

**NOTE**

All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  [ $\pm .005$ ] and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale.

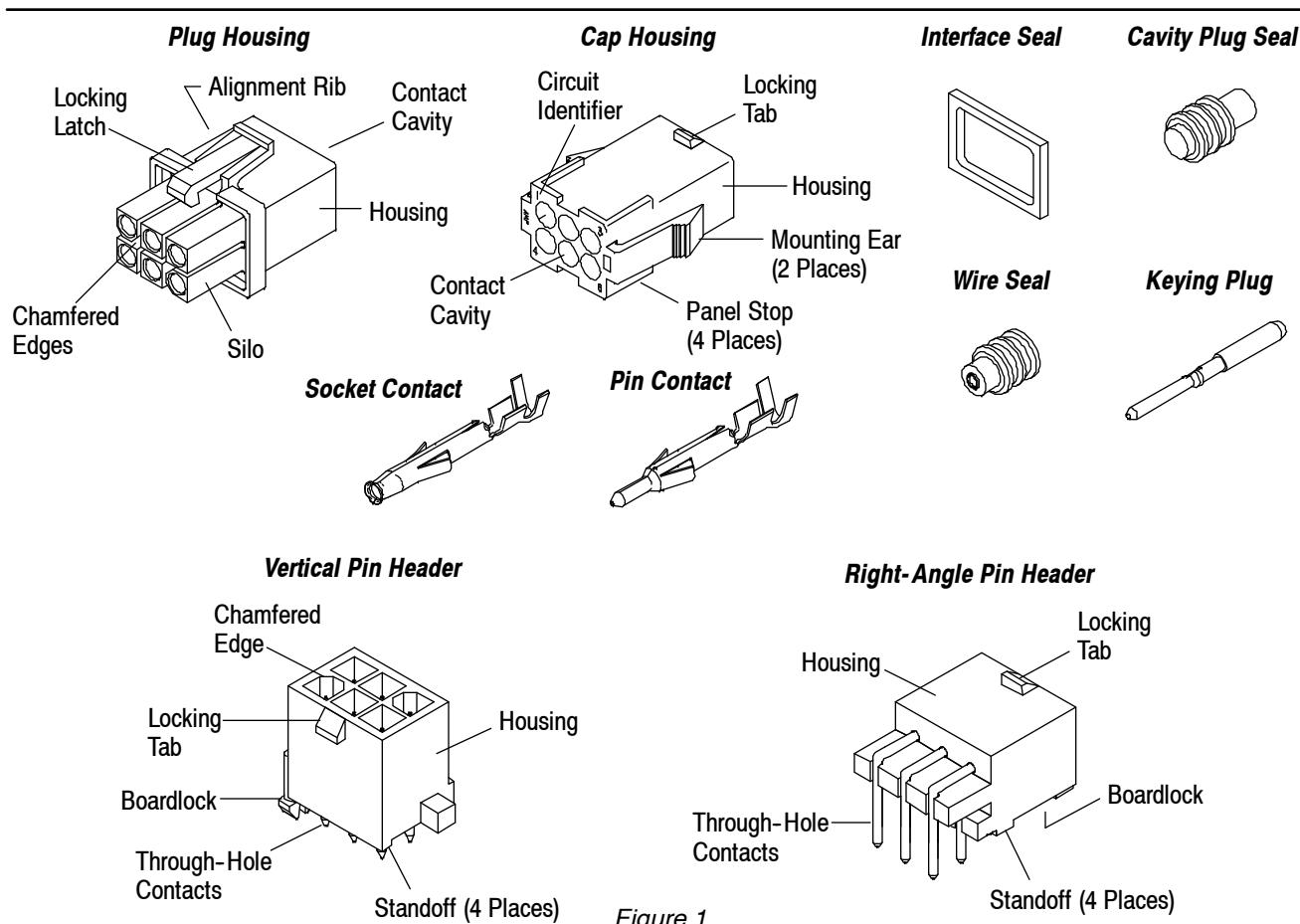
**1. INTRODUCTION**

This specification covers the requirements for application of mini-universal MATE-N-LOK splash-proof sealed connectors. These connectors are designed to be used with splash-proof seals that will ensure a water and dust resistant assembly. The connectors are available in plug housings and cap housings for wire-to-wire free-hanging and panel mount applications, and vertical pin headers and right-angle pin headers for wire-to-printed circuit (pc) board applications. Each connector consists of a housing and contacts. The connectors have dual rows available in 2, 4, 6, 8, or 10 positions with a contact centerline spacing of 4.14 [.163].

The housings accept crimp type contacts. End contact cavities of the cap housing are marked to provide circuit identification. A raised alignment rib along the side of the plug housing indicates Position 1. The cap housing features mounting ears and panel stops to aid in mounting to a panel. The contacts are available in loose-piece form for terminating with manual hand-held tools, and in strip form for terminating with semi-automatic or automatic machines.

The pin headers contain through-hole solder type contacts. The pin headers feature integral boardlocks to provide stability for placement on the pc board and standoffs to facilitate pc board cleaning after the soldering operation. The pin headers are placed on the pc board by hand.

When corresponding with personnel, use the terminology provided in this specification to facilitate your inquiries for information. Basic terms and features of this product are provided in Figure 1.

**Figure 1**

## 1.1. Seals

The seals are available to be installed onto the connectors to ensure a sealed assembly. The interface seal protects the connecting point between mating connectors, the cavity plug seal protects the opening of an unused contact cavity, and the wire seal protects the opening around the contact cavity containing a contact or keying plug.

## 1.2. Polarization and Keying Plugs

The connectors are polarized for proper mating. The contact cavities with chamfered edges (each forming a "D" shaped opening) at the mating face of the connector provide proper connector alignment, and the location of these cavities ensure proper connector orientation. Because mating connectors must have identical number of positions, the location of these cavities is specific to the connector positions. Keying plugs are available for further assurance of proper mating.

## 1.3. Mating

When the connectors are properly mated, positive locking mechanisms (locking latch on plug housing and locking tab on cap housing and pin headers) prevent accidental disengagement of mated connectors.

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

Revisions to this application specification include:

- Changed company name and logo
- Changed table diamond note in Figure 5

### 2.2. Customer Assistance

Reference Product Part Number 794895 and Product Code 7167 are representative of mini-universal MATE-N-LOK splash-proof sealed connectors. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product and tooling information. Such information can be obtained through a local Representative or, after purchase, by calling PRODUCT INFORMATION at the number at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the Customer Drawings and this specification or with any other technical documentation supplied, call PRODUCT INFORMATION at the number at the bottom of page 1.

### 2.4. Specifications

Application Specification 114-16017 provides product description and application requirements for mini-universal MATE-N-LOK connectors.

Product Specification 108-1543 provides product performance and test information for the header assembly, and 108-1542-2 provides product performance and test information for the splash-proof seals (interface seal, wire seal, and cavity plug seal). Product Specification 108-1542 provides product performance and test information for the plug housing.

### 2.5. Instructional Material

Instruction Sheets (408-series) provide assembly instructions and Customer Manuals (409-series) provide machine setup and operation procedures. Documents available which pertain to this product are:

- 408-4118 Extraction Tool 189727-1
- 408-7347 Insertion Tool 91002-1
- 408-8040 HDM Quick-Change Applicators (Side-Feed Type) with Mechanical Feed System
- 408-8547 CERTI-CRIMP\* II Straight Action Hand Tools 91522-1 and 91529-1
- 409-5128 AMP-O-LECTRIC\* Model "K" Terminator Machine 565435-5
- 409-5842 AMP-O-LECTRIC Model "G" Terminating Machines 354500-[ ]
- 409-5852 AMPOMATOR\* CLS III-G Lead-Making Machine 122500-[ ]
- 409-5878 AMPOMATOR CLS IV+ Lead-Making Machine 356500-[ ]

## 2.6. Manuals

Manual 402-40 can be used as a guide to soldering. This manual provides information on various flux types and characteristics with the commercial designation and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

## 2.7. Standards and Publications

Standards and publications developed by the International Electrotechnical Commission (IEC) provide industry test and performance requirements. Documents available which pertain to this product are:

IEC 60529, "Degrees of Protection Provided by Enclosures (IP Code)"

## 3. REQUIREMENTS

### 3.1. Special Assembly Considerations

The following information must be considered when designing the system into which these connectors are installed:

- These connectors are interchangeable with mini-universal MATE-N-LOK connectors; however, applications using any unsealed product (connector, contact, or keying plug) will not perform as a sealed assembly
- The pin headers described in this document do not have drain holes. Pin headers *with* drain holes MUST NOT be used in sealed applications

### 3.2. Safety

Do not stack product shipping containers so high that the containers buckle or deform.

### 3.3. Storage

#### A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the connector material.

#### B. Shelf Life

The connectors should remain in the shipping containers until ready for use to prevent deformation to components. The connectors should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

The seals must be stored in sealed plastic bags to prevent seals from drying and cracking.

#### C. Chemical Exposure

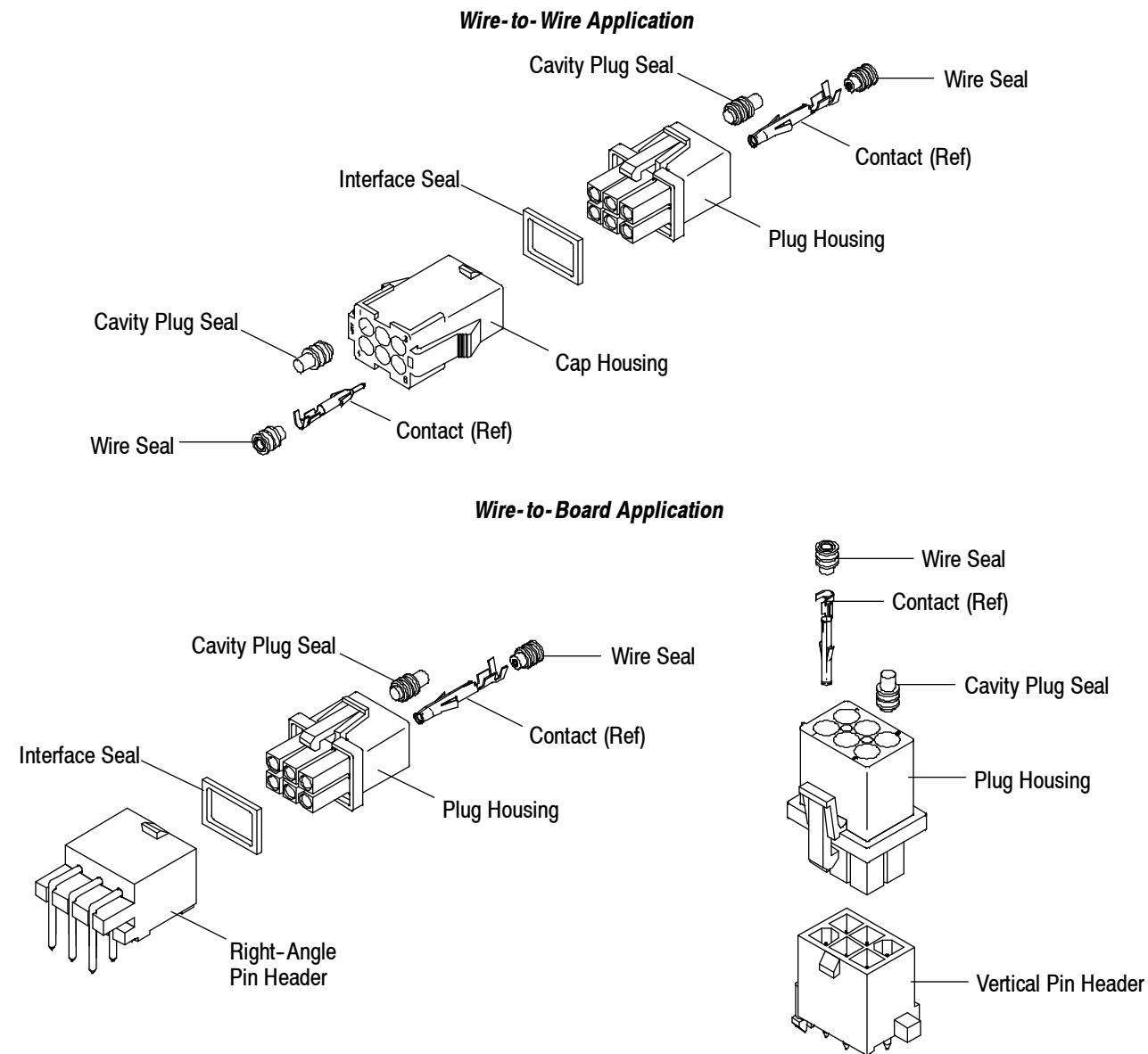
Do not store connectors near any chemical listed below as they may cause stress corrosion cracking in the components.

Alkalies	Ammonia	Citrates	Phosphates	Sulfur Compounds
Amines	Carbonates	Nitrites	Citrates	Tartrates

### 3.4. Component Selection

#### A. Connectors and Seals

Each connector must be used with specific seals to ensure a sealed assembly for the required application. Mating connectors must have identical number of positions. A cross-reference of connector-to-seal and connector-to-connector is listed in Figure 2.



CONNECTOR Number of Positions	CAP HOUSING	PLUG HOUSING	SEAL			VERTICAL PIN HEADER	RIGHT-ANGLE PIN HEADER
			Interface	Wire	Cavity Plug		
2	794896-1	794894-1	794772-2	794758-1	794995-1	770872-[]	770966-[]
4	794939-1	794805-1	794772-4	794758-1	794995-1	770874-[]	770968-[]
6	794940-1	794895-1	794772-6	794758-1	794995-1	770875-[]	770969-[]
8	794941-1	794821-1	794772-8	794758-1	794995-1	794073-[]	770970-[]
10	794942-1	794781-1	1-794772-0	794758-1	794995-1	770858-[]	770971-[]

Figure 2

## B. Contact and Wire

The contacts accept stranded copper or tin-coated wire sizes 26 through 18 AWG with an insulation diameter range of 1.02 through 2.11 [.040 through .083]. Selection of the contact depends upon the wire size as listed in Figure 3.

WIRE SIZE (AWG)	CONTACT			
	PIN		SOCKET	
	Strip	Loose Piece	Strip	Loose Piece
26-22	770901	770985	770902	770986
22-18	770903	770987	770904	770988

Figure 3

## 3.5. Wire Preparation

### A. Wire Stripping

Proper strip length is necessary to properly insert the wire into the contact. Reasonable care must be taken not to nick, scrape, or cut any part of the wire during the stripping operation. The strip length of the wire is shown in Figure 4. There must be no loose wire strands and the conductors must not be cut. The wire insulation must be round and there must be no flaws, dents, or other damage.

### B. Wire Seal

The wire seal must be installed onto the wire before or after stripping the wire. It is recommended to install the wire seal after stripping the wire; however, if installing before stripping the wire, the wire seal must be protected from being damaged during the stripping operation. The wire seal must be installed onto the wire, flanged end (end opposite the throat) first. The wire seal must be located on the wire so that the wire insulation is flush with or extends beyond the wire seal to the dimension stated in Figure 4.

After installation, there must be no flaws or other damage to the wire seal, and the shape of the wire seal must be maintained.

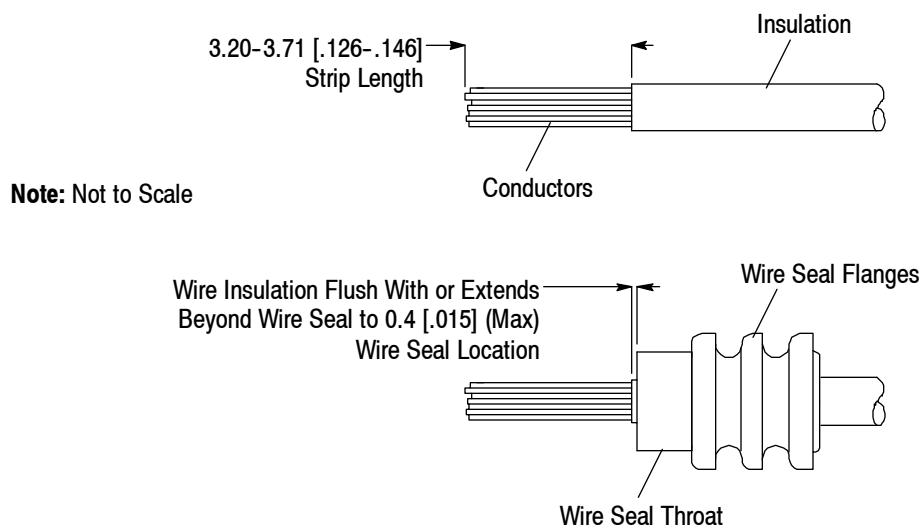


Figure 4

## 3.6. Crimp Requirements

### NOTE

A single wire per contact is recommended for use with these connectors. Dual wire crimps are not compatible with the wire seals.



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The contact must be crimped to the wire according to instructions packaged with applicable tooling.

#### **A. Cutoff Tab and Burr**

The cutoff tab is the remaining portion of the carrier strip after the contact is cut from the strip. The following dimensional requirements will ensure proper application for these contacts.

1. The cutoff tab must not exceed the dimension shown in Figure 5.
2. There must be no burr resulting from the cutoff tab shearing.

#### **B. Flash**

The flash is the formation that may appear on both sides of the wire barrel as the result of crimping. Flash must not exceed the dimension shown in Figure 5.

#### **C. Wire Barrel Seam**

The seam between the two sides of the wire barrel must be completely closed. There must be no loose wire strands or wire strands visible in the seam. Wire strands must not be embedded in the outside of the wire barrel.

#### **D. Wire Barrel Crimp**

The crimp applied to the wire barrel is the most compressed area and is critical in ensuring optimum electrical and mechanical performance of the crimped contact. No strands can be folded back over the wire insulation. The wire barrel crimp height and width must be within the dimensions provided in Figure 5.

#### **E. Insulation Barrel Crimp**

The insulation barrel must be crimped in the "F" crimp where the tips of the insulation barrel turn inward and capture the throat of the wire seal and the wire insulation. The insulation barrel crimp width must be within the dimensions provided in Figure 5.

#### **F. Bellmouths**

The front bellmouth and rear bellmouth shall be evident and conform to the dimensions shown in Figure 5.

#### **G. Effective Crimp Length**

Effective crimp length is defined as that portion of the wire barrel, excluding bellmouths, fully formed by the tooling. For optimum crimp effectiveness, the crimp must be within the area shown in Figure 5.

#### **H. Wire Location**

The wire conductors must be visible within the transition area (between the wire barrel and insulation barrel). The wire insulation may be visible within the transition area. Wire strands must not extend beyond the height of the wire barrel. The conductor ends must be flush with, or extend beyond, the end of the wire barrel to the dimension shown in Figure 5.

#### **I. Locking Lances**

The locking lances shall not be deformed in any way. The position of each locking lance, measured from the body of the contact to the tip of the locking lance, must be within the specified limit in Figure 5.

#### **J. Wire Seal Location and Workmanship**

The wire seal shall not enter the wire barrel. The throat of the wire seal must protrude into the transition area (between the wire barrel and insulation barrel) to the minimum stated in Figure 5.

There shall be no cuts, flaws, or other damage to the wire seal. The tips of the insulation barrel may partially pierce the throat of the wire seal; however, the throat must not be split. The insulation barrel crimp must maintain an even grip on the throat of the wire seal without tilting. The wire seal shall not slant beyond the limit provided in Figure 5.

**Note:** Socket Contact Shown, Requirements Apply Equally to Pin Contact

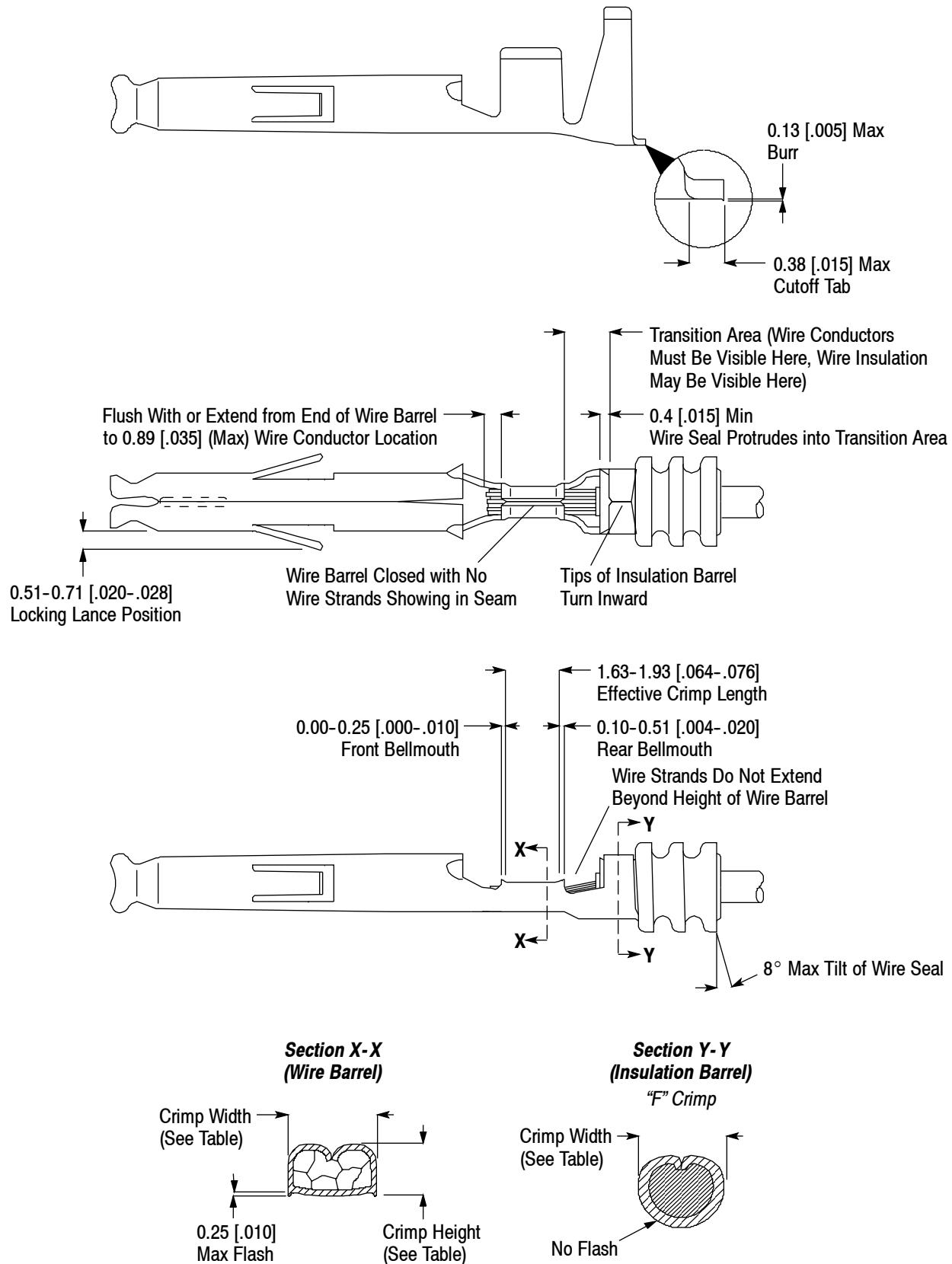


Figure 5 (Cont'd)

WIRE		STRIP FORM CONTACT (Using Automatic Machine)		
SIZE (AWG)	INSULATION DIAMETER RANGE	WIRE BARREL CRIMP		INSULATION BARREL WIDTH (Ref)
		HEIGHT	WIDTH	
26	1.02-1.52 [.040-.060]	0.63±0.05 [.025±.002]	1.22 [.048]	2.03 [.080]
		0.63+0.03/-0.05 [.025+.001/-0.002]■		
		0.69±0.05 [.027±.002]		
		0.78±0.05 [.031±.002]		
22	1.27-2.11 [.050-.083]	0.81±0.05 [.032±.002]	1.57 [.062]	2.79 [.110]◆
20		0.91±0.05 [.036±.002]		
18		1.07±0.05 [.042±.002]		

WIRE		LOOSE-PIECE CONTACT (Using Hand Tool)		
SIZE (AWG)	INSULATION DIAMETER RANGE	WIRE BARREL CRIMP		INSULATION BARREL WIDTH (Ref)
		HEIGHT	WIDTH	
26	1.02-1.52 [.040-.060]	0.69±0.05 [.027±.002]	1.07 [.042]	2.03 [.080]
24		0.69±0.05 [.027±.002]		
22		0.78±0.05 [.031±.002]		
22	1.27-2.11 [.050-.083]	0.79±0.05 [.031±.002]	1.57 [.062]	2.79 [.110]◆
20		0.79±0.05 [.031±.002]		
18		1.04±0.05 [.041±.002]		

- For 7-strand, tin-coated wire with insulation diameter of 0.15 [.006].
- ◆ When using wire seals, the insulation barrel crimp must be round. The insulation barrel crimp width (IBCW) must be within 0.00015 [.004] of the insulation barrel crimp height (IBCH); for example, if the IBCW is 0.00456 [.116] and the IBCH is 0.00448 [.114], the crimp is acceptable, if the IBCW is 0.00460 [.117] and the IBCH is 0.00440 [.112], the crimp is not acceptable and must be adjusted.

Figure 5 (End)

**NOTE**

The developed crimp configurations result from using the specific tooling described in Section 5, TOOLING.



**K. Twist and Roll**

There should be no twist or roll of the crimped portions or mating portion of the contact that would cause overstress or impair usage. Twist and roll is allowed within the limits specified in Figure 6.

**Avoid Twist and Roll**

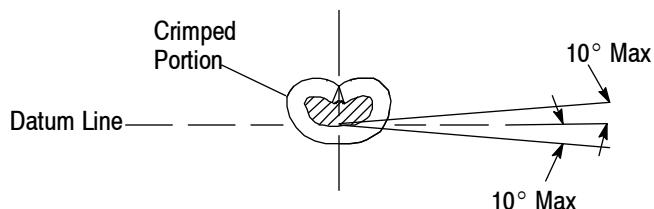


Figure 6

## L. Bend Allowance

The force applied during crimping may cause some bending between the crimped portion and wire. Such deformation is acceptable within the following limits.

### 1. Up and Down

The crimped portion, including the cutoff tab, must not be bent beyond the limits shown in Figure 7.

### 2. Side-to-Side

The crimped portion must not be bent from one side to the other beyond the limits shown in Figure 7.

**Note:** Socket Contact Shown, Requirements Apply Equally to Pin Contact

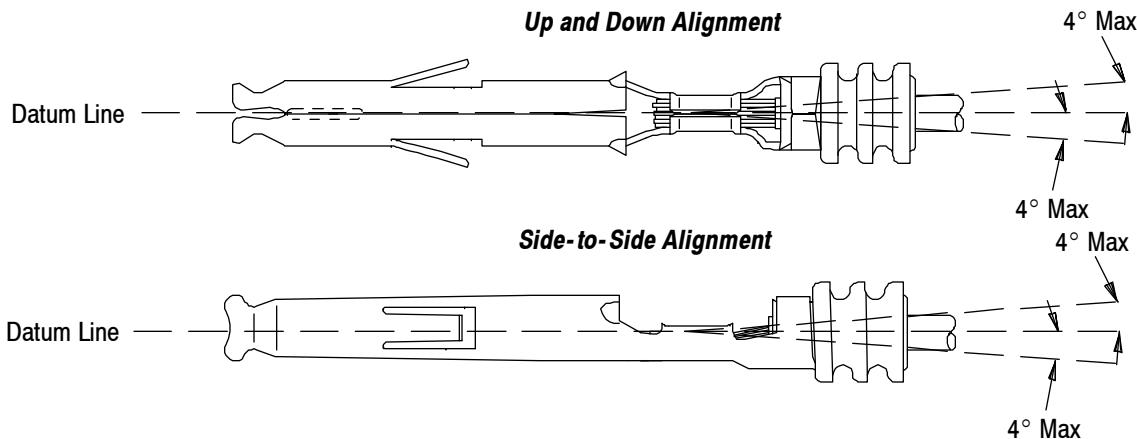


Figure 7

## 3.7. Interface Seal

The interface seal must be installed onto the plug housing. The installed interface seal must fit inside the channel at the base of the silos of the plug housing. The interface seal must remain flat against the back of the channel and shall not be twisted. There shall be no tears, rips, or other damage to the interface seal. Refer to Figure 8.

**NOTE**

*A method to prevent damage to the interface seal is to use the mating cap housing (without contacts) or pin header (not installed onto pc board) to slide the interface seal along the silos and against the back of the channel.*



## 3.8. Installing Contacts into Housing

The contacts must be installed into the plug housing and cap housing. Each contact must be inserted into a contact cavity at the wire end of the housing until it bottoms (there should be an audible “click”). For optimum sealing performance, the wire seal on the contact must have at least two of the three flanges fully inserted into the contact cavity. Each contact must be locked into place. Refer to Figure 8.

**NOTE**

*Because of the wire seal, these contacts require more insertion force than unsealed contacts (without a wire seal).*



## 3.9. Cavity Plug Seal

The cavity plug seal must be installed into any unused contact cavities of the plug housing and cap housing. The cavity plug seal must be inserted (short tab end first) into the contact cavity at the wire end of the housing. For optimum sealing performance, the cavity plug seal must have at least two of the three flanges fully inserted into the contact cavity. See Figure 8.

A cavity plug seal must also be installed in any mating contact cavity containing a keying plug. See Figure 8.

**NOTE**

The cavity plug seals can be installed manually or by using Insertion Tool 91002-1. Instruction for using the tool is provided on Instruction Sheet 408-7347.



### 3.10. Keying Plug

The keying plug must be installed into an empty contact cavity in the plug housing or cap housing. The keying plug must be inserted (tapered end first) into the contact cavity at the mating face of the housing until it bottoms (there should be an audible “click”).

The contact cavity containing the keying plug must be sealed using a wire seal. The wire seal must be installed into the contact cavity at the wire end of the housing *after* the keying plug is installed. The wire seal must be inserted flanged end (end opposite the throat) first, over the keying plug and into the contact cavity. For optimum sealing performance, the wire seal must have at least two of the three flanges fully inserted into the contact cavity. See Figure 8.

**NOTE**

The wire seal can be installed over the keying plug and into the contact cavity manually or by using Insertion Tool 91002-1. Instruction for using the tool is provided on Instruction Sheet 408-7347.



If a keying plug is installed into a housing, the corresponding contact cavity of the mating connector must contain a cavity plug seal.

**Note:** Cap Housing Shown, Requirements Equally Apply to Pin Header

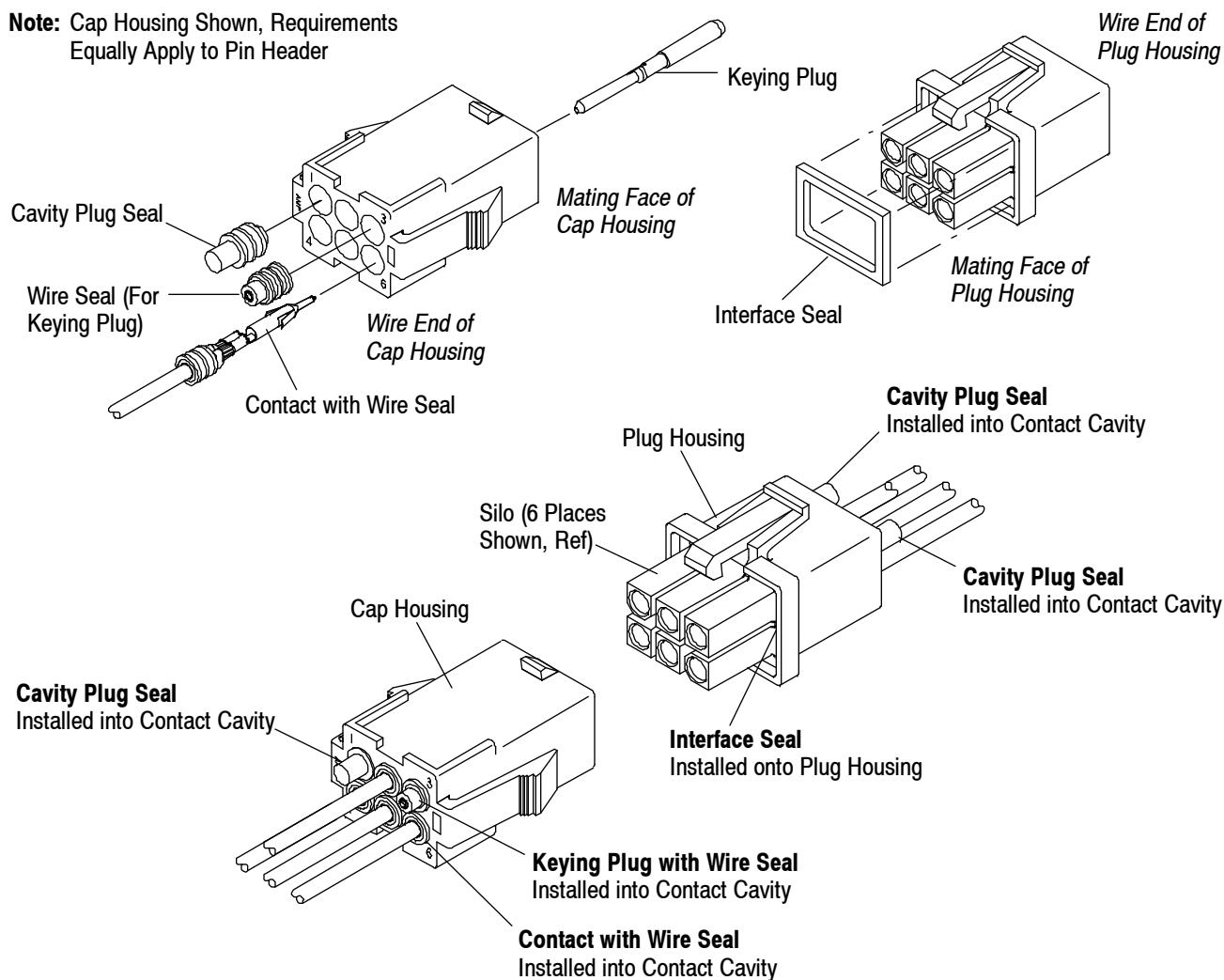


Figure 8

### 3.11. PC Board

#### A. Material and Thickness

The pc board material shall be glass epoxy (FR-4 or G-10). The pc board thickness range shall be 1.57 to 2.36 [.062 to .093].

#### B. Pads

The pc board circuit pads must be solderable in accordance with Test Specification 109-11.

#### C. Hole Dimensions

The contact holes must be drilled and plated through to specific dimensions to prevent stubbing during placement of the pin headers on the pc board. The drilled hole size, plating types, and plating thickness are dependent on the application requirements. The boardlock hole may be used with or without plated holes. The finished hole size must be as stated to provide unrestricted insertion. See Figure 9.

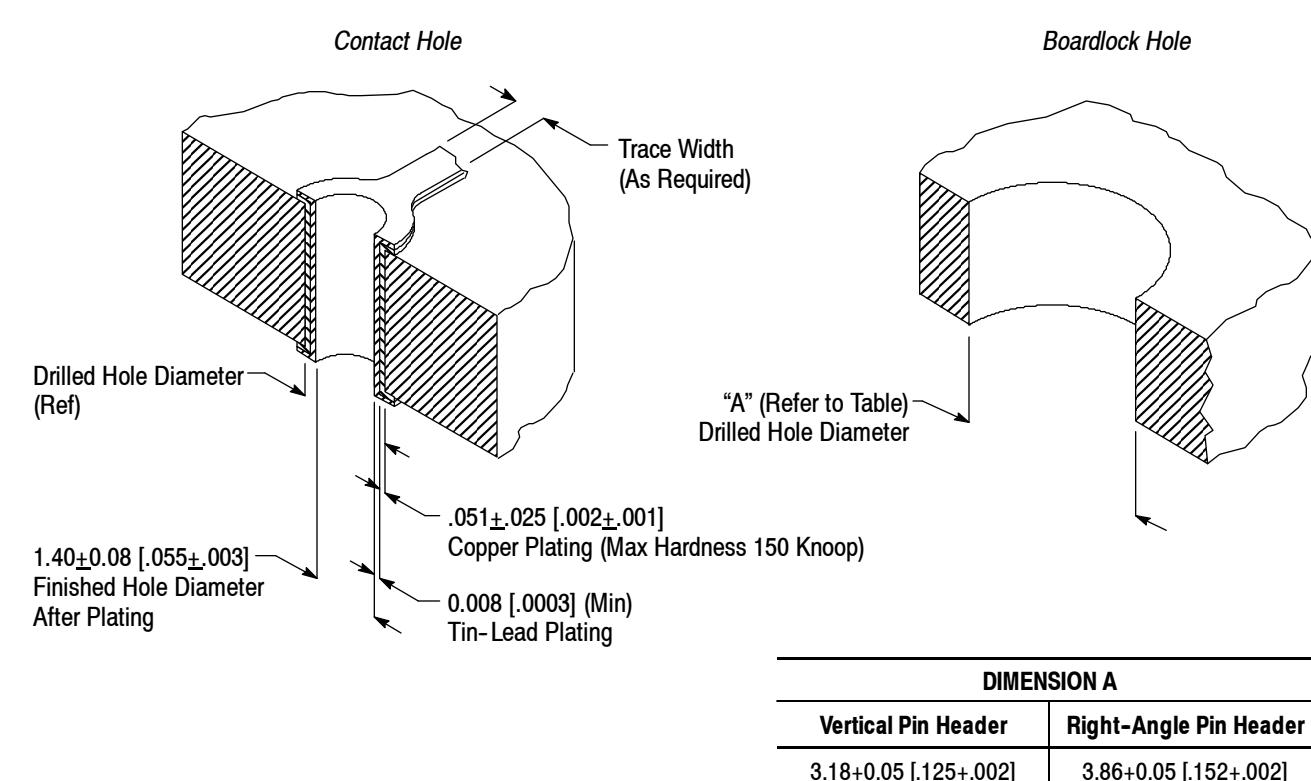


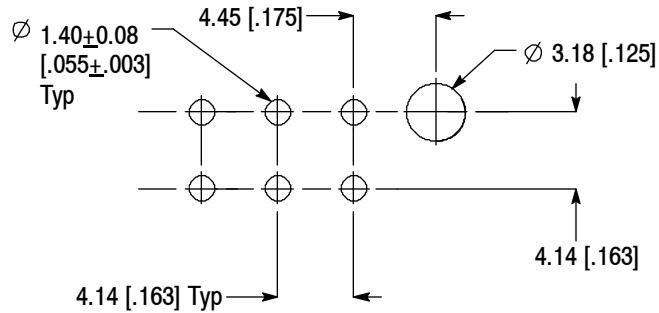
Figure 9

## D. Layout

The holes in the pc board must be precisely located to ensure proper placement and optimum performance of the pin header. The pc board layout must be designed using the dimensions provided on the customer drawing for the specific pin header. Reference *samples* of the recommended pc board layouts are shown in Figure 10.

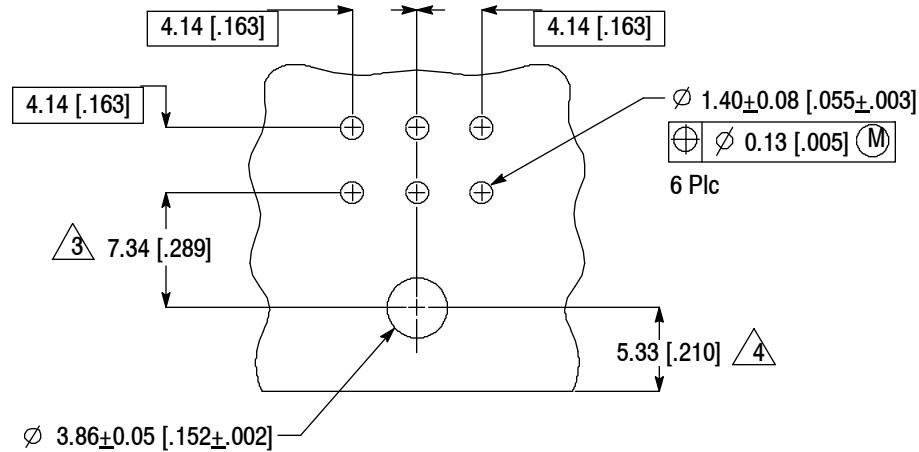
### Sample Recommended PC Board Layout

#### 6-Position Vertical Pin Header



Recommended Mounting Hole Pattern for 1.57-Thick PC Board  
Tolerances Non-Accumulative

#### 6-Position Right-Angle Pin Header



Recommended Mounting Hole Pattern for 1.57-Thick PC Board

 3 Coordinate Dimension Applies from Center of Actual Feature

 4 Recommended for Edge Mounting

Figure 10

## E. Pin Header Spacing

Care must be used to avoid interference between adjacent pin headers and other components. The minimum allowable distance between pin headers to ensure proper mating is provided in Figure 11.

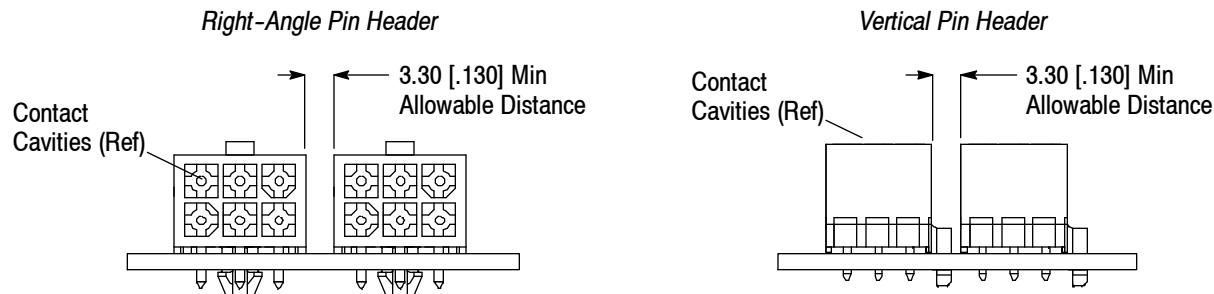


Figure 11

### 3.12. Pin Header Placement

**CAUTION**

Pin headers should be handled only by the housing to avoid deformation, contamination, or damage to the contact solder tails.



The pin header number one position must be aligned with the number one position pc board hole. When placing pin headers on the pc board, the contact solder tails and boardlock must be aligned and started into their matching holes before seating the pin header onto the pc board. After seating, the shoulder of the boardlock must be through the pc board, and the standoffs must be seated on the pc board. See Figure 12.

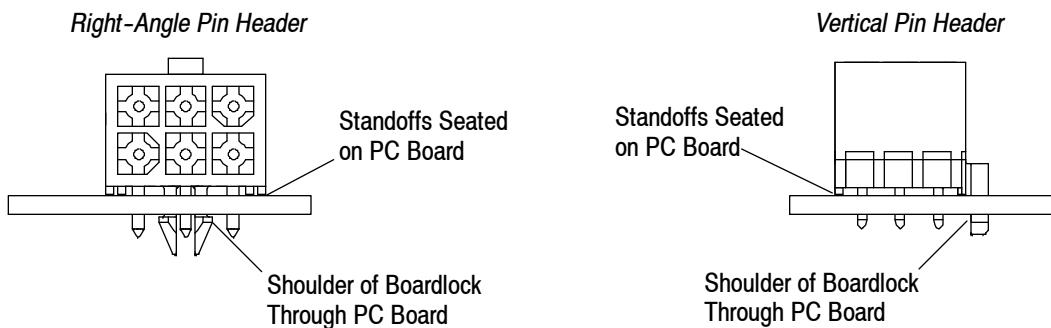


Figure 12

### 3.13. Soldering

Observe guidelines and procedures when soldering header assembly contacts. All solder joints should conform to those specified in Workmanship Specification 101-21 and all other requirements specified in this document. Solder, clean, and dry all wire leads to contacts according to the following:

#### A. Flux Selection

Contacts must be fluxed prior to soldering with a mildly active, rosin base flux. Selection of the flux will depend on the type of pc board and other components mounted on the board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. Call PRODUCT INFORMATION at the number at the bottom of page 1 for consideration of other types of flux. Flux that is compatible with these connectors is provided in Figure 13.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
RMA	Mild	Noncorrosive	186	611

Figure 13

Kester and Alpha are trademarks.

## B. Process

The connectors can be soldered using wave soldering or equivalent soldering techniques. The temperatures and exposure time shall be as specified in Figure 14.

SOLDERING PROCESS	WAVE TEMPERATURE	TIME (At Max Temperature)
Wave	260°C [500°F]	5 Seconds

Figure 14

## C. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. The following is a list of common cleaning solvents that will not affect the connectors for the time and temperature specified. See Figure 15.

CLEANER		TIME (Minutes)	TEMPERATURE (Maximum)
NAME	TYPE		
ALPHA 2110	Aqueous	1	132°C [270°F]
BIOACT EC-7	Solvent	5	100°C [212°F]
Butyl CARBITOL Solvent	Solvent	1	Ambient Room
Isopropyl Alcohol	Solvent	5	100°C [212°F]
KESTER 5778	Aqueous		
KESTER 5779	Aqueous		
LONCOTERGE 520	Aqueous		
LONCOTERGE 530	Aqueous		
Terpene Solvent	Solvent		

Figure 15

### DANGER



Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the manufacturer's Material Safety Data Sheet (MSDS) for characteristics and handling of cleaners. Trichloroethylene and Methylene Chloride is not recommended because of harmful occupational and environmental effects. Both are carcinogenic (cancer-causing).

### NOTE

Contact PRODUCT INFORMATION at the number at the bottom of page 1 for a solvent that is not listed.



## D. Drying

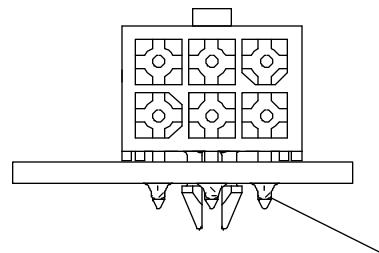
When drying cleaned assemblies and pc boards, make certain that temperature limitations are not exceeded: -55° to 105°C [-68° to 221°F]. Excessive temperatures may cause degradation or deterioration.

### 3.14. Checking Installed Pin Header

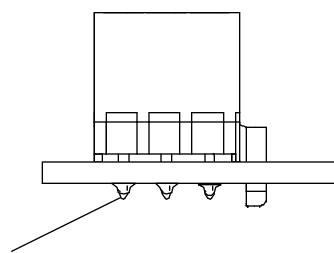
All solder joints should conform to those specified in Workmanship Specification 101-21 and all other requirements specified in this document. The installed pin header must have solder fillets evenly formed around each contact with no skips or voids. There should be no solder on the boardlocks. Refer to Figure 16.

Bioact, Carbitol, and Loncoterge are trademarks of their respective owners.

Right-Angle Pin Header



Vertical Pin Header



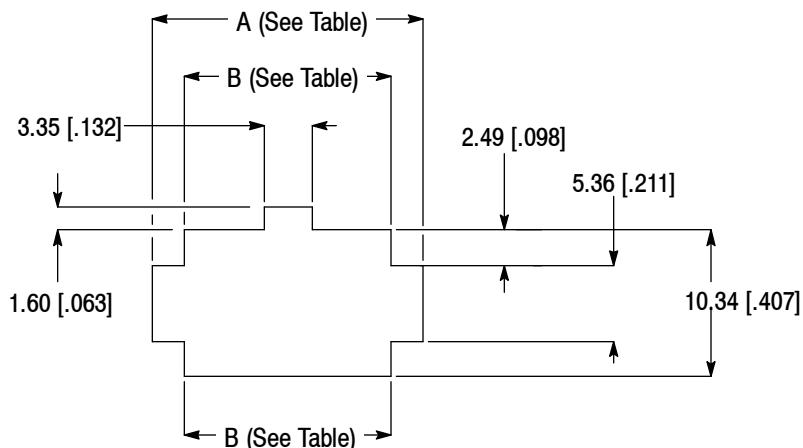
Solder Fillet Evenly Formed Around Each Contact with No Skips or Voids  
(No Solder on Boardlocks)

Figure 16

### 3.15. Panel Cutout

The cap housings are designed to be panel mounted. The panel thickness range must be 0.8 through 2.0 [.031 through .079]. The panel cutout must conform to the dimensions provided in Figure 17.

Panel Cutout



CAP HOUSING No. of Positions	PANEL DIMENSION	
	A	B
2	10.69 [.421]	6.15 [.242]
4	14.91 [.587]	10.34 [.407]
6	19.10 [.752]	14.55 [.573]
8	23.29 [.917]	18.72 [.737]
10	27.50 [1.083]	22.96 [.904]

Figure 17

### 3.16. Mounting Cap Housing in Panel

The cap housing must be inserted (mating face first) through the panel cutout in the same direction as the punch. The panel stops must be flush with the panel, and the mounting ears must be against the panel. The serrations on the mounting ears are designed to ensure a tight fit between the connector and panel by accommodating any of the panel thicknesses within range. See Figure 18.

Before removing the cap housing from the panel, the mounting ears must be deflected until clear of the panel. The cap housing can be removed from either the front or back of the panel.

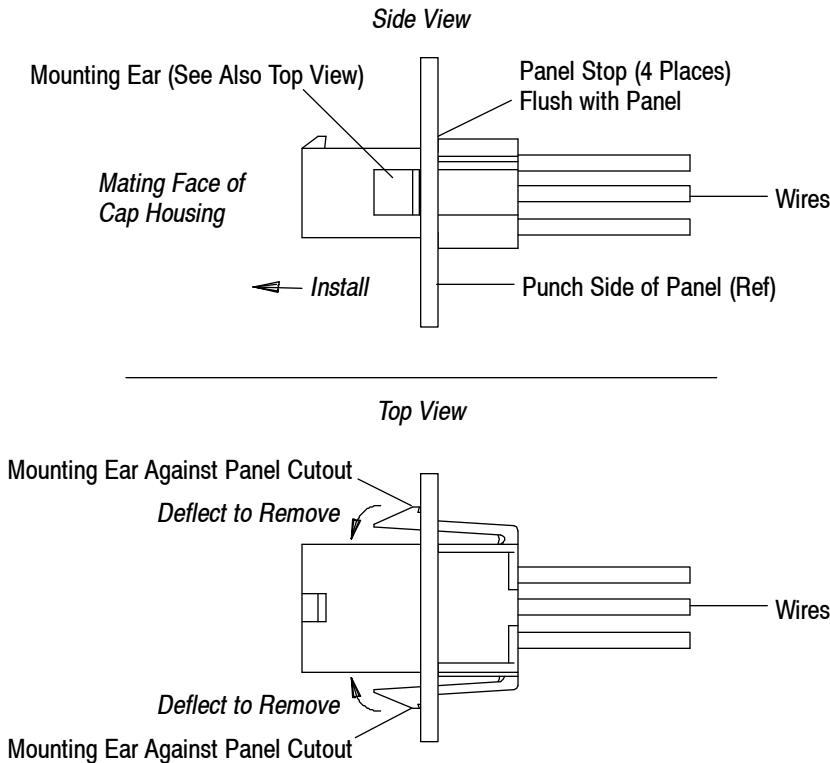


Figure 18

### 3.17. Mating and Unmating

Mating connectors must have identical number of positions. When mating, the housing must be pushed straight into the housing or header. The locking latch of the plug housing must engage and be fully seated on the locking tab of the cap housing or pin header after mating. The interface seal must be flat and compressed against the back of the channel at the base of the silos of the plug housing. Refer to Figure 19.

The locking latch of the plug housing must be depressed to release the locking tab of the cap housing or pin header. The plug housing must be pulled straight out of the mating connector. After unmating the connectors, the interface seal must be inspected for damage or twisting. If damaged or twisted, the interface seal must be replaced before re-mating the connectors.

**Note:** Cap Housing Shown, Requirements Equally Apply to Pin Header

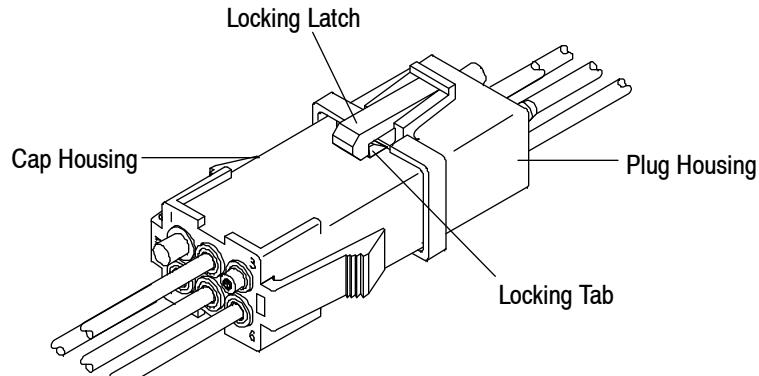


Figure 19

### 3.18. Strain Relief and Wire Dress

If necessary, wires can be bundled together and supported with cable ties or similar device. Wires must not be stretched or confined in any way. Therefore, the wires must remain perpendicular to the connector and avoid an excessively sharp bend radius. The minimum distance for the cable tie, measured from the housing at the wire end of the connector to the cable tie is shown in Figure 20.

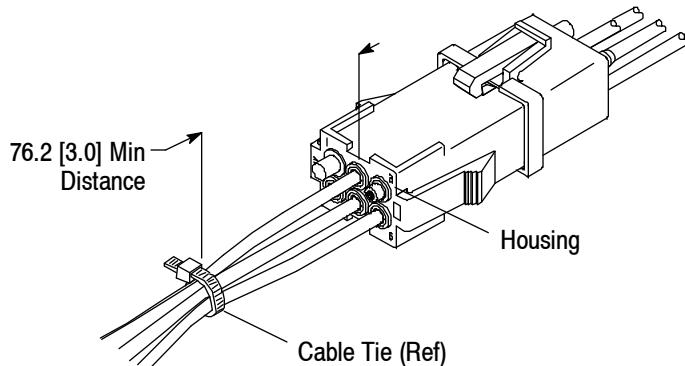


Figure 20

### 3.19. Repair and Removal

Connectors, contacts, interface seals, wire seals, and cavity plug seals are not repairable. Any damaged or defective components MUST NOT be used. Terminated contacts or wire seals MUST NOT be re-used by removing the wire.

Standard de-soldering methods must be used to remove pin headers from the pc board. Removed pin headers MUST NOT be re-used.

Keying plugs must be removed from the mating face of the connector using pliers.

## 4. QUALIFICATION

No qualifying support for mini-universal MATE-N-LOK splash-proof sealed connectors was defined at the time of publication of this document.

## 5. TOOLING

Tooling part numbers and instructional material packaged with the tooling are shown in Figure 21.

### 5.1. Hand Tools

Hand tools for manual application of loose-piece contacts are available to cover the full wire size range.



*Only CERTI-CRIMP II hand tools (or similar type of tools) can be used to crimp these contacts with wire seals. The wire seals are not compatible with other types of hand tools.*

### 5.2. Extraction Tool

The extraction tool is used to remove the contacts from the plug housing or the cap housing by releasing the contact locking lance from the housing without overstressing the contact.

### 5.3. Insertion Tool

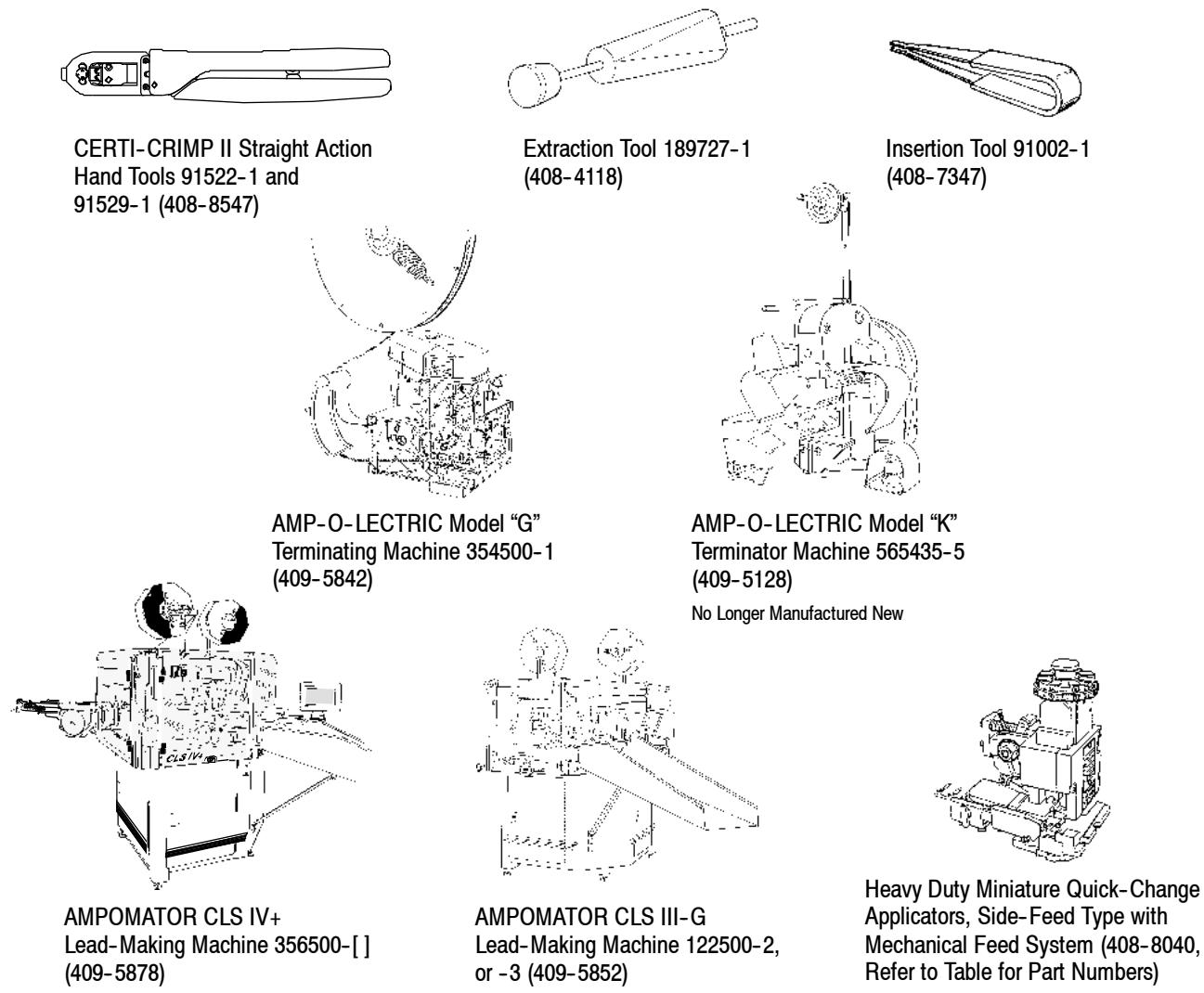
The insertion tool is available for inserting contacts crimped onto small wire sizes or when the wire bundle is too large for hand insertion.

### 5.4. Applicators

Applicators are used to crimp strip form contacts onto pre-stripped wire, and provide for high volume, heavy duty production requirements. The applicator must be installed onto a power unit.

## 5.5. Power Units

Automatic and semi-automatic machines for power assisted application of strip form contacts are available to cover the full wire size range. These power units provide the force required to drive the applicator for crimping the contacts. Automatic power units are single-wire lead-making machines that do all the work necessary to automatically turn the reels of wire and contacts into finished leads while maintaining high production rates. The machines are designed to be floor-standing. The semi-automatic power unit terminates pre-stripped wires onto the contacts. It is designed to be bench mounted and provides for medium-volume applications.



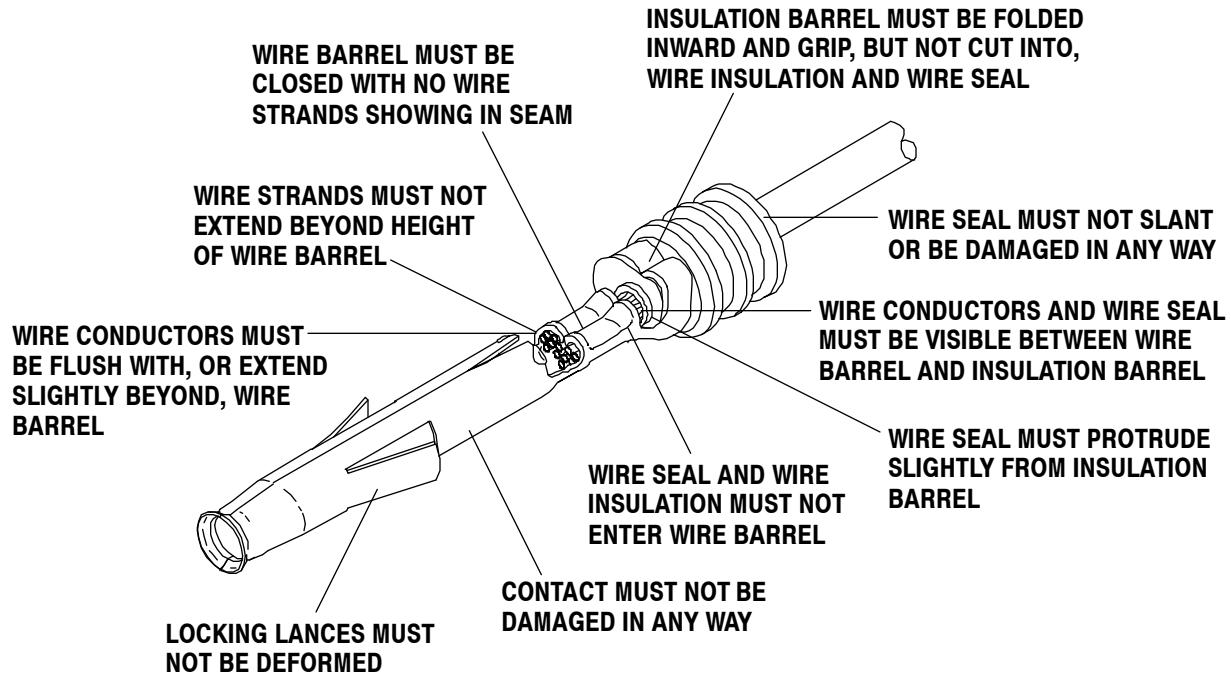
WIRE		APPLICATOR	POWER UNIT	HAND TOOL	
SIZE (AWG)	INSULATION DIAMETER RANGE				
26	1.02-1.52 [.040-.060]	567066-3	AMPO-MATOR CLS IV+ or CLS III-G	91529-1	
24		567066-4	AMP-O-LECTRIC Model "G" or Model "K"		
22		567066-4			
22	1.27-2.11 [.050-.083]	567067-1	AMPO-MATOR CLS IV+ or CLS III-G	91522-1	
20		567067-1			
18		567067-2			

Figure 21

## 6. VISUAL AID

Figure 22 shows a typical application of mini-universal MATE-N-LOK splash-proof sealed connectors. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.

**Note:** Socket Contact Shown, Requirements Apply Equally to Pin Contact



### WIRE-TO-WIRE FREE-HANGING APPLICATION

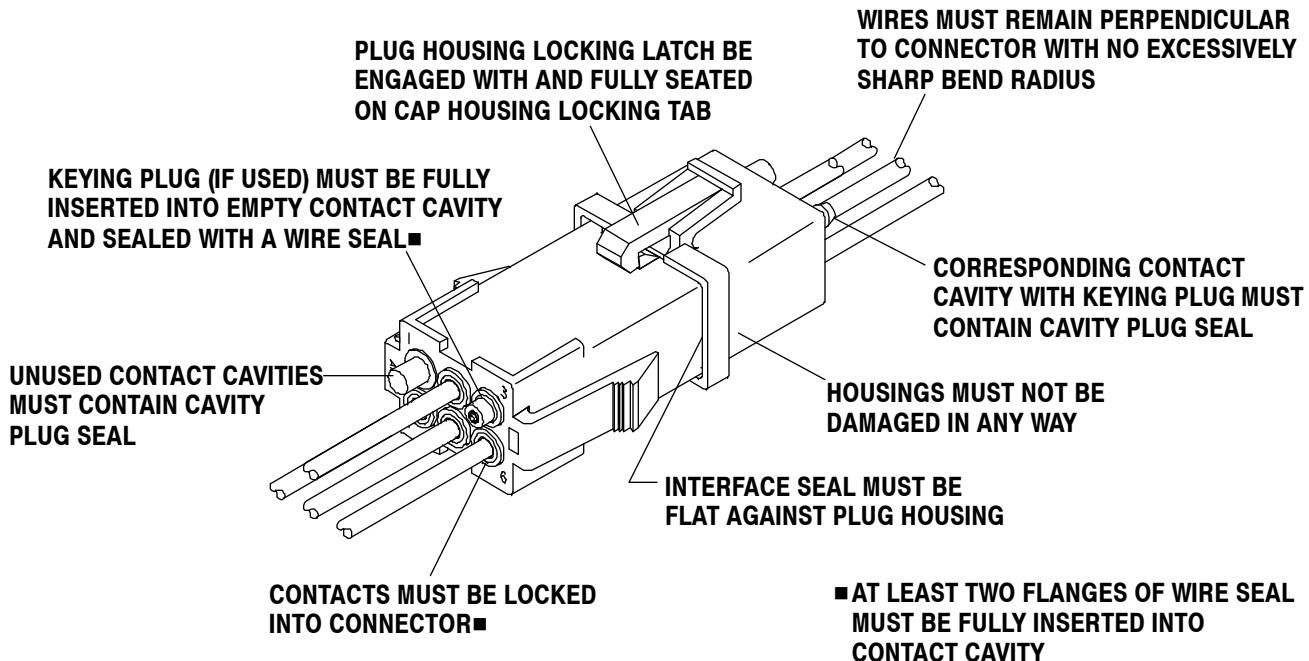
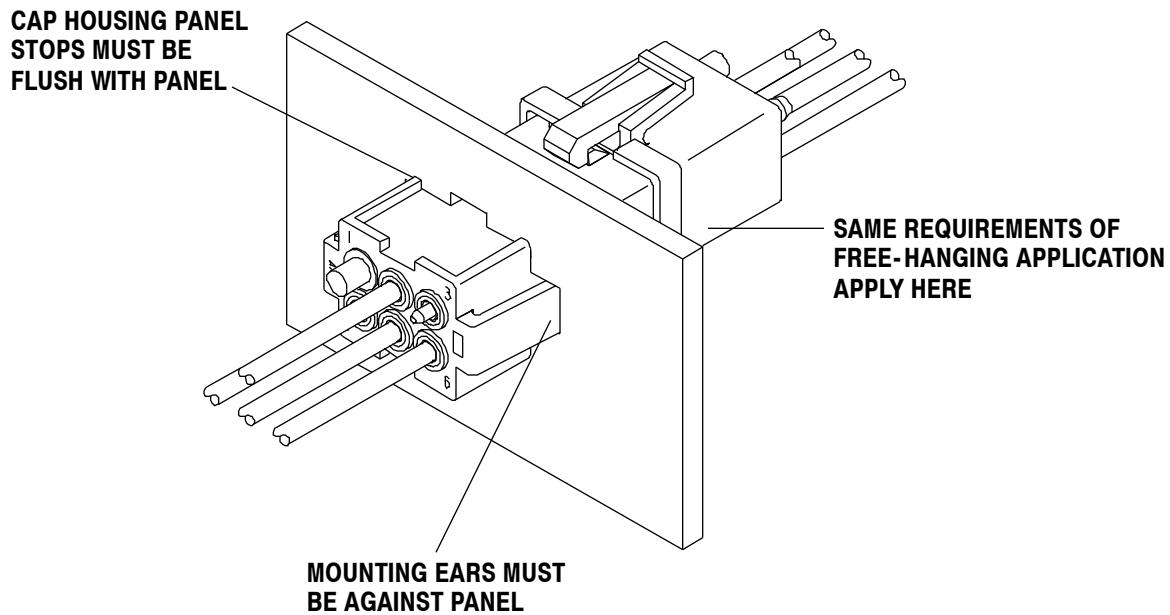


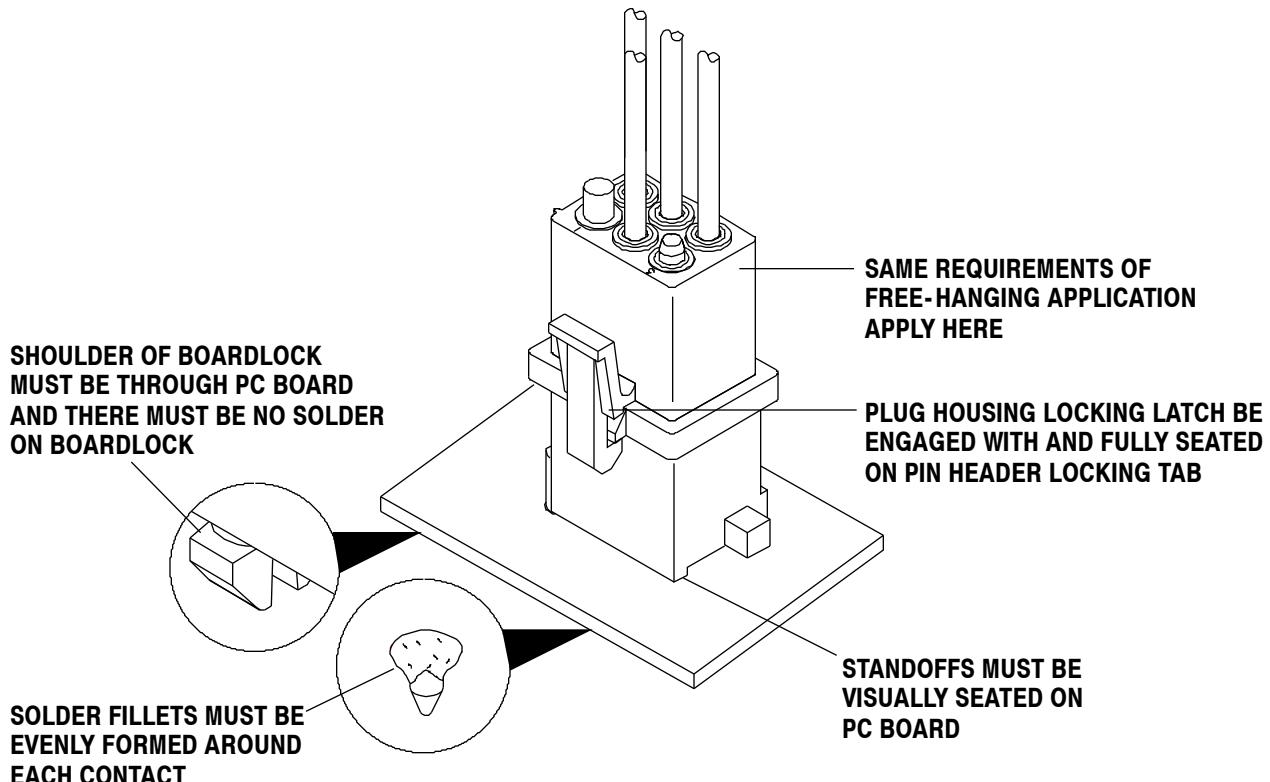
FIGURE 22. VISUAL AID (CONT'D)

### WIRE-TO-WIRE PANEL MOUNT APPLICATION



### WIRE-TO-BOARD APPLICATION

**Note:** Vertical Pin Header Shown, Requirements Apply Equally to Right-Angle Pin Header



**FIGURE 22. VISUAL AID (END)**