



**707, 727-787**  
**STANDARD WIRING PRACTICES MANUAL**  
**REPAIR OF FLAT CABLE CONNECTOR ASSEMBLIES**

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**REPAIR OF FLAT CABLE CONNECTOR ASSEMBLIES**

**1. GENERAL DATA**

**A. Flat Cable Connector Assemblies**

Flat cable connectors are used to assemble wire harnesses with either of these types of cable:

- Flat conductor cable
- Round conductor wires that are put in a flat configuration with each wire parallel to the other.

**B. Conditions for Flat Conductor Cable Assembly and Repair**

This Subject does not give the procedures to assemble wire harnesses that have either of these configurations:

- A BACS52H multiple termination splice that connects a flat conductor cable to a round conductor cable
- A flat cable connector that is assembled with a flat conductor.

**NOTE:** Special tools are necessary to assemble the flat cable connector or the multiple termination splice with the flat conductor cable.

This Subject does give the procedures to repair flat conductor cable assemblies when the conditions for repair are applicable. Refer to Subject 20-10-13.

**2. PART NUMBERS AND DESCRIPTION**

**A. Connector Part Numbers**

**Table 1**  
**CONNECTOR PART NUMBERS**

Boeing Standard	Description
BACC65M()	Plug, Flat Cable
BACC65N()	Receptacle, Flat Cable
BACC65P()	Plug, Flat Cable
BACC65R()	Receptacle, Flat Cable

**B. BACS52H() Splice Part Numbers**

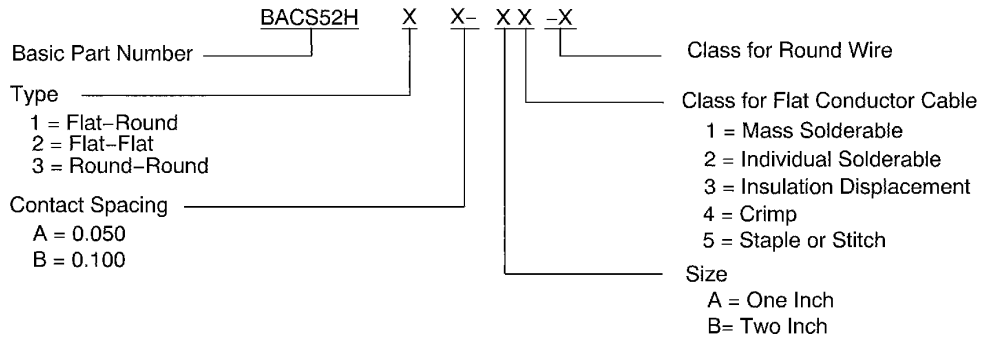
**Table 2**  
**BACS52H() SPLICE PART NUMBERS**

Boeing Standard	Description	Supplier Kit	
		Part Number	Supplier
BACS52H1B-B1-1	Splice, multiple termination, flat conductor to round conductor	CTM-1001	Raychem

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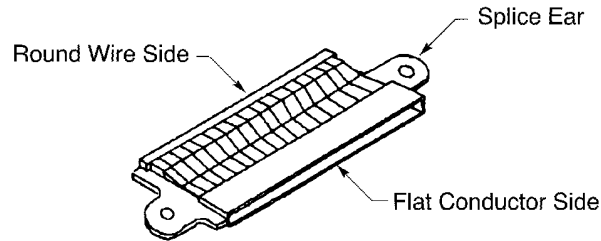
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**BACS52H() SERIES SPLICE PART NUMBER STRUCTURE**

Figure 1



2446700 S00061548077\_V1

**BACS52H MULTIPLE TERMINATION SPLICE**

Figure 2

**3. REPAIR OF THE FLAT CABLE ASSEMBLY**

**A. Connector Disassembly**

Refer to Subject 20-73-01.

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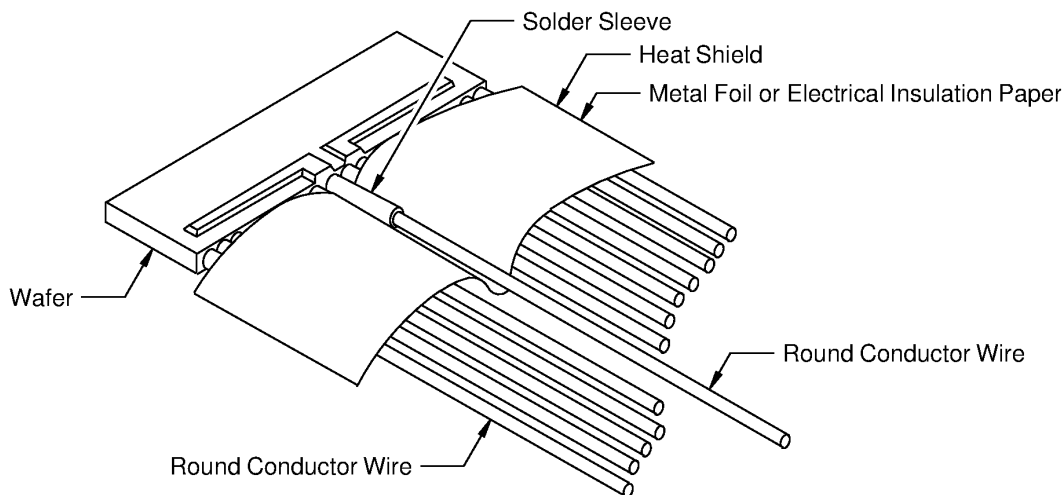
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#### B. Removal of a Round Conductor Wire from a Connector Wafer Contact Terminal

- (1) Isolate the wire from the other wires with a heat shield. Refer to Figure 3.

**NOTE:** Metal foil or MIL-I-695 electrical insulation paper can be used as a heat shield.



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#### ISOLATED WIRE AND SOLDER SLEEVE

Figure 3

- (2) Make a selection of a hot air gun. Refer to Subject 20-10-13.

**WARNING:** THE OPERATION OF A HOT AIR GUN CAN CAUSE AN EXPLOSION. REFER TO THE SAFETY PRACTICES IN SUBJECT 20-00-10 FOR THE NECESSARY PRECAUTIONS TO AVOID:

- DAMAGE TO THE EQUIPMENT
- INJURY TO THE PERSON.

- (3) Remove the solder sleeve:

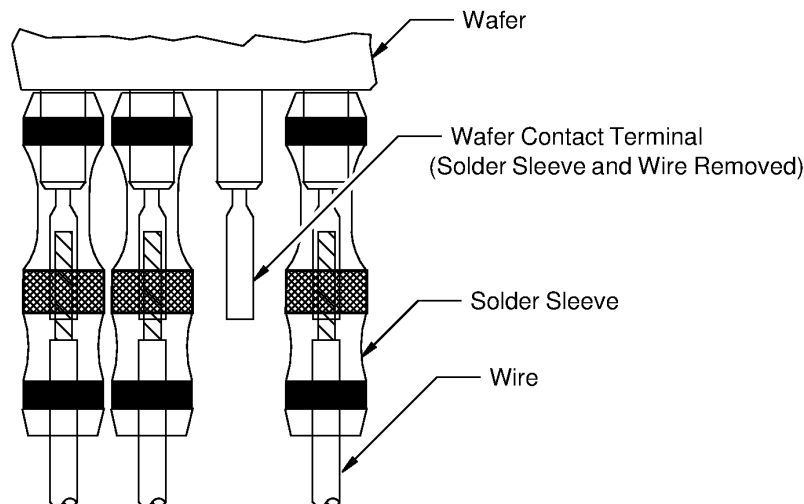
- (a) Cut the solder sleeve with a sharp knife.
- (b) Apply hot air on the solder joint until the solder melts. Refer to Subject 20-10-13 for the procedure to use the hot air gun.

Make sure that heat is not applied to the adjacent wires or the adjacent solder sleeves that are installed.

- (c) With a pair of tweezers, pull the wire straight from the wafer contact terminal.
- (d) Remove the unwanted solder sleeve material from the wafer contact terminal. Refer to Figure 4.

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**SOLDER SLEEVE AND WIRE REMOVED FROM A WAFER CONTACT TERMINAL**

**Figure 4**

- (4) Remove the unwanted solder sleeve material from the wire.

If it is necessary, apply hot air again:

- To make the plastic of the sleeve soft
- To melt the unwanted solder.

**CAUTION:** DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF HEAT TO REMOVE THE UNWANTED SOLDER SLEEVE MATERIAL. MORE THAN THE NECESSARY AMOUNT OF HEAT CAN CAUSE DAMAGE TO THE INSULATION OF THE WIRE OR THE CONNECTOR DIELECTRIC, OR BOTH.

**C. Replacement of a Round Conductor Wire and Solder Sleeve on a Connector Wafer Contact Terminal**

**Table 3**

**SOLDER SLEEVE PART NUMBERS FOR FLAT CONDUCTOR CABLE**

Part Number	Description	Supplier
CTA 0036	Solder Sleeve, Standard	Raychem
CTA 0070	Solder Sleeve, Large Wire Entry	Raychem

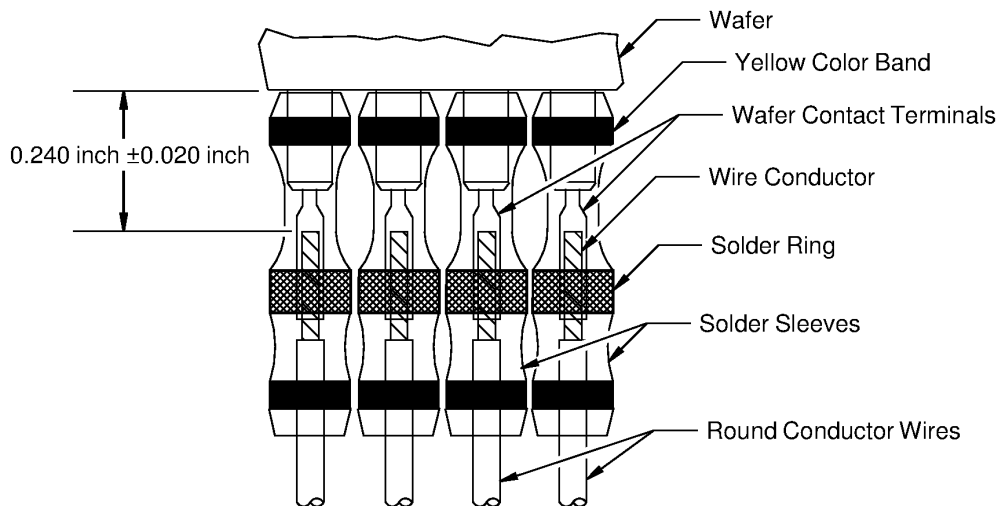
- (1) If it is necessary to replace the wire:
- (a) Remove 0.15 inch  $\pm$  0.03 inch of the insulation from the end of the wire.
  - (b) Twist the strands of the conductor in their initial direction.
  - (c) Make the end of the wire straight.

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- (2) Make a selection of a solder sleeve from Table 3.
- (3) Put the new sleeve on the wire.
- (4) Put the wire on the wafer contact terminal.
- (5) Push the sleeve over the terminal until the yellow insert touches the wafer.
- (6) Put the sleeve and the wire on the terminal. Refer to Figure 5.



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### POSITION OF THE SOLDER SLEEVE, THE WIRE, AND THE TERMINAL

Figure 5

- (7) Make a selection of a hot air gun. Refer to Subject 20-10-13.  
Make sure that the hot air gun is ready for operation. Refer to Subject 20-10-13.

**WARNING:** THE OPERATION OF A HOT AIR GUN CAN CAUSE AN EXPLOSION. REFER TO THE SAFETY PRACTICES IN SUBJECT 20-00-10 FOR THE NECESSARY PRECAUTIONS TO AVOID:

- DAMAGE TO THE EQUIPMENT
- INJURY TO THE PERSON.

- (8) Turn the knob in a clockwise direction to adjust the air pressure to 50 psi.  
The air from the nozzle should be:
  - Hot within 30 seconds
  - At a stable temperature within 1 minute.

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**CAUTION:** DO NOT POINT THE HOT AIR STREAM AT:

- THE UNIT HOSE
- THE POWER CORD
- THE OPERATOR.

- (9) Point the hot air gun at the middle of the solder sleeve to shrink the sleeve in position.

Make sure that:

- The conductor is in the correct position on the contact terminal of the wafer
- The sleeve is fully formed and in the correct position
- A solder fillet is formed between the conductor and the contact terminal of the wafer.

Make sure that the necessary amount of heat is applied to the solder sleeve. A sleeve with applied heat that is not sufficient shows:

- The solder has not flowed
- The solder sleeve is not fully formed in position.

Make sure that only the necessary amount of heat is applied to the solder sleeve. A sleeve with too much heat applied shows any of these conditions:

- The insulation of the sleeve is not transparent
- The sleeve has a hole
- The insulation of the sleeve is very dark.

- (10) If the solder sleeve is not installed correctly:

- (a) Remove the solder sleeve. Refer to Paragraph 3.B.
- (b) Do the installation procedure again from Step 3.C.(2).

**D. Connector Assembly**

Refer to Subject 20-73-01.

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This Subject gives maintenance information for MTC type connectors that contain wafers that have non-removable solder contacts.

Refer to Subject 20-73-00 for the repair of wafers that have non-removable solder contacts.

Refer to Subject 20-74-11 for maintenance information for MTC type connectors that contain wafers that have removable crimp type contacts.

**1. PART NUMBERS AND DESCRIPTION**

**A. Connector Part Numbers**

**Table 1**  
**BACC65() CONNECTOR PART NUMBERS**

Boeing Standard	Type	Supplier Kits	
		Part Number	Supplier
BACC65M()	Plug	-	QPL
BACC65N()	Receptacle	-	QPL
BACC65P22244A()	Plug	MTC100-KT2-0023	Raychem
BACC65R22211A()	Receptacle	MTC100-KT2-0036	Raychem

**Table 2**  
**BACC65() CONNECTOR SUPPLIER KITS**

Supplier Kit	Kit Contents		
	Part Number	Contents	Supplier
MTC100-KT2-0036	MTC100-EA2-P12	Pin Wafer, A Position, Flat Conductor Cable AWG 22 and AWG 24	Raychem
	MTC100-EB2-P12	Pin Wafer, B Position, Flat Conductor Cable AWG 22 and AWG 24	Raychem
	MTC100-JH2-R12	Receptacle Shell	Raychem
MTC100-KT2-0023	MTC100-JA2-S11-T14	Socket Wafer, A Position, Round Wire	Raychem
	MTC100-JB2-S11-T16	Socket Wafer, B Position, Round Wire	Raychem
	MTC100-JH2-P12	Plug Shell	Raychem

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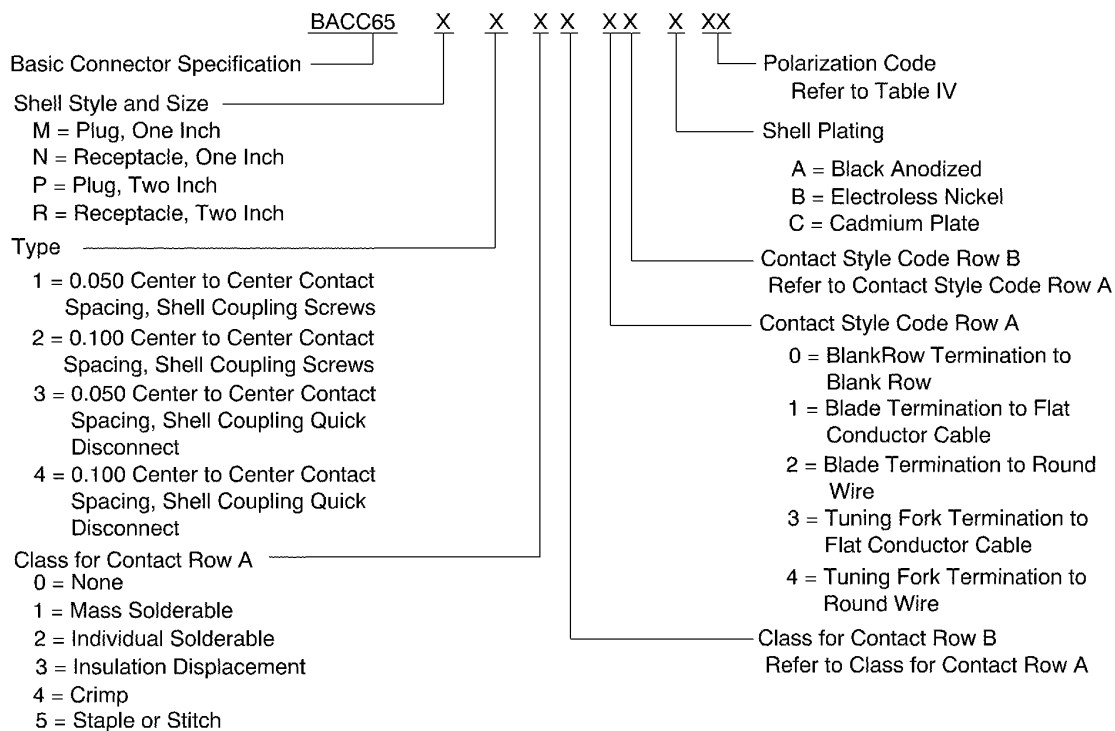


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Table 3  
ALTERNATIVE WAFER PART NUMBERS

Specified Wafer		Alternative Wafer	
Part Number	Supplier	Part Number	Supplier
MTC100-JA2-P12	Raychem	MTC100-EA2-P12	Raychem
MTC100-JB2-P12	Raychem	MTC100-EB2-P12	Raychem



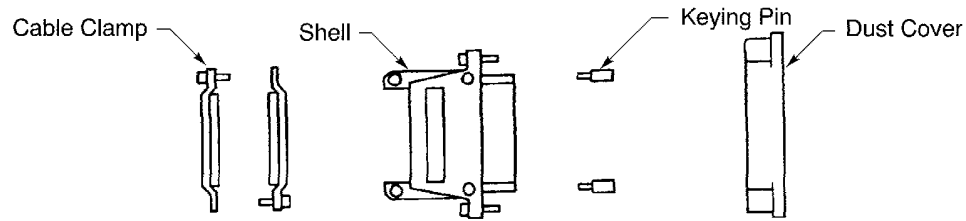
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BACC65() SERIES CONNECTOR PART NUMBER STRUCTURE  
Figure 1

20-73-01



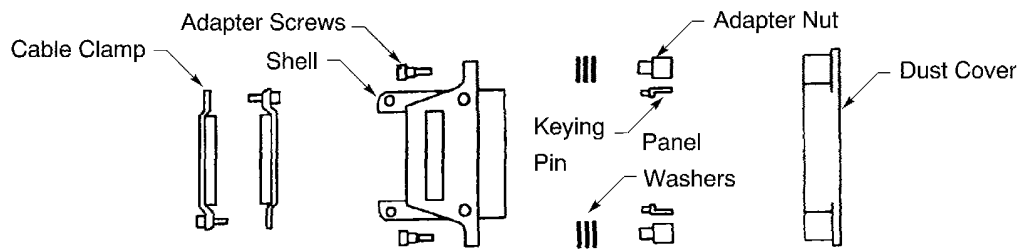
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**BACC65M AND BACC65P PLUGS**

Figure 2

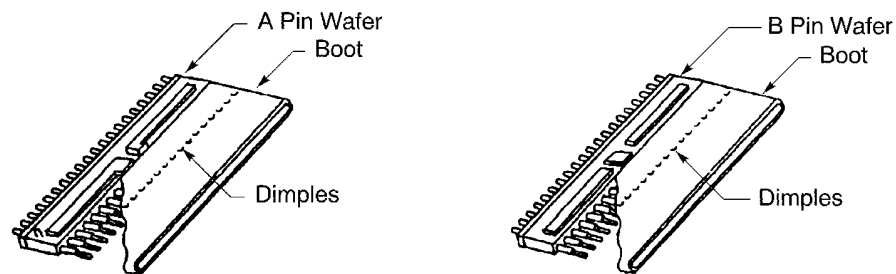


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**BACC65N AND BACC65R RECEPTACLES**

Figure 3

**B. BACC65() Pin and Socket Wafers**



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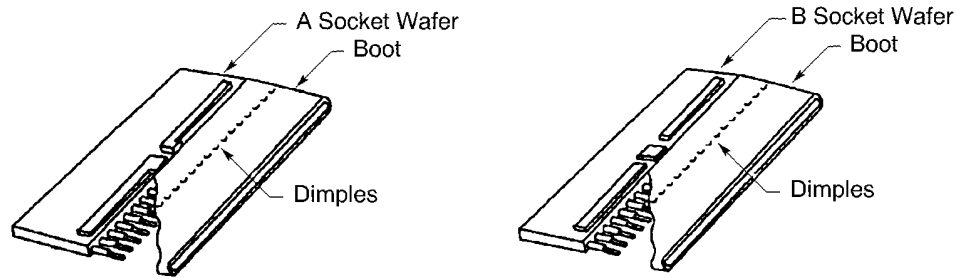
**PIN WAFERS**

Figure 4

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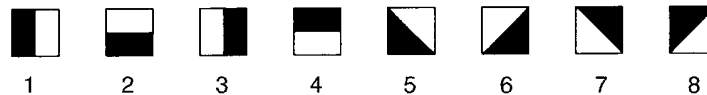
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**SOCKET WAFERS**  
**Figure 5**

**2. CONNECTOR POLARIZATION**

**A. BACC65() Series Connectors**

Alpha-numeric codes for connector keying are superseded by numeric codes.



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**KEYING PIN POLARIZATION POSITIONS**  
**Figure 6**

**Table 4**  
**POLARIZATION CODES**

Polarization Code		Receptacle Key		Plug Key	
Numeric	Alpha- Numeric	Left	Right	Left	Right
01	AA	1	1	1	1
02	AB	1	2	4	1
03	AC	1	3	3	1
04	AD	1	4	2	1
05	BA	2	1	1	4
06	BB	2	2	4	4
07	BC	2	3	3	4
08	BD	2	4	2	4
09	CA	3	1	1	3

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**Table 4 POLARIZATION CODES (Continued)**

Polarization Code		Receptacle Key		Plug Key	
Numeric	Alpha- Numeric	Left	Right	Left	Right
10	CB	3	2	4	3
11	CC	3	3	3	3
12	CD	3	4	2	3
13	DA	4	1	1	2
14	DB	4	2	4	2
15	DC	4	3	3	2
16	DD	4	4	2	2
17	A1	1	5	8	1
18	A2	1	6	7	1
19	A3	1	7	6	1
20	A4	1	8	5	1
21	B1	2	5	8	4
22	B2	2	6	7	4
23	B3	2	7	6	4
24	B4	2	8	5	4
25	C1	3	5	8	3
26	C2	3	6	7	3
27	C3	3	7	6	3
28	C4	3	8	5	3
29	D1	4	5	8	2
30	D2	4	6	7	2
31	D3	4	7	6	2
32	D4	4	8	5	2
33	1A	5	1	1	8
34	1B	5	2	4	8
35	1C	5	3	3	8
36	1D	5	4	2	8
37	2A	6	1	1	7
38	2B	6	2	4	7
39	2C	6	3	3	7
40	2D	6	4	2	7
41	3A	7	1	1	6
42	3B	7	2	4	6
43	3C	7	3	3	6

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Table 4 POLARIZATION CODES (Continued)

Polarization Code		Receptacle Key		Plug Key	
Numeric	Alpha- Numeric	Left	Right	Left	Right
44	3D	7	4	2	6
45	4A	8	1	1	5
46	4B	8	2	4	5
47	4C	8	3	3	5
48	4D	8	4	2	5

**B. Keying Pin Insertion**

- (1) Put the keying pins straight into the square holes of the shell. Refer to Figure 6 and Table 4.

**CAUTION:** DO NOT USE DAMAGED KEYING PINS.

**C. Keying Pin Removal**

- (1) Hold the keying pin and pull it straight back.

**CAUTION:** IF THE KEYING PIN HAS DAMAGE AFTER IT IS REMOVED, IT MUST BE DISCARDED.

**3. CONNECTOR DISASSEMBLY**

**A. Wired Wafer Removal**

Table 5  
WAFER REMOVAL TOOLS

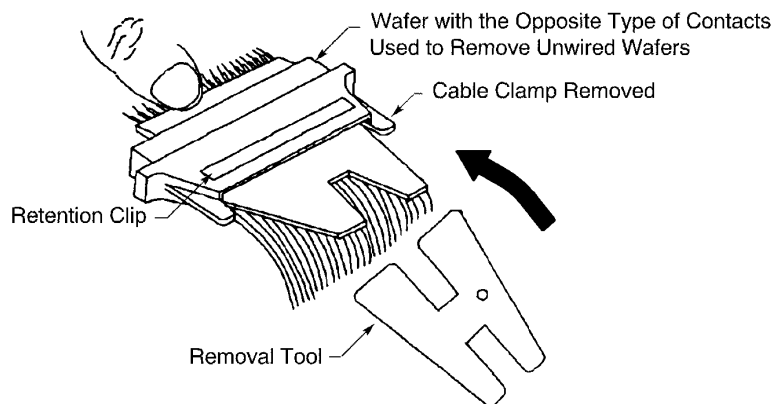
Removal Tool	Type	Supplier
CE-1201900	Metal	Raychem
CE-1202400	Metal, Right Angle	Raychem
D-659-0001	Plastic	Raychem

**NOTE:** The Raychem tools in Table 5 are used for both wafer insertion and wafer removal.

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**WAFER REMOVAL**  
**Figure 7**

- (1) Remove the cable clamp.  
Make sure that the shell is not connected.
- (2) Make a selection of a removal tool from Table 5.
- (3) Put the tool into the rear of the connector shell on either the A side or B side. Refer to Figure 7.
- (4) Push the tool in until it passes the retention clip and hits the bottom inside the connector shell.
- (5) Pull firmly on the cable or wires of the wafer next to the tool.
- (6) After one wafer has been removed, the other wafer can be removed by hand.

**B. Unwired Wafer Removal**

- (1) Make a selection of a removal tool from Table 5.
- (2) Push the removal tool into the rear of the connector shell on either the A side or the B side.
- (3) Push the wafer out of the shell with a wafer that has the opposite type of contacts. Refer to Figure 7.

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**C. Removal of a Round Conductor Wire from a Connector Wafer Contact Terminal**

Refer to Subject 20-73-00.

**D. Replacement of a Round Conductor Wire and Solder Sleeve on a Connector Wafer Contact Terminal**

Refer to Subject 20-73-00.

**4. CONNECTOR ASSEMBLY**

**A. Mating Hardware Installation**

Mating hardware can be installed on the receptacle shells either before or after the wafers are inserted.

(1) On each side of the shell, install:

- One or more panel washers
- One adapter nut
- One adapter screw.

Make sure to use only the hardware supplied with the connector.

Refer to Figure 2 and Figure 3.

(2) Hold the adapter nut and tighten the adapter screw.

**B. Wafer Insertion**

**Table 6**  
**WAFER INSERTION TOOLS**

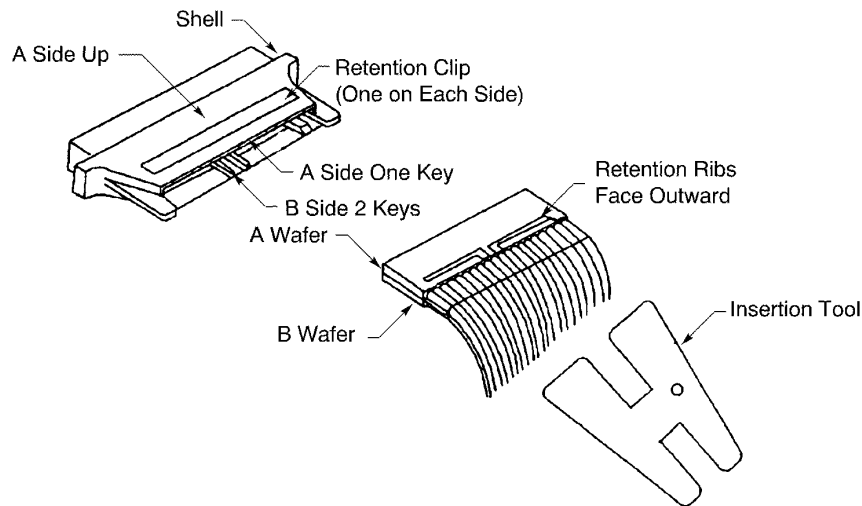
Insertion Tool	Type	Supplier
CE-1201900	Metal	Raychem
CE-1202400	Metal, Right Angle	Raychem
D-659-0001	Plastic	Raychem

**NOTE:** The Raychem tools in Table 6 are used for both wafer insertion and wafer removal.

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**WAFER INSERTION**  
**Figure 8**

For correct assembly:

- A wafers are inserted into the A side of the shell
- B wafers are inserted into the B side of the shell
- Wafers are inserted into shells that are not connected
- A wafers and B wafers are inserted as a pair.

Make sure to use only the allowable combinations of A wafers and B wafers. Refer to Table 7.

**Table 7**  
**WAFER COMBINATIONS**

Position A	Position B
Pin	Pin
Pin	Socket
Pin	Blank
Socket	Socket
Socket	Pin
Socket	Blank
Blank	Pin
Blank	Socket

- (1) Put the two wafers together so that the retention ribs face outward. Refer to Figure 8.
- (2) Turn the A wafer toward the A side of the shell and B wafer toward B side of shell.

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- (3) If any of the wafers are unwired or if the wires are not rigid enough to push the wafer into position:
  - (a) Make a selection of an insertion tool from Table 6.
  - (b) Put the tool against the edge of the wafer.
- (4) Push the wafers into the connector shell until the retention clips make a click.  
Make sure that the wafers are locked in position.

**C. Cable Clamp Installation**

Refer to Figure 2 and Figure 3.

- (1) If a cable clamp is necessary:
  - (a) Put the clamp on the cable.
  - (b) Dress any round wires evenly across the clamp.
  - (c) Tighten the clamp.
  - (d) If a cable shield is necessary, terminate the shield under the cable clamp.

Make sure to use only the components that are supplied with the connector.

**D. Installation of a Connector Receptacle in a Panel**

**Table 8**  
**NECESSARY PANEL WASHERS**

Panel Thickness (inch)		Number of Washers
Minimum	Maximum	
0.073	0.103	0
0.042	0.072	1
0.011	0.041	2
0	0.010	3

- (1) Measure the panel thickness.
- (2) Make a selection of the number of washers that are necessary from Table 8.
- (3) Put the receptacle and the washers, if any, on the panel.
- (4) Hold the adapter nut and tighten the screw.  
Make sure that the adapter nut is within 0 inch +0.020 inch, -0.010 inch with the front surface of the connector shell.

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