE TO THE WIRES, CABLES OR SHIELDS OF THE WIRE HARNESS.

(17) Push the ground ring rearward on the wire harness.

(18) Fold the shields rearward on the wire harness.

(19) Disengage the threads of the coupling ring of the backshell extension from the connector.

(20) Push the backshell extension rearward on the wire harness, away from the connector.

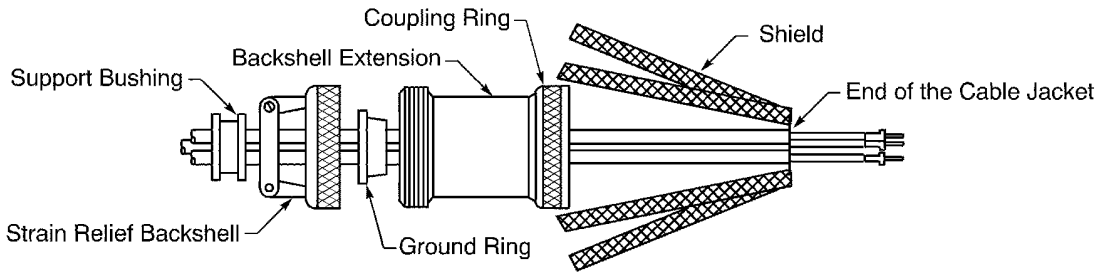
CAUTION: DO NOT CAUSE DAMAGE TO THE WIRES, CABLES OR SHIELDS OF THE WIRE HARNESS.

(21) Remove the contacts from the connector. Refer to Paragraph 2.F.

(22) Remove these backshell components from the end of the harness:

- The backshell extension
- The ground ring
- The backshell strain relief clamp
- The support bushing.

Refer to Figure 8.



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THE POSITION OF THE ESC() BACKSHELL EXTENSION, THE GROUND RING, THE STRAIN RELIEF BACKSHELL, AND THE BUSHING
Figure 8

E. Seal Plug and Seal Rod Removal

(1) Make a selection of a needle nose pair of pliers.

CAUTION: MAKE SURE THAT THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

(2) If it is necessary, remove a plastic tie strap or a wire harness tie that is less than 6 inches from the connector.

(3) Hold the end of the seal plug or the seal rod tightly in the jaws of the pliers.

(4) Pull the seal plug or the seal rod from the contact cavity.

F. Contact Removal - ESC() Rear Release Connectors

Table 5
CONTACT REMOVAL TOOLS - REAR RELEASE CONNECTORS

Contact Size	Removal Tool	Supplier
16	M81969/14-03	QPL
	M83723/31-16	QPL
20	M81969/14-02	QPL
	M81969/14-11	QPL
	M83723/31-20	QPL

(1) Make a selection of a contact removal tool from Table 5.

(2) Put the tip of the tool on the wire.

WARNING: DO NOT USE A REMOVAL TOOL THAT HAS A BENT TIP. AN INJURY CAN OCCUR.

(3) At the rear of the connector, axially align the tool and the contact cavity at the rear of the connector.

(4) Carefully push the tool into the contact cavity until it stops.

Make sure that the tool stays aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT CAVITY CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

(5) Hold the wire against the tool.

(6) Pull the tool and the wire out from the contact cavity at the same time.
Make sure that the tool stays aligned with the contact cavity.

(7) If the contact is not released:

(a) Carefully remove the tool.

(b) Turn the tool approximately 90 degrees.

(c) Do Step (2) through Step (6) again.

3. CONNECTOR DISASSEMBLY OF THE CA66279-106 CONNECTOR

A. Separation of the CA66279-106 Plug and the Receptacle

NOTE: If disassembly of the backshell of the plug is necessary, the plug must stay connected to the receptacle.

Table 6
NECESSARY TOOLS

Tool	Part Number	Supplier
Adapter, Coupling Ring	MT0011	Daniels
Drive Extension	-	An available source
Wrench, Socket	-	An available source

(1) Make a selection of these tools from Table 6:

- A coupling ring adapter
- A drive extension
- A socket wrench.

(2) Disengage the threads of the coupling ring of the plug connector and the receptacle with the coupling ring adapter, the drive extension, and the socket wrench.

(3) Pull the plug from the receptacle.

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

B. Disassembly of a CA66279-106 Plug Connector

NOTE: For the removal of the strain relief backshell, the plug must be connected to the receptacle and the receptacle must be installed in the bracket.

Table 7
NECESSARY TOOLS

Tool	Part Number	Supplier
Pliers, Soft Jaw	BT-SJ-468	Daniels
	TG69	Daniels
		Glenair
Screwdriver, Number 3 Phillips	-	An available source
Adapter, Coupling Ring	MT0011	Daniels
Drive Extension	-	An available source
Wrench, Socket	-	An available source

(1) Make a selection of pliers from Table 7:

NOTE: An equivalent pliers is a satisfactory alternative.

(2) Make a selection of a screwdriver from Table 7.

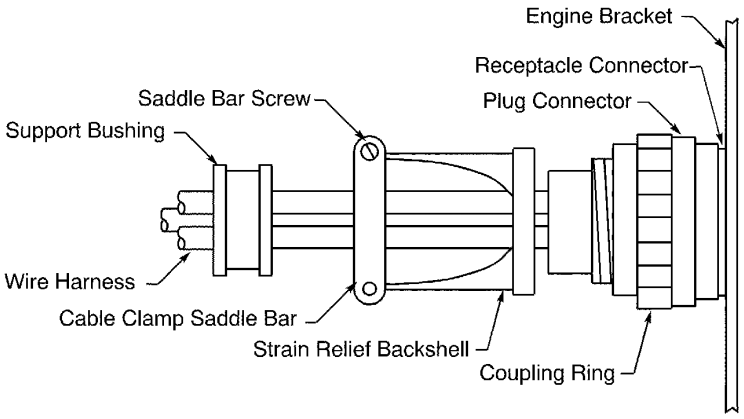
NOTE: An equivalent screwdriver is a satisfactory alternative.

(3) Remove the saddle bar screws and the saddle bars.

(4) Push the support bushing rearward on the wire harness.

(5) Loosen the strain relief backshell with the pliers.

(6) Push the strain relief backshell rearward on the wire harness. Refer to Figure 9.



BACKSHELL REMOVAL
Figure 9

(7) Make a selection of these tools from Table 7:

- A coupling ring adapter
- A drive extension
- A socket wrench.

(8) Disengage the threads of the coupling ring using the coupling ring adapter, the socket extension, and the socket wrench.

(9) Pull the plug from the receptacle.

(10) Remove the contacts from the connector. Refer to Paragraph 2.F.

(11) Remove the strain relief backshell from the wire harness.

Refer to Figure 9.

C. Contact Removal - CA66279-106 Front Release Connectors

Table 8
CONTACT REMOVAL TOOLS - FRONT RELEASE CA66279-106 CONNECTORS

Engaging End	Removal Tool	Supplier
4	294-239	Amphenol
	CET-FRF-4	ITT Cannon
	M81969/19-04	QPL
	MS90456-4	QPL

Table 8 CONTACT REMOVAL TOOLS - FRONT RELEASE CA66279-106 CONNECTORS (Continued)

Engaging End	Removal Tool	Supplier
16	294-219	Amphenol
	CET-FRF-16-22A	ITT Cannon
	M81969/19-02	QPL
	MS90456-3	QPL

(1) Make a selection of a contact removal tool from Table 8.

(2) Axially align the tool and the contact cavity at the front face of the connector.
Make sure that the plunger of the removal tool is fully retracted.

(3) Push the tool into the contact cavity until it stops.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT CAVITY CAN OCCUR.

(4) Push the plunger of the tool until the contact starts to come out of the contact cavity.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

(5) Carefully pull the tool out from the contact cavity.
Make sure that the tool stays aligned with the contact cavity.

(6) Pull the contact out of the contact cavity from the rear of the connector.

4. CONNECTOR ASSEMBLY OF THE ESC() CONNECTOR

A. ESC() Contact Assembly

Table 9
CONTACT CRIMP TOOLS

Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit Part Number	Locator Part Number	Supplier
16	16	M22520/7-01	M22520/7-03	Daniels
20	20	M22520/7-01	M22520/7-02	Daniels

Table 10
INSULATION REMOVAL LENGTH

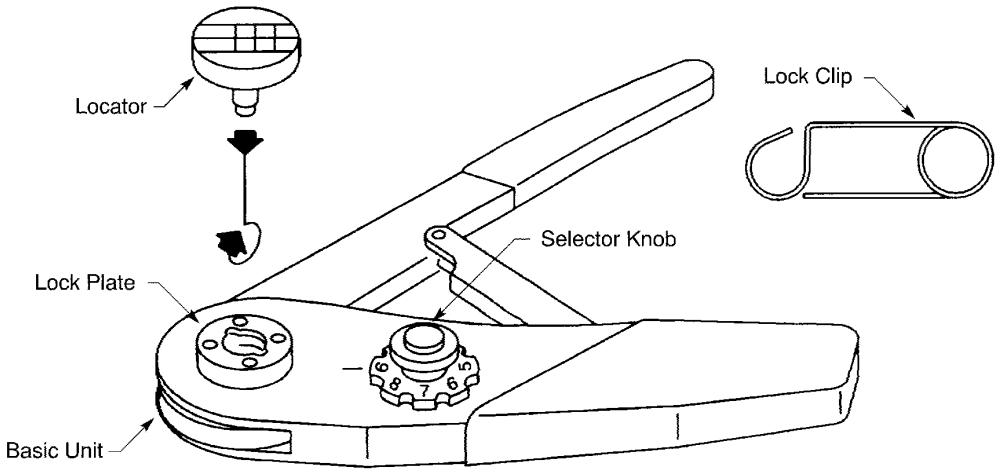
Wire Size	Crimp Barrel Size	Removal Length L (inch)		Removal Length L (millimeters)	
		Minimum	Maximum	Minimum	Maximum
20	20	0.11	0.15	3	4
16	16	0.21	0.25	5	6

(1) Make a selection of a crimp tool from Table 9.

(2) Assemble the crimp tool. Refer to Figure 10.

CAUTION: TO PREVENT DAMAGE TO THE CRIMP TOOL, THE HANDLE OF THE BASIC UNIT MUST BE IN THE OPEN POSITION WHEN THE LOCATOR IS:

- INSTALLED
- REMOVED
- RELEASED.



CONTACT CRIMP TOOL
Figure 10

(a) Remove the lock clip from the lock ring on the locator.

(b) Put the locator in the lock plate of the basic unit.

(c) Align the locator pins with the ring slots on the lock plate.

(d) Push the locator into the basic unit.

(e) Turn the locator in a clockwise direction until it locks in its position, approximately 90 degrees.

(f) Put the lock clip in the lock ring.

(3) Adjust the crimp tool.

CAUTION: IF THE SELECTOR KNOB OF THE BASIC UNIT IS IN AN INCORRECT POSITION WHEN THE CONTACT IS CRIMPED:

- DAMAGE TO THE CONTACT CAN OCCUR
- UNSATISFACTORY RELIABILITY AND PERFORMANCE OF THE CONTACT ASSEMBLY CAN OCCUR.

(a) Remove the lock clip from the lock ring hole in the selector knob.

(b) Lift and turn the selector knob of the basic unit until the number on the knob is the same as the number on the locator data plate for the size of the wire.

(c) Put the lock clip in the lock ring hole.

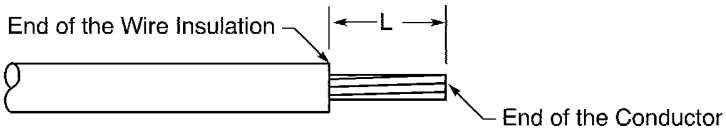
(d) Align the number on the knob to the index mark on the basic unit.

(e) Release the knob.

(4) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 11
- Table 10 for the insulation removal length.



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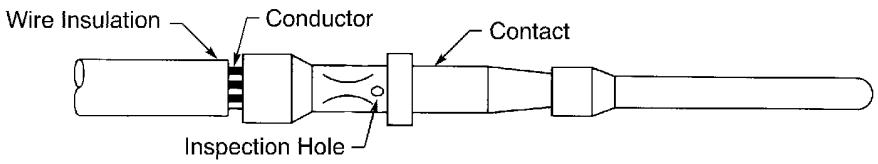
INSULATION REMOVAL LENGTH
Figure 11

(5) Put the conductor in the crimp barrel of the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch (1 millimeter).



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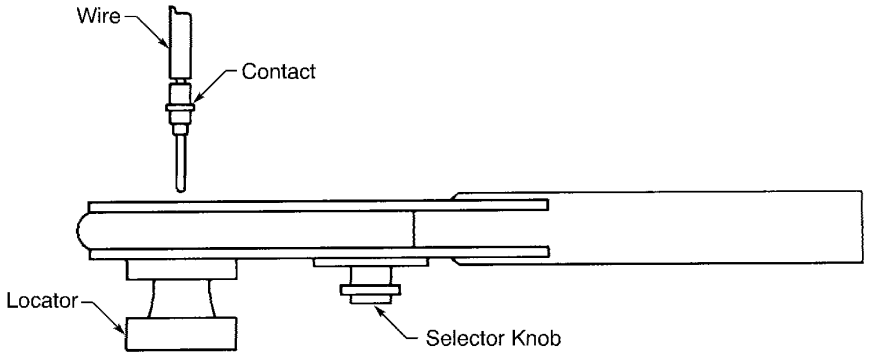
POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 12

(6) Put the wire and the contact in the locator of the crimp tool. Refer to Figure 13.
Make sure that the forward end of the contact is against the bottom of the locator.



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ALIGNMENT OF THE WIRE, THE CONTACT, AND THE CRIMP TOOL
Figure 13

(7) Crimp the contact.
Make sure that:
- All the strands of the conductor are in the crimp barrel
- You can see the conductor in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch (1 millimeter).

(a) Close the handles of the basic unit until the ratchet is released.

CAUTION: DO NOT RELEASE THE LATCH FOR THE LOCATOR WHEN THE BASIC UNIT HANDLE IS IN THE CLOSED POSITION.

(b) Remove the contact assembly from the tool.

(8) Hold the wire and lightly pull the contact to make sure that the contact is crimped on the conductor.

B. ESC() Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be put on the wire harness before the insertion of the contacts into the connector. Refer to Subject 20-23-39.

Table 11
CONTACT INSERTION TOOLS - REAR RELEASE CONNECTORS

Contact Size	Insertion Tool	Supplier
20	M83723/31-20	QPL
16	M83723/31-16	QPL

Table 12
CONTACT RETENTION TEST TOOLS

Contact		Contact Retention Test Tool		Supplier
Engaging End Size	Type	Basic Unit	Tip	
20	Pin	HT250-4	68-020-01	Daniels
	Socket	HT250-4	67-020-01	Daniels
16	Pin	HT250-4	68-016-01	Daniels
	Socket	HT250-4	67-016-01	Daniels

(1) Make a selection of an insertion tool from Table 11.

(2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

(3) Put the contact assembly in the insertion tool.

(4) At the rear of the connector, axially align the tool and the contact cavity.

(5) Carefully push the contact into the contact cavity until it stops.

Make sure that the tool and the contact cavity stay axially aligned.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

(6) Carefully pull the tool out of the contact cavity.

Make sure that the tool and the contact cavity stay axially aligned.

(7) Do a contact retention test:

NOTE: The retention test tool applies a known force to the contact to make sure that the connector holds the contact.

(a) Make a selection of a contact retention test tool basic unit from Table 12.

(b) Make a selection of a contact retention test tool tip from Table 12:

- A tip for a pin to test a pin contact
- A tip for a socket to test a socket contact.

(c) Axially align the retention test tool, the tip, and the engaging end of the contact.

(d) Apply hand pressure with the test tool against the contact until the indicator located on the tip is aligned with the body of the test tool.

CAUTION: KEEP THE RETENTION TEST TOOL AXIALLY ALIGNED TO THE CONTACT. DAMAGE TO THE CONTACT CAN OCCUR.

(e) If the contact stays locked in the contact cavity, the contact retention is satisfactory.

(f) Do steps (7a) through (7d) again for all the contacts in the connector.

(8) If the contact is not locked in the contact cavity:

(a) Pull the contact assembly out of the contact cavity.

(b) Do Step 4.B.(3) through Step 4.B.(7) again.

C. Seal of an Empty Contact Cavity

All empty contact cavities must be sealed. Refer to Subject 20-60-08.

If a stub wire is necessary, the length of the stub wire must be 4 inches to 6 inches.

D. ESC() Backshell Assembly

(1) Assemble the backshell. Refer to Subject 20-23-39.

(2) Do an insulation resistance check for each wire that terminates in the connector. Refer to Paragraph 6.B.

(3) Do a wire continuity check for each wire that terminates in the connector. Refer to Paragraph 6.A.

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

5. CONNECTOR ASSEMBLY OF THE CA66279-106 CONNECTOR

A. CA66279-106 Contact Assembly

Table 13
INDENTER TYPE CRIMP TOOLS

Wire Size (AWG)	Engaging End	Crimp Barrel	Crimp Tool					Supplier
			Basic Unit		Die	Locator		
			Part Number	Setting		Part Number	Color	
16	16	16	294-126	-	-	-	-	Amphenol
			M22520/1-01	6	-	M22520/1-02	Blue	QPL
			MS3191-1	6	-	MS3191-16A	Blue	QPL
			ST2220-1-Y	6	-	ST2220-1-2	-	Boeing
			WA27F	6	-	M22520/1-02	Blue	Daniels
8	4	8	400B	-	414DA-8N	4112	-	Pico
			M22520/23-01	-	WA23-2	WA23-9	-	QPL
			WA23	-	WA23-2	WA23-9	-	Daniels

Table 14
HEX TYPE CRIMP TOOLS

Wire Size (AWG)	Contact Size		Crimp Tool			Supplier
	Engaging End	Crimp Barrel	Basic Unit	Die Set		
				Primary	Secondary	
8	4	8	13642	ST2354-5	11732	Thomas & Betts

Table 15
INSULATION REMOVAL LENGTH

Wire Size	Engaging End	Crimp Barrel	Removal Length L (inch)		Removal Length L (millimeter)		Special Instructions
			Minimum	Maximum	Minimum	Maximum	
16	16	16	0.22	0.28	6	7	-
8	4	8	0.50	0.56	13	14	Increase the O.D. of the wire

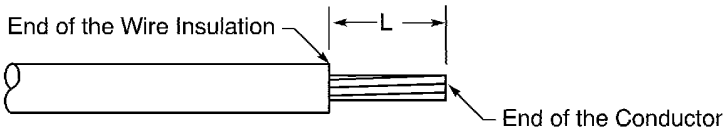
Table 16
NECESSARY MATERIALS

Description	Part Number	Approved Supplier
Tape, self-bonding silicone rubber, high temperature, 0.012 inch thick, 1 inch wide	912-10X12	Arlon, Silicone Technologies Division

(1) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 14
- Table 15 for the insulation removal length.



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INSULATION REMOVAL LENGTH
Figure 14

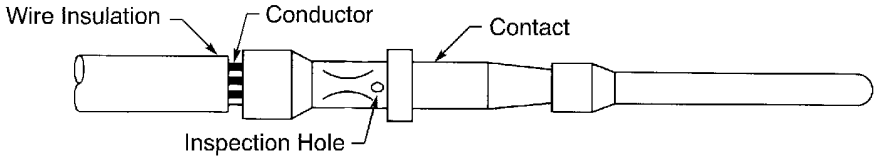
(2) Make a selection of a crimp tool from:

- Table 13 for size 16 contacts
- Table 13 or Table 14 for size 4 contacts.

(3) Put the conductor in the crimp barrel of the contact.

Make sure that:

- All the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is not more than 0.03 inch (1 millimeter).



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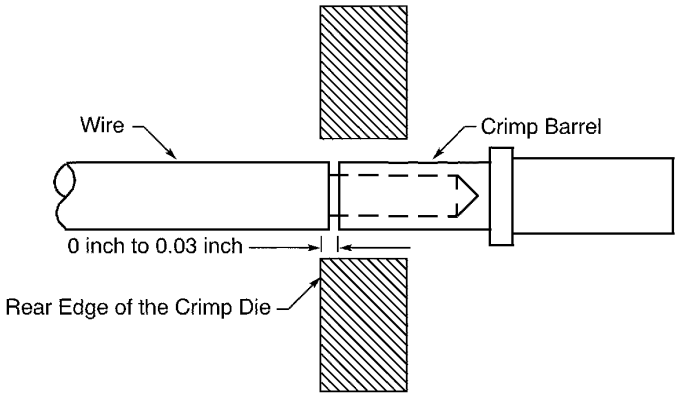
POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 15

(4) If the crimp tool is an indenter type crimp tool, crimp the contact.

(5) If the crimp tool is a hex type crimp tool:

(a) Put the contact in the primary crimp die. Refer to Figure 16.

Make sure that the distance from the rear end of the crimp barrel to the rear edge of the die is between 0 inch (0 millimeter) and 0.03 inch (1 millimeter).



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POSITION OF THE CONTACT AND WIRE IN THE CRIMP TOOL DIE
Figure 16

(b) Crimp the contact with the primary crimp die.

(c) Turn the contact 60 degrees on the longitudinal axis of the contact.

(d) Put the crimp barrel end of the contact in the secondary crimp die. Refer to Figure 16.

Make sure that the distance from the rear end of the crimp barrel to the rear edge of the die is between 0 inch (0 millimeter) and 0.03 inch (1 millimeter).

(e) Crimp the contact with the secondary crimp die.

(f) If the contact crimp barrel has flash, do Step (c) through Step (e) again.

NOTE: Copper that can be seen on the edges of the crimp barrel is permitted.

(6) Hold the wire and lightly pull the contact to make sure that the contact is crimped on the conductor.

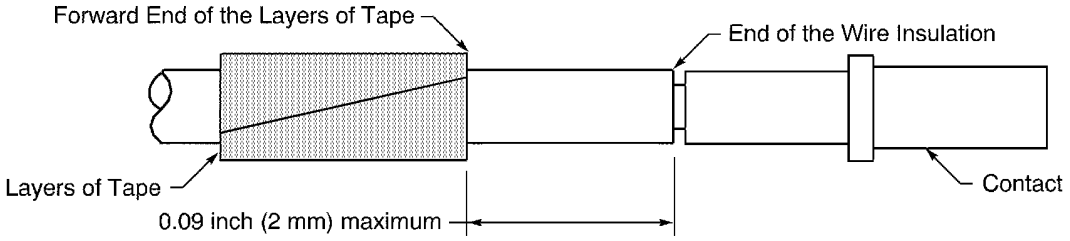
(7) To increase the outside diameter of the 8 AWG wire, make a selection of tape from Table 16.

NOTE: An equivalent tape is a satisfactory alternative.

(8) Increase the outside diameter of the 8 AWG wire by winding 4.5 to 5.0 layers of tape around the wire.

Make sure that:

- The distance from the forward edge of the tape to the end of the contact crimp barrel is 0.09 inches (2 millimeters) maximum
- Each layer of tape has a 100 percent overlap
- The minimum outside diameter of the wire and tape is 0.23 inch (6 millimeter) minimum.



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LOCATION OF THE TAPE ON THE WIRE
Figure 17

B. CA66279-106 Contact Insertion

NOTE: If a backshell is specified, the necessary backshell components must be put on the wire harness before the insertion of the contacts into the connector. Refer to Subject 20-23-39.

Table 17
CONTACT INSERTION TOOLS - FRONT RELEASE CONNECTORS

Contact Size	Insertion Tool	Supplier
16	294-192	Amphenol
	CIT-16	ITT Cannon
	M81969/17-01	QPL
	M81969/17-04	QPL
4	294-236	Amphenol
	M81969/17-08	QPL

(1) Make a selection of an insertion tool from Table 17.

(2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

(3) Put the contact assembly in the insertion tool.

(4) At the rear of the connector, axially align the tool and the contact cavity.

(5) Carefully push the contact into the contact cavity until it stops.
Make sure that the tool and the contact cavity stay axially aligned.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

(6) Carefully pull the tool out of the contact cavity.

Make sure that the tool and the contact cavity stay axially aligned.

(7) Lightly pull the wire to make sure that the contact is locked in the contact cavity.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

(8) Do Step 5.B.(7) again for all the contacts in the connector.

(9) If the contact is not locked in the contact cavity:

(a) Pull the contact assembly out of the contact cavity.

(b) Do Step 5.B.(3) through Step 5.B.(7) again.

C. CA66279-106 Backshell Assembly

(1) Assemble the backshell. Refer to Subject 20-23-39.

(2) Do an insulation resistance check for each wire that terminates in the connector. Refer to Paragraph 6.B.

(3) Do a wire continuity check for each wire that terminates in the connector. Refer to Paragraph 6.A.

6. WIRE CHECKS

A. Wire Continuity Check

(1) Find the wire termination data. Refer to the WDM.

(2) Disconnect each connector on the circuit that must have a wire continuity check.

CAUTION: EACH CONNECTOR ON THE CIRCUIT THAT MUST HAVE A TEST MUST BE DISCONNECTED. IF THE CONNECTORS ARE NOT DISCONNECTED, UNSATISFACTORY RESISTANCE INDICATIONS OR DAMAGE TO THE CONNECTOR CAN OCCUR.

(3) Measure the resistance on all wires.

Make sure that each circuit has continuity from one end of the wire to the other end of the wire.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

RB 211 TRENT 800 POWER PLANT: CONNECTOR DISASSEMBLY AND ASSEMBLY

B. Insulation Resistance Check

(1) Make a selection of a multimeter.

WARNING: DO NOT USE A MEGOHMETER FOR THE INSULATION RESISTANCE TEST OF THE ON-WING WIRING REPAIR. INJURY TO PERSONNEL OR DAMAGE TO THE AIRPLANE CAN OCCUR.

(2) Set the meter to the 100 megohm scale.

(3) Attach one meter test lead to the contact assembly on the connector.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

(4) Attach the other meter test lead to a contact assembly on a wire that does not connect to the same circuit.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

(5) Read the meter.

Make sure that the resistance is a minimum of 100 megohm.

(6) Do Step 6.B.(3) through Step 6.B.(5) for each contact in the connector.

(7) Attach the one meter test lead to the backshell.

(8) Attach the other meter test lead to the contact assembly on the wire that must have a test.

CAUTION: DO NOT BEND OR PUT STRESS ON THE CONTACTS. DAMAGE TO THE CONNECTOR OR THE CONTACTS CAN OCCUR.

(9) Read the meter.

Make sure that the resistance is a minimum of 100 megohm.

(10) Do Step 6.B.(8) through Step 6.B.(9) for each wire that must have a test.

7. CONNECTOR INSTALLATION OF THE ESC() CONNECTOR

A. ESC() Receptacle Installation in a Bracket

Table 18
RECEPTACLE INSTALLATION FASTENER TORQUE

Fastener Thread Size	Fastener Torque		Connector Shell Size
	(pound-inches)	(Newton-meters)	
4-40	5.0	0.57	08
			10
			12
			14
			16
			18
			20
			22
6-32	10.0	1.13	24
			28

Table 19
NECESSARY TOOLS

Tool	Special Instructions	Supplier
Screwdriver, Number 3 Phillips	-	An available source
Torque	Tool must measure 10 inch-pounds (1.13 newton-meters) minimum	An available source

(1) Make a selection of these tools from Table 19.
- A screwdriver
- A torque tool.

(2) For a connector that has a 90 degree backshell or a 45 degree backshell, align the keyway of the connector with the mark that was made on the engine bracket.

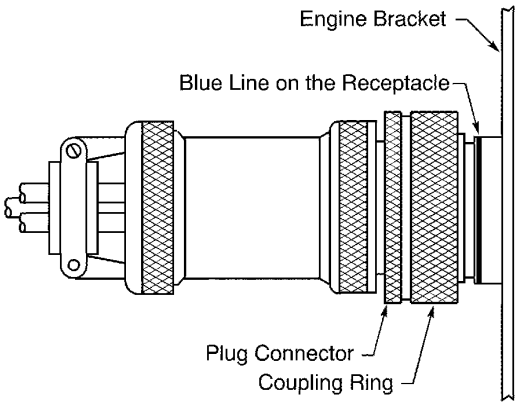
(3) Put the receptacle in its installation location in the engine bracket.

(4) Put the screws through the installation holes in the engine bracket and the installation holes in the receptacle flange.

(5) Engage the threads of the installation nuts and the screws.

(6) Tighten the nuts to the specified torque. Refer to Table 18.

B. Connection of the ESC() Plug and Receptacle



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CONNECTION OF THE PLUG AND RECEPTACLE
Figure 18

(1) Align the key of the receptacle and the keyway of the plug.

Make sure that the contacts are correctly aligned.

Make sure that the wire harness has sufficient slack for the plug:

- To move forward
- To make a satisfactory connection with the receptacle
- To prevent tension on the contact assemblies in the plug.

(2) Engage the threads of the plug and the receptacle.

Make sure that the threads of the plug and receptacle are correctly engaged.

(3) Push the plug into the receptacle.

(4) Tighten the coupling ring with the hand.

(5) Move the backshell from side to side and continue to tighten the coupling ring of the plug with the hand.

(6) Tighten the coupling ring of the plug connector with the hand until you cannot see the blue line. Refer to Figure 18.

NOTE: If you can see the blue line on the connector, the connector is not installed correctly.

8. CONNECTOR INSTALLATION OF THE CA66279-106 CONNECTOR

A. Connection of the CA66279-106 Plug and a Receptacle

Table 20
NECESSARY TOOLS

Tool	Part Number	Supplier
Adapter, Coupling Ring	MT0011	Daniels
Drive Extension	-	An available source
Wrench, Torque	-	An available source

(1) Make a selection of these tools from Table 20:

- A coupling ring adapter
- A drive extension
- A torque wrench.

(2) Align the key of the receptacle and the keyway of the plug.

Make sure that the contacts are correctly aligned.

Make sure that the wire harness has sufficient slack for the plug:

- To move forward
- To make a satisfactory connection with the receptacle
- To prevent tension on the contact assemblies in the plug.

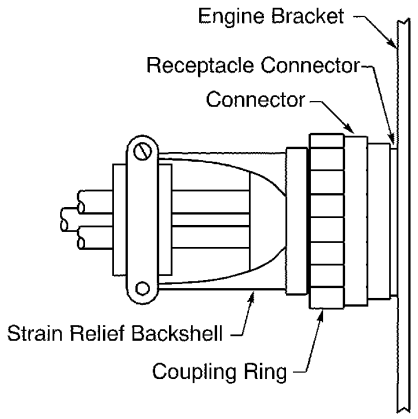
(3) Engage the threads of the plug and the receptacle.

Make sure that the threads of the plug and receptacle are correctly engaged.

(4) Push the plug into the receptacle.

(5) Tighten the coupling ring with the hand.

(6) Move the backshell from side to side and continue to tighten the coupling ring of the plug with the hand.



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CONNECTION OF THE PLUG AND RECEPTACLE
Figure 19

(7) Torque the coupling ring 200 inch-pounds (23 newton-meters) to 240 inch-pounds (27 newton-meters).

CAUTION: DO NOT USE A METAL JAW TOOL TO TIGHTEN THE COUPLING RING OF THE CONNECTOR. DAMAGE TO THE CONNECTOR WILL OCCUR.

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

TABLE OF CONTENTS

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

1. GENERAL DATA

A. Applicable Conditions

For the conditions that are applicable:

- To the data and procedures of this Subject, refer to Subject 20-23-00
- For the replacement of wiring components, refer to Subject 20-23-15.

2. PART NUMBERS AND DESCRIPTION

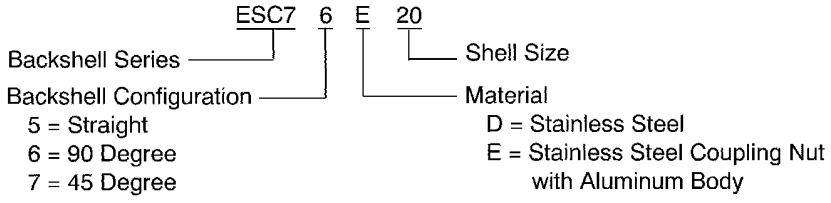
A. Backshell Part Numbers

Table 1
BACKSHELL PART NUMBERS

Backshell		Supplier
Part Number	Configuration	
ESC75()	Straight	QPL
ESC76()	90 Degree	QPL
ESC77()	45 Degree	QPL
057-0872-000	Straight	ITT Cannon

Table 2
APPROVED SUPPLIERS OF ESC STANDARD BACKSHELLS

Standard	Approved Supplier
ESC75()	Glenair
	Polamco
ESC76()	Glenair
	Polamco
ESC77()	Glenair
	Polamco



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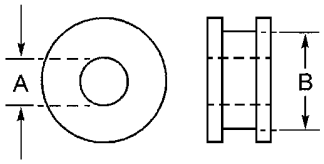
ESC75, ESC76 AND ESC77 BACKSHELL PART NUMBER STRUCTURE
Figure 1

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

B. Support Bushing Part Numbers

To find the ESC support bushing part numbers, refer to the Aircraft Illustrated Parts Catalog (AIPC).

NOTE: If the diameter of the wire harness is changed from the initial configuration, a new support bushing for the backshell strain relief can be selected from Table 3.



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SUPPORT BUSHING
Figure 2

Table 3
SUPPORT BUSHING PART NUMBERS

Shell Size	Support Bushing			
	Dimension	Diameter (inch)	Diameter (millimeter)	Part Number
08	A	0.13	3.3	ESC53-20
	B	0.27	6.9	
	A	0.15	3.8	ESC53-21
	B	0.27	6.9	
10	A	0.20	5.1	ESC53-22
	B	0.46	11.7	
	A	0.25	6.4	ESC53-23
	B	0.46	11.7	
	A	0.30	7.6	ESC53-24
	B	0.46	11.7	
12	A	0.25	6.4	ESC53-25
	B	0.59	15.0	
	A	0.30	7.6	ESC53-26
	B	0.59	15.0	
	A	0.35	8.9	ESC53-27
	B	0.59	15.0	

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

Table 3 SUPPORT BUSHING PART NUMBERS (Continued)

Shell Size	Support Bushing			
	Dimension	Diameter (inch)	Diameter (millimeter)	Part Number
14	A	0.25	6.4	ESC53-28
	B	0.65	16.5	
	A	0.30	7.6	ESC53-29
	B	0.65	16.5	
	A	0.35	8.9	ESC53-30
	B	0.65	16.5	
	A	0.40	10.2	ESC53-31
	B	0.65	16.5	
16	A	0.40	10.2	ESC53-32
	B	0.78	19.8	
	A	0.50	12.7	ESC53-33
	B	0.78	19.8	
	A	0.60	15.2	ESC53-34
	B	0.78	19.8	
18	A	0.40	10.2	ESC53-32
	B	0.78	19.8	
	A	0.50	12.7	ESC53-33
	B	0.78	19.8	
	A	0.60	15.2	ESC53-34
	B	0.78	19.8	
22	A	0.40	10.2	ESC53-35
	B	0.98	24.9	
	A	0.50	12.7	ESC53-36
	B	0.98	24.9	
	A	0.60	15.2	ESC53-37
	B	0.98	24.9	
	A	0.70	17.8	ESC53-38
	B	0.98	24.9	

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

Table 3 SUPPORT BUSHING PART NUMBERS (Continued)

Shell Size	Support Bushing			
	Dimension	Diameter (inch)	Diameter (millimeter)	Part Number
24	A	0.50	12.7	ESC53-39
	B	1.28	32.5	
	A	0.75	19.1	ESC53-40
	B	1.28	32.5	
	A	0.88	22.4	ESC53-41
	B	1.28	32.5	
	A	1.00	25.4	ESC53-42
	B	1.28	32.5	
28	A	0.75	19.1	ESC53-43
	B	1.40	35.6	
	A	0.88	22.4	ESC53-44
	B	1.40	35.6	
	A	1.00	25.4	ESC53-45
	B	1.40	35.6	
	A	1.20	30.5	ESC53-46
	B	1.40	35.6	

Table 4
APPROVED SUPPLIERS OF ESC53 STANDARD SUPPORT BUSHINGS

Part Number	Supplier
ESC53()	Dunlop

3. ESC BACKSHELL ASSEMBLY

A. Assembly of Straight ESC Backshells

Table 5
NECESSARY MATERIALS

Material	Description	Supplier
Tape	Adhesive	An available source

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

Table 6
BACKSHELL INSTALLATION TOOLS

Tool	Part Number	Supplier
Pliers, Soft Jaw, Adjustable	BT-SJ-468	Daniels
	TG69	Daniels
		Glenair
Screwdriver	Number 3 Phillips	An available source

(1) Make a selection of a tape from Table 5.

NOTE: An equivalent tape is a satisfactory alternative.

(2) Make a selection of pliers from Table 6.

NOTE: An equivalent pliers is a satisfactory alternative.

(3) Make a selection of a screwdriver from Table 6.

(4) If the diameter of the wire harness is not the same as the initial configuration, make a selection of a new support bushing from Table 3.

Make sure that the new support bushing is the correct size for the wire harness diameter and the diameter of the cable clamp of the strain relief backshell.

(5) Put the necessary backshell components on the wire harness in this sequence:

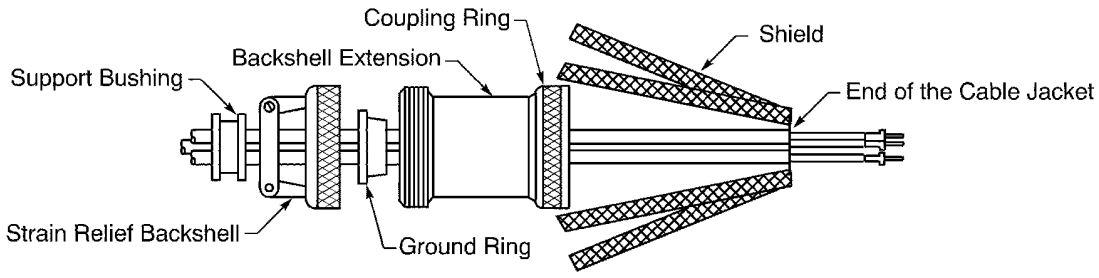
- The support bushing
- The strain relief backshell
- The ground ring
- The backshell extension.

Refer to Figure 3.

Make sure that:

- The end of the strain relief backshell that has the coupling ring is pointed forward to the end of the wire harness
- The end of the ground ring that has the larger diameter is pointed rearward away from the end of the wire harness
- The end of the backshell extension that has the coupling ring is pointed forward to the end of the wire harness.

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS



BACKSHELL COMPONENTS ON THE WIRE HARNESS
Figure 3

(6) Install the contacts in the connector. Refer to Subject 20-23-37.

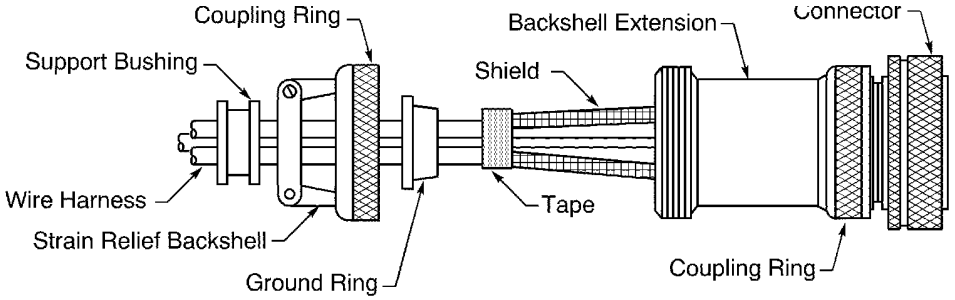
(7) Fold the shields back on the wire harness.

Make sure that:

- The shields are symmetrical around the circumference of the wire harness
- The shields are flat against the wire harness.

(8) Wind a layer of tape on the ends of the shields to temporarily hold the shields on the harness.

(9) Fully engage the threads of the coupling ring of the backshell extension and the connector. Refer to Figure 4.



ENGAGED THREADS OF THE BACKSHELL EXTENSION AND THE CONNECTOR
Figure 4

(10) To remove the play between the backshell extension and the connector:

(a) Tighten the coupling ring of the backshell extension with the hand and, at the same time, twist the backshell extension clockwise and counterclockwise approximately 1/8 inch in each direction.

(b) Move the backshell extension from side to side and continue to tighten the coupling ring.

(c) Twist the backshell extension clockwise and counterclockwise approximately 1/8 inch in each direction and fully tighten the coupling ring.

(11) Remove the tape that holds the shields on the wire harness.

(12) Carefully fold the shields forward on the backshell extension.

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

(13) Push the ground ring forward into the backshell extension.

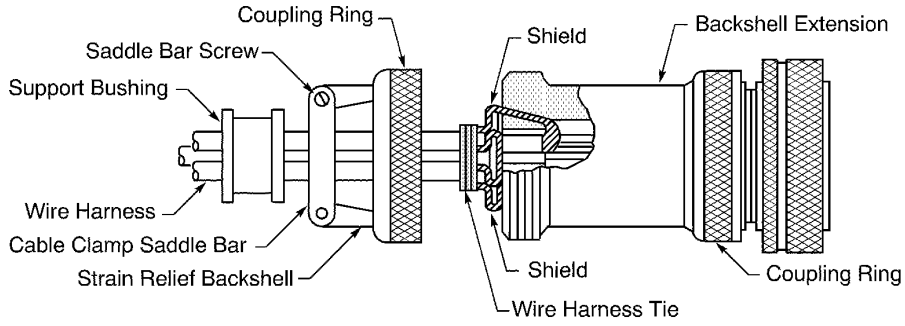
(14) Carefully fold the shields back against the wire harness.

Make sure that the shields are even and symmetrical around the ground ring.

(15) Assemble a wire harness tie on the ends of the shields at the rear end of the ground ring.

Refer to:

- Figure 5
- Subject 20-23-30 for the procedure to assemble a wire harness tie.



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POSITION OF THE WIRE HARNESS TIE ON THE ENDS OF THE SHIELDS
Figure 5

(16) Fully engage the threads of the coupling ring of the strain relief backshell and the backshell extension.

(17) Align the center of the support bushing with the saddle bar installation screw holes in the legs of the strain relief backshell.

(18) Align the installation screw holes of the saddle bars and the legs of the strain relief backshell.

(19) Install the saddle bar screws.

Make sure that the screws are not fully tightened.

(20) If the connector is a receptacle, install it. Refer to Subject 20-23-37.

(21) If the connector is a plug, connect it to the related receptacle. Refer to Subject 20-23-37.

NOTE: The receptacle must be installed before the coupling ring can be fully tightened.

(22) Move the backshell extension from side to side and, at the same time, tighten the backshell extension coupling ring with the pliers until the pliers move on the surface of the coupling ring.

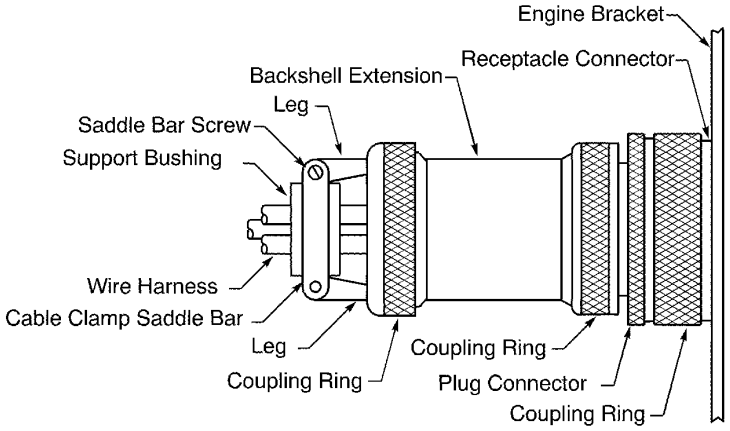
RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

(23) Move the strain relief backshell from side to side and, at the same time, tighten the strain relief backshell coupling ring with the pliers until the pliers move on the surface of the coupling ring.

(24) Fully tighten the saddle bar screws. Refer to Figure 6.

Make sure that:

- The saddle bar screws are tight
- The saddle bars are against the legs of the strain relief backshell
- The wire harness cannot be moved in the cable clamp.



FULLY ASSEMBLED BACKSHELL
Figure 6

B. Assembly of 45 Degree and 90 Degree ESC Backshells

Table 7
NECESSARY MATERIALS

Material	Description	Supplier
Tape	Adhesive	An available source

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

Table 8
NECESSARY TOOLS

Tool	Part Number	Supplier
Marker	Sharpie	Sanford
Pliers, Soft Jaw, Adjustable	BT-SJ-468	Daniels
	TG69	Daniels
		Glenair
Screwdriver	Number 3 Phillips	An available source

(1) Make a selection of a tape from Table 7.

NOTE: An equivalent tape is a satisfactory alternative.

(2) Make a selection of a marker from Table 8.

NOTE: An equivalent marker is a satisfactory alternative.

(3) Make a selection of pliers from Table 8.

NOTE: An equivalent pliers is a satisfactory alternative.

(4) Make a selection of a screwdriver from Table 8.

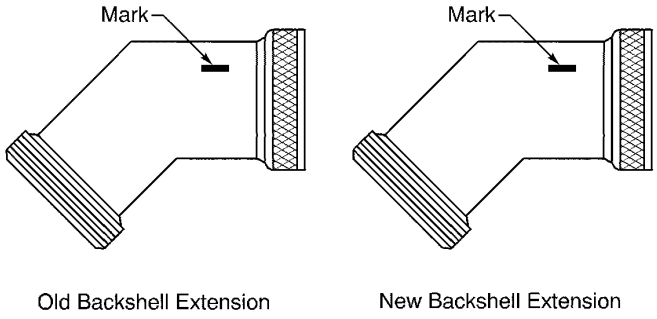
(5) If the diameter of the wire harness is not the same as the initial configuration, make a selection of a new support bushing from Table 3.

Make sure that the new support bushing is the correct size for the wire harness diameter and the diameter of the cable clamp of the strain relief backshell.

(6) Make a mark on the new backshell extension in the same location as the mark on the backshell extension in the initial installation.

Refer to:

- Figure 7
- Subject 20-23-37 for the procedure to record the clock position of the backshell extension of the initial installation.



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MARK ON THE NEW BACKSHELL EXTENSION IN THE SAME LOCATION AS THE MARK ON THE OLD BACKSHELL EXTENSION

Figure 7

(7) Put the necessary backshell components on the wire harness in this sequence:

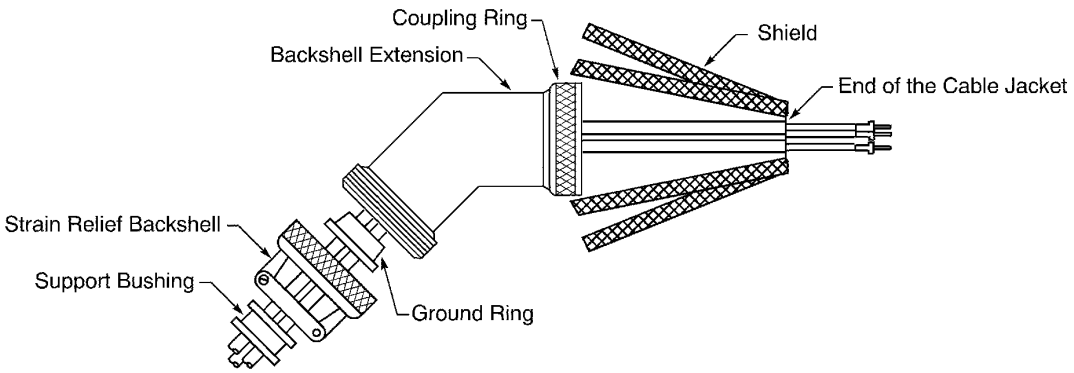
- The support bushing
- The strain relief backshell
- The ground ring
- The backshell extension.

Refer to Figure 8.

Make sure that:

- The end of the strain relief backshell that has the coupling ring is pointed forward to the end of the wire harness
- The end of the ground ring that has the larger diameter is pointed rearward away from the end of the wire harness
- The end of the backshell extension that has the coupling ring is pointed forward to the end of the wire harness.

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS



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BACKSHELL COMPONENTS ON THE WIRE HARNESS
Figure 8

(8) Install the contacts in the connector. Refer to Subject 20-23-37.

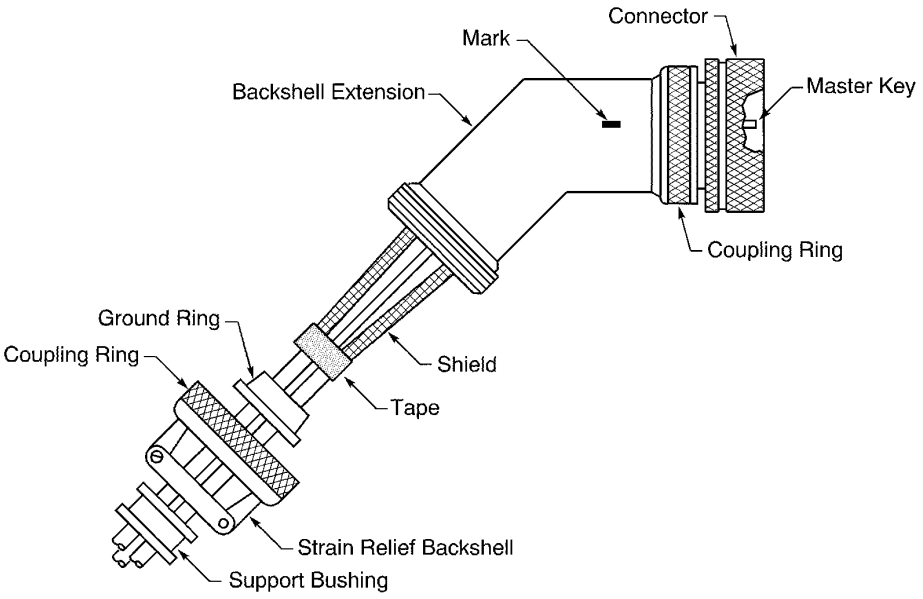
(9) Fold the shields back on the wire harness.

Make sure that:

- The shields are symmetrical around the circumference of the wire harness
- The shields are flat against the wire harness.

(10) Wind a layer of tape on the ends of the shields to temporarily hold the shields on the harness.

(11) Align the mark on the backshell extension with the master key or the master keyway of the connector. Refer to Figure 9.



ALIGNMENT OF THE BACKSHELL EXTENSION AND THE CONNECTOR
Figure 9

(12) Fully engage the threads of the coupling ring of the backshell extension and the connector.

Make sure that the mark on the backshell extension stays aligned with the master key or the master keyway of the connector. Refer to Figure 9.

(13) To remove the play between the backshell extension and the connector:

(a) Tighten the coupling ring of the backshell extension with the hand and, at the same time, twist the backshell extension clockwise and counterclockwise approximately 1/8 inch in each direction.

(b) Move the backshell extension from side to side and continue to tighten the coupling ring.

(c) Twist the backshell extension clockwise and counterclockwise approximately 1/8 inch in each direction and fully tighten the coupling ring.

(14) Remove the tape that holds the shields on the wire harness.

(15) Carefully fold the shields forward on the backshell extension.

(16) Push the ground ring forward into the backshell extension.

(17) Carefully fold the shields back against the wire harness.

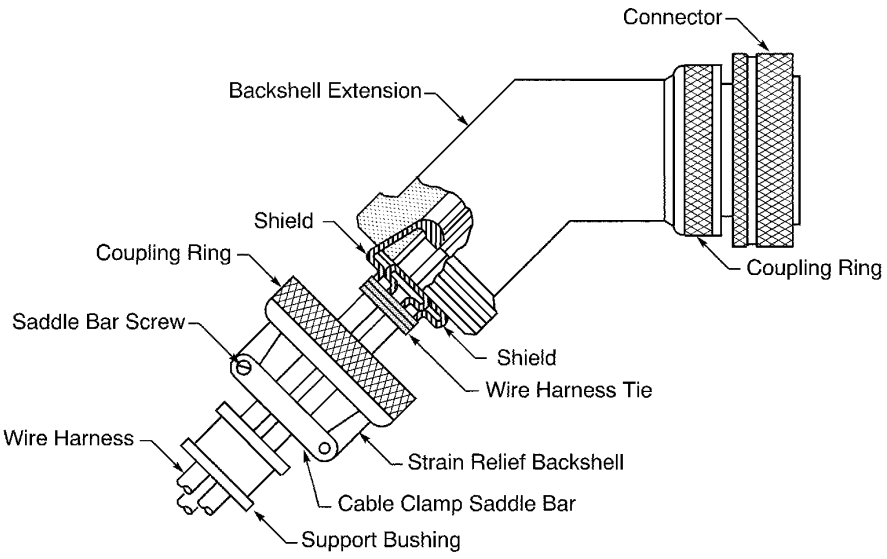
Make sure that the shields are even and symmetrical around the ground ring.

(18) Assemble a wire harness tie on the ends of the shields at the rear end of the ground ring.

Refer to:

- Figure 10
- Subject 20-23-30 for the procedure to assemble a wire harness tie.

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS



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POSITION OF THE WIRE HARNESS TIE ON THE ENDS OF THE SHIELDS
Figure 10

(19) Fully engage the threads of the coupling ring of the strain relief backshell and the backshell extension.

(20) Align the center of the support bushing with the saddle bar installation screw holes in the legs of the strain relief backshell.

(21) Align the installation screw holes of the saddle bars and the legs of the strain relief backshell.

(22) Install the saddle bar screws.

Make sure that the screws are not fully tightened.

(23) If the connector is a receptacle, install it. Refer to Subject 20-23-37.

(24) If the connector is a plug, connect it to the related receptacle. Refer to Subject 20-23-37.

NOTE: The receptacle must be installed before the coupling ring can be fully tightened.

(25) Move the backshell extension from side to side and, at the same time, tighten the backshell extension coupling ring with the pliers until the pliers move on the surface of the coupling ring.

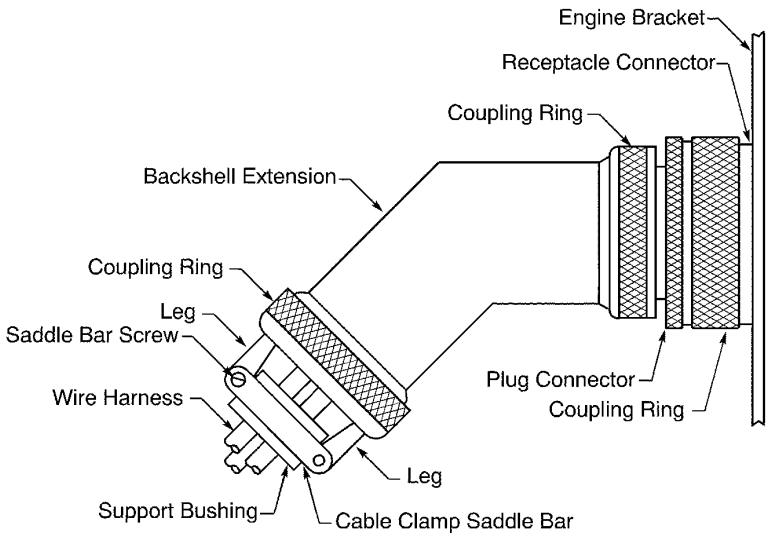
(26) Move the strain relief backshell from side to side and, at the same time, tighten the strain relief backshell coupling ring with the pliers until the pliers move on the surface of the coupling ring.

(27) Fully tighten the saddle bar screws. Refer to Figure 11.

Make sure that:

- The saddle bar screws are tight
- The saddle bars are against the legs of the strain relief backshell
- The wire harness cannot be moved in the cable clamp.

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS



FULLY ASSEMBLED BACKSHELL
Figure 11

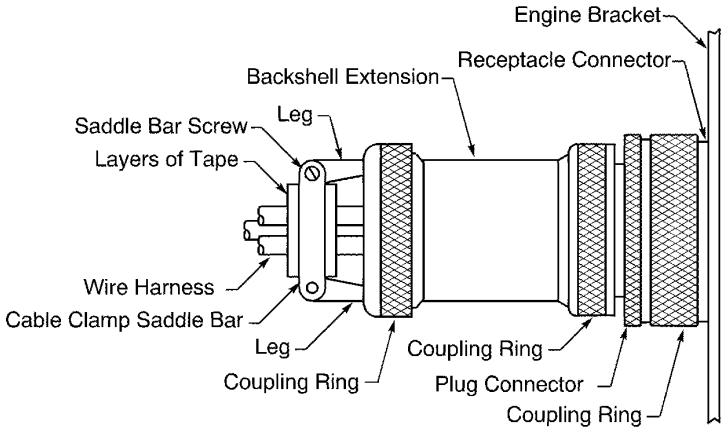
C. Strain Relief Assembly Without a Support Bushing

Table 9
NECESSARY MATERIALS

Material	Specification	Description	Supplier
Tape	A-A-59474	TFE, High Temperature, Pressure Sensitive	An available source

Table 10
NECESSARY TOOLS

Tool	Description	Supplier
Screwdriver	Number 3 Phillips	An available source



FULLY ASSEMBLED BACKSHELL
Figure 12

Refer to Figure 12.

(1) Make a selection of a screwdriver from Table 10.

(2) Align the installation screw holes of the saddle bars and the legs of the strain relief backshell.

(3) Install the saddle bar screws.

(4) Fully tighten the saddle bar screws.

Make sure that:

- The saddle bar screws are tight
- The saddle bars do not crush or pinch the wire harness
- The wire harness does not move in the cable clamp.

(5) If the wire harness can be moved in the clamp, increase the diameter of the wire harness with tape:

(a) Remove the saddle bars.

(b) Make a selection of tape from Table 9.

(c) Wind a sufficient number of layers of tape on the wire harness where the saddle bars hold the wire harness to increase the wire harness diameter.

Make sure that the layers of tape make a 100 percent overlap.

(6) If the ends of the saddle bars are not against the legs, or the wire harness is too tight in the clamp, decrease the diameter of the wire harness:

(a) Remove the saddle bars.

(b) Remove a sufficient number of layers of tape to decrease the diameter of the wire harness.

(7) Fully tighten the saddle bar screws.

Make sure that:

- The saddle bar screws are tight
- The saddle bars are against the legs of the strain relief backshell
- The saddle bars do not crush or pinch the wire harness
- The wire harness cannot be moved in the cable clamp
- Tape is not between the saddle bars and the legs of the strain relief backshell.

(8) If the fit of the wire harness in the clamp is not correct, do Step 3.C.(5) through Step 3.C.(7) again.

4. ASSEMBLY OF BACKSHELLS FOR CA66279-106 CONNECTORS

A. Assembly of Backshells for CA66279-106 Connectors

Table 11
NECESSARY MATERIALS

Material	Part Number	Approved Supplier
Thread Lock Compound	222	Loctite

Table 12
NECESSARY TOOLS

Tool	Description
Torque	Torque tool with strap wrench

Table 13
BACKSHELL INSTALLATION TORQUE VALUES

Connector Shell Size	Torque (inch-pounds)		Torque (newton-meters)	
	Minimum	Maximum	Minimum	Maximum
28	115	120	1.33	1.38

(1) Put the necessary backshell components on the wire harness in this sequence:

- The ESC53-37 support bushing
- The strain relief backshell

Make sure that the strain relief end of the backshell is pointed rearward away from the end of the wire harness.

(2) Install the contacts in the connector. Refer to Subject 20-23-37.

(3) Make a selection of thread lock compound from Table 11.

(4) Put one drop of thread lock compound on the threads at the rear of the connector on one side of the connector.

RB 211 TRENT 800 POWER PLANT: ASSEMBLY OF BACKSHELLS

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

(5) Put one drop of thread lock compound on the threads at the rear of the connector on the other side of the connector.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

(6) Engage the threads of the backshell and the connector.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

(7) Torque the backshell 115 inch-pounds (1.33 newton-meters) to 120 inch-pounds (1.38 newton-meters).

(8) Assemble the strain relief. Refer to Paragraph 4.B.

B. Standard Strain Relief Assembly

Table 14
NECESSARY MATERIALS

Material	Part Number	Approved Supplier
Thread Lock Compound	222	Loctite

Table 15
NECESSARY TOOLS

Tool	Type	Supplier
Screwdriver	Flat Blade	An available source

Table 16
TERMINAL LUG PART NUMBERS

Crimp Barrel Size	Part Number	Supplier
16-14	322334	AMP/Tyco

(1) Make a selection of a terminal lug from Table 16.

NOTE: An equivalent terminal lug is a satisfactory alternative.

Make sure that:

- The type of terminal lug is applicable for the type of the shield ground wire
- The type of terminal lug is applicable for the location of the installation of the connector
- The stud size hole of the terminal lug is applicable for the cable clamp screw.

(2) Assemble the terminal lug. Refer to Subject 20-23-32.

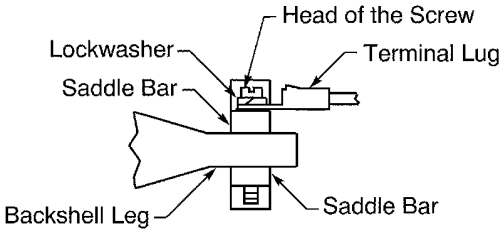
(3) Make a selection of a screwdriver from Table 15.

(4) Make a selection of thread lock compound from Table 14.

(5) Align the center of the support bushing with the saddle bar installation screw holes in the legs of the strain relief backshell.

(6) Put a lockwasher on each cable clamp screw.

(7) Put the terminal lug in its position on the saddle clamp screw.



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POSITION OF THE TERMINAL LUG
Figure 13

(8) Align the screw holes of a saddle bar of the cable clamp and the screw holes in the legs of the backshell.

(9) Put the other saddle bar on the wire harness and the backshell.

(10) Push the saddle bars of the cable clamp together.

(11) Engage the threads of each cable clamp screw and the applicable screw hole.

(12) Put a thin layer of the compound on one or two threads of the cable clamp screws around the circumference of the threads.

Make sure that the thread lock compound is applied to screw threads that engage the threads in the saddle bar.

CAUTION: THREAD LOCK COMPOUND MUST NOT BE APPLIED ON THE COUPLING MECHANISM OF THE CONNECTOR. UNSATISFACTORY OPERATION OF THE COUPLING MECHANISM CAN OCCUR.

(13) Tighten the screws until the ends of the saddle bars are against the legs of the backshell.

Make sure that:

- The saddle bars do not crush or pinch the wire harness
- The wire harness is tight in the cable clamp
- The cable clamp screws are tight.