

### 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.

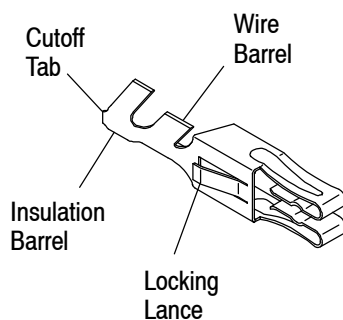
## 1. INTRODUCTION

This specification covers the requirements for the application of High Current Edge Connector Contacts and Housings. Housings are available in 3, 4, 6, 8, 9, 10, and 12 contact positions with contact centerline spacing of 7.92 mm [.312 in.]. The housings are designed with or without mounting ears and have the capability of mating with double-sided printed circuit (pc) boards.

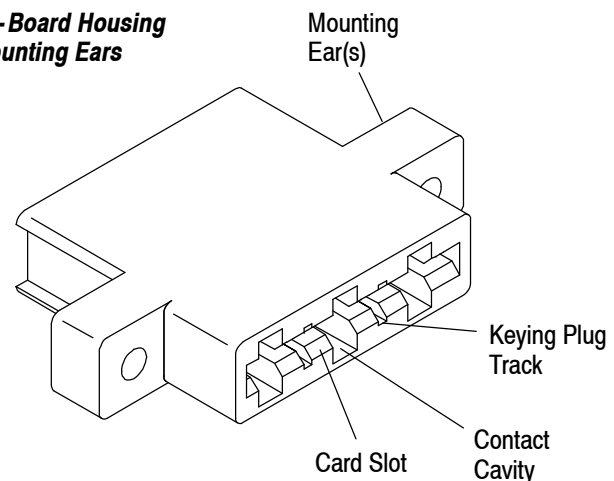
These housings are available two styles for wire-to-board and board-to-board applications. Wire-to-board housings accept heavy duty crimp, snap-in contacts which can accommodate a wire size range of 16–10 AWG with an insulation diameter of 2.29–5.34 mm [.090–.210 in.]. Contacts are supplied in strip form for automatic machine termination and in loose piece form for hand tool application. Board-to-board housings are supplied pre-loaded with solder tine contacts. Housings are placed on pc boards manually.

When corresponding with TE Personnel, use the terminology provided on this specification to help facilitate your inquiry for information. Basic terms and features of components are provided in Figure 1.

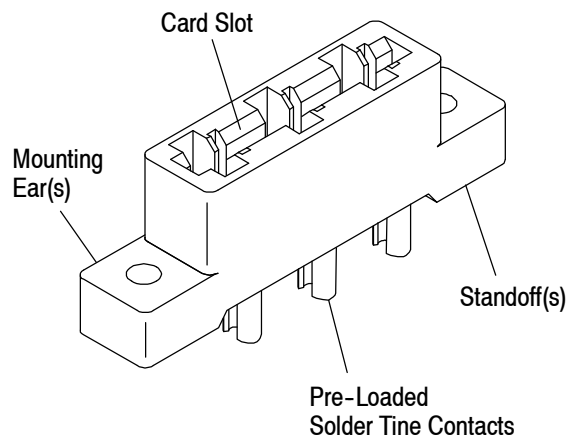
### Contact



### Wire-to-Board Housing With Mounting Ears



### Board-to-Board Housing



### Wire-to-Board Housing Without Mounting Ears

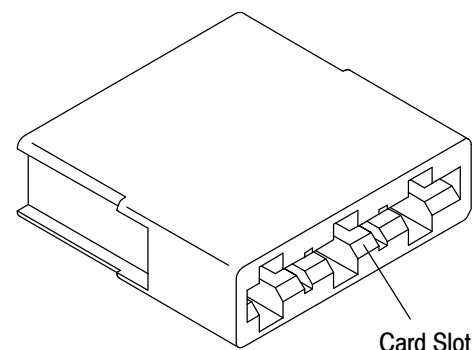


Figure 1

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## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

This paragraph is reserved for a revision summary covering the most recent additions and changes made to this specification which include the following:

- Updated document to corporate requirements

### 2.2. Customer Assistance

Reference Part Number 530521 and Product Code 5259 are representative numbers of High Current Edge Connector Contacts and Housings. 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 TE Representative or, after purchase, by calling the Tooling Assistance Center or the Product Information number at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for each product part number are available from the service network. The information contained in Customer Drawings takes priority if there is a conflict with this specification or with any technical documentation supplied by TE.

### 2.4. Manuals

Manual 402-40 is available from the service network. This manual provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is included in the manual for information on soldering problems.

### 2.5. Specifications

Product Specification 108-9045 provides product performance requirements and test information.

### 2.6. Instructional Material

The following list includes available instruction sheets (408-series) that provide assembly procedures for product, and operation, maintenance, and repair of tooling; and customer manuals (409-series) that provides setup, operation, and maintenance of machines.

408-2095	Hand Crimping Tool 69710-1
408-6516	Keying Plugs 530533-1 and 531369-1
408-7782	Extraction Tool 91116-1
408-7783	Crimping Die Assemblies 90332-1 and 90332-2
408-7802	Crimping Die Assembly 90333-1
408-8040	Miniature Quick Change Applicators 466438-1 and 466439-2
408-9123	High Current Edge Connector Contacts and Housings
409-5842	AMP-O-ELECTRIC* Model "G" Terminating Machine 354500-1

## 3. REQUIREMENTS

### 3.1. Material

High Current Edge Contacts are made of high conductivity copper alloy with bright tin-over-nickel plating. Housings are glass-filled, high-temperature thermoplastic.

### 3.2. Storage

#### A. Ultraviolet Light

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

#### B. Reeled Contacts

When using reeled contacts, store coil wound reels horizontally and traverse wound reels vertically.

#### C. Shelf Life

The contacts and housings should remain in the shipping containers until ready for use to prevent deformation to the contacts and damage to the housings. They should be used on a first in, first out basis to avoid storage contamination that could adversely affect signal transmissions.

### 3.3. Wire-to-Board Connectors

#### A. Wire Selection and Preparation

##### 1. Selection

Contacts are available for solid and stranded copper wire sizes specified in Figure 2.

##### 2. Strip Length

Insulation must be stripped as indicated in Figure 2.

#### CAUTION

*Do not nick, scrape, or cut the wire conductor during the stripping operation.*



#### B. Crimp Requirements

##### 1. Cutoff Tab and Burr

The cutoff tab is the remaining portion of the carrier strip after the contact is cut from the strip. The cutoff tab and the burr resulting from the cutoff tab shearing must not exceed the dimension shown in Figure 2.

##### 2. Locking Lance

The locking lance retains the contact in the housing and must not be deformed or bent beyond the dimensions shown in Figure 2.

##### 3. Terminating

Select the contact to be crimped for the wire size being used. Crimp the contact according to the instructions packaged with the appropriate tooling.

##### 4. Wire Conductor Location

After crimping, the end of the wire conductor must be flush with or extend 1.27 mm [.050 in.] from the front end of the contact wire barrel. Both the insulation and the conductor must be visible between the wire barrel and the insulation barrel. Care must be taken not to allow the wire insulation to be crimped in the wire barrel. See Figure 2.

##### 5. Wire Barrel Seam

The seam must be completely closed and there must be no evidence of loose wire strands or wire strands visible in the seam.

#### CAUTION

*When crimping contacts with large wire sizes, extra caution should be taken to ensure that all wire strands are in the wire barrel*



##### 6. Wire Barrel Flash

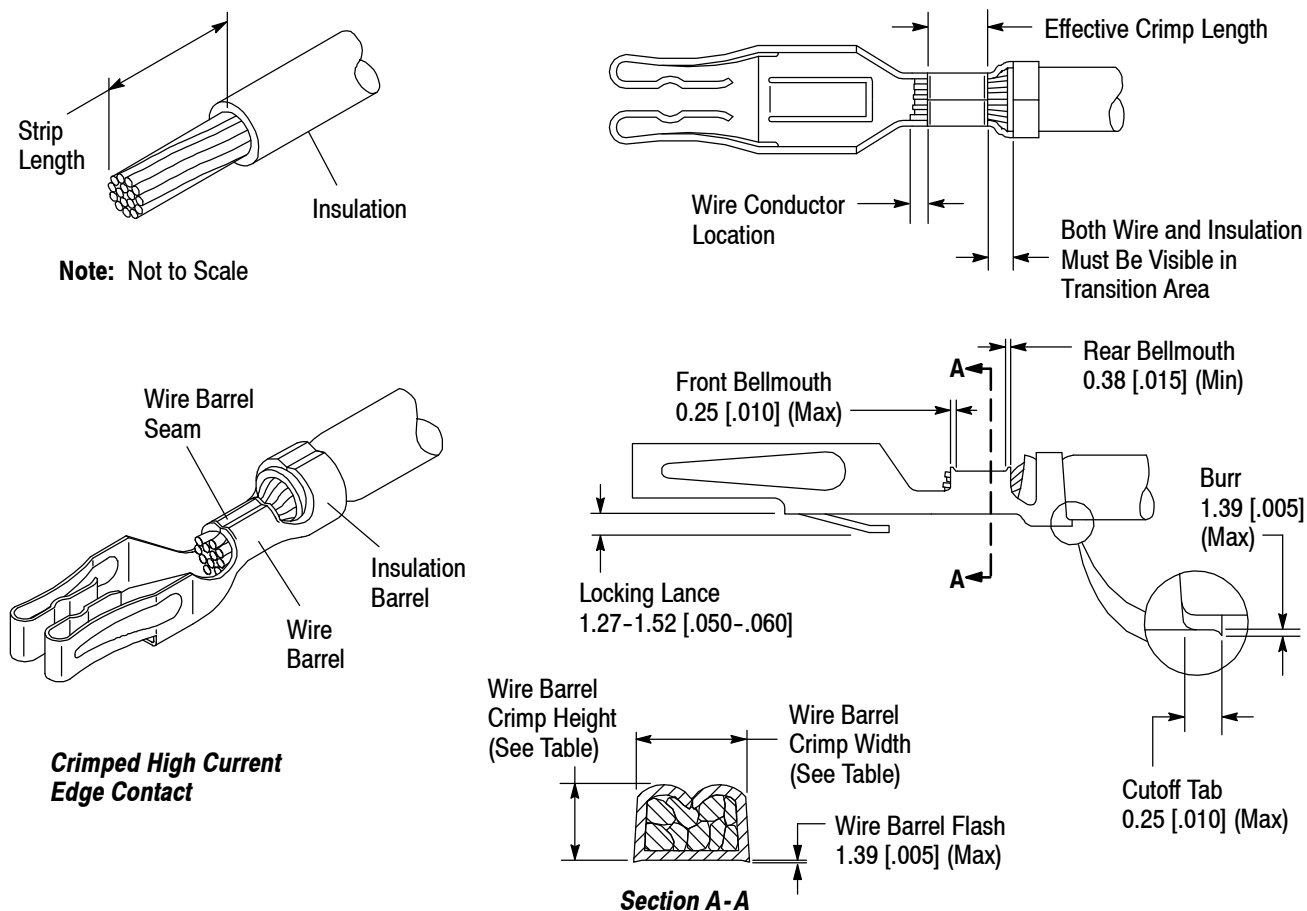
Wire barrel flash is the formation that may appear on both sides of the wire barrel as the result of the crimping process. It must not exceed the dimension provided in Figure 2.

##### 7. Crimp Height and Width

The effective crimp length applied to the wire barrel is the most compressed area and is most critical in ensuring optimum electrical and mechanical performance of the crimped contact. The crimp height and width of the wire and insulation barrels must be within the dimensions provided in Figure 2.

##### 8. Bellmouths

Bellmouths should be visible at the front and rear of the contact after crimping. The rear bellmouth and front bellmouth lengths must not exceed the dimensions shown in Figure 2.



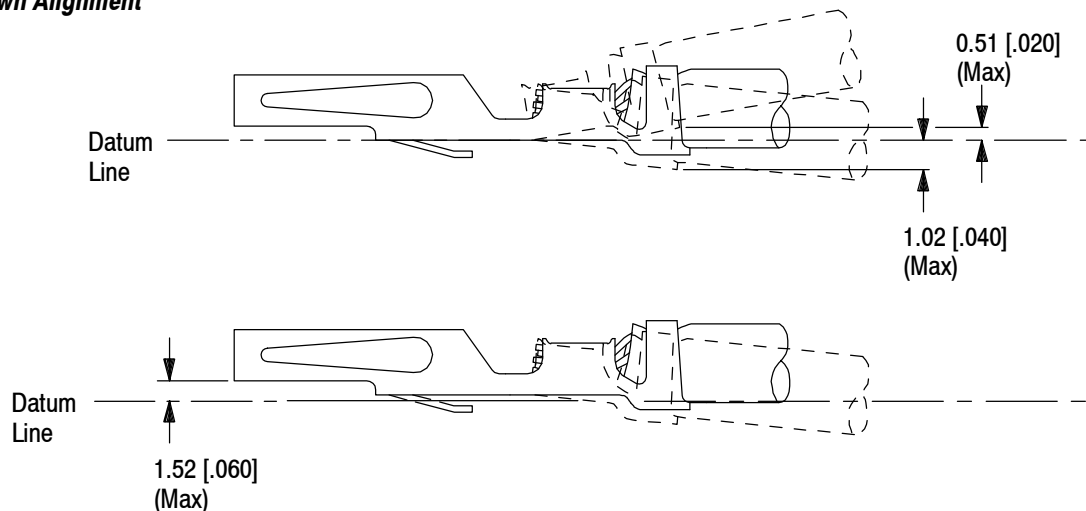
WIRE			CONTACT			
			WIRE BARREL CRIMP		INSULATION BARREL CRIMP (Ref)	
SIZE (AWG)	INSUL DIA	STRIP LENGTH	HEIGHT	WIDTH	HEIGHT	WIDTH
18	2.29-3.68 [.090-.145]	6.10-6.60 [.240-.260]	1.78-1.88 [.070-.074]	0.20-2.84 [.008-.112]	Adjustable	4.50-4.65 [.177-.183]
16			1.91-2.06 [.075-.081]		3.86-4.01 [.152-.158]	
14			1.83-2.36 [.072-.093]			
12	4.06-5.33 [.160-.210]	7.11-7.62 [.280-.300]	1.78-3.38 [.070-.133]	3.05-4.06] [.120-.160]	5.38-5.54 [.212-.218]	6.27-6.43 [.247-.253]
10			2.44-3.15 [.096-.124]			

Figure 2

## 9. Alignment

The wire end of the contact, including the cutoff tab and burr, must not be bent above or below the datum line more than the amount shown in Figure 3. The mating end of the contact must not exceed the requirements of Figure 3. The side-to-side bending of the contact must not exceed the limits specified.

### Up and Down Alignment



### Side-to-Side Alignment

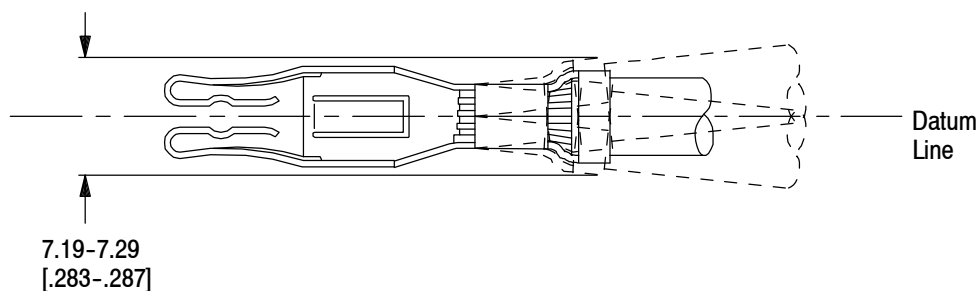


Figure 3

## 10. Twist and Roll

There shall be no twist or roll in the crimped portion in relation to the mating end that will impair usage of the contact. See Figure 4.

### Twist and Roll

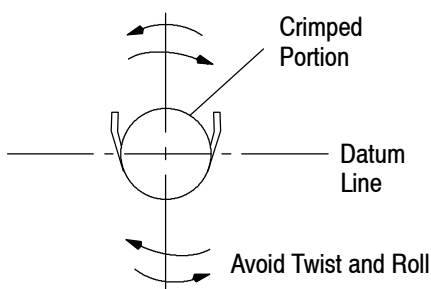


Figure 4

### C. Dummy Contacts

Dummy contacts are used in partially-loaded housings for pc board-to-housing retention. Loose-piece contacts designed for wire sizes 12 to 10 AWG should be used for producing dummy contacts. Contacts must be crimped *without a wire* in the appropriate crimping tool before inserting them into the housing.

### D. Mating PC Board (Daughter Board)

Wire-to-board connector housings accept crimp, snap-in contacts designed for double-sided daughter boards in any of three nominal thicknesses: 1.57 mm [.062 in.], 2.36 mm [.093 in.], or 3.18 mm [.125 in.].

Board-to-board connector housings are pre-loaded with contacts designed to mate with double-sided pc boards with a nominal thickness of 1.57 mm [.062 in.].

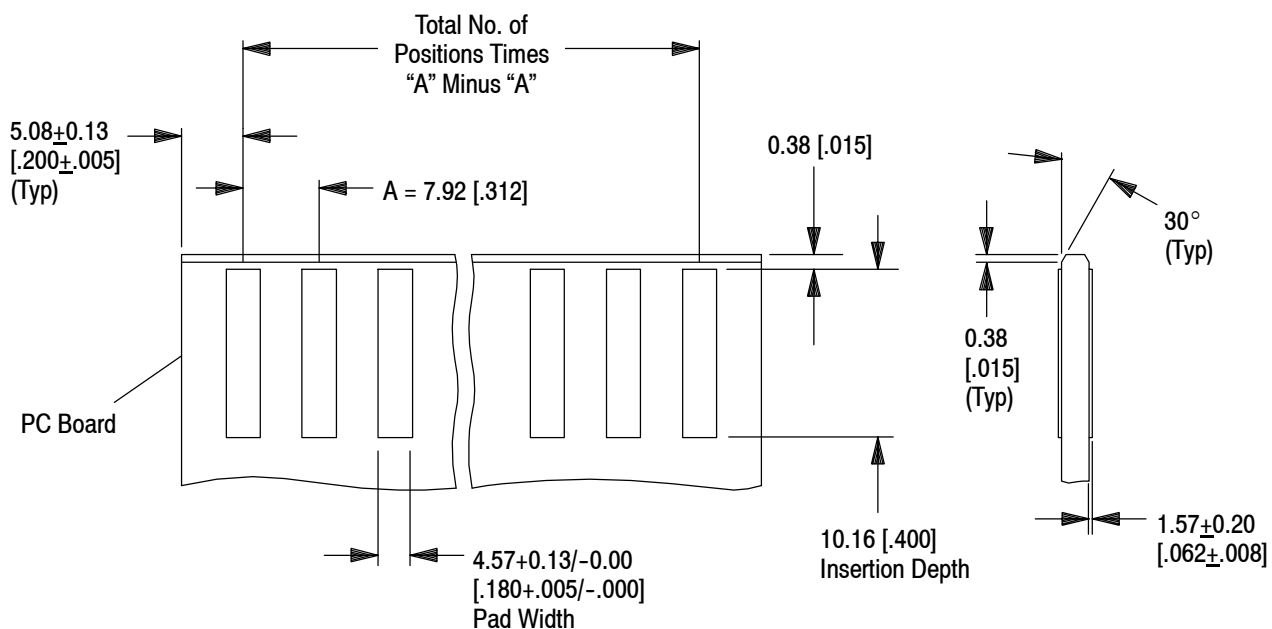
Board pad layout is shown in Figure 5.

#### NOTE



The dimensions necessary to ensure full engagement of the contacts with the circuit pads are provided in Figure 5.

#### Daughter Board Pad Layout



**Note:** All dimensions apply to both sides of board.

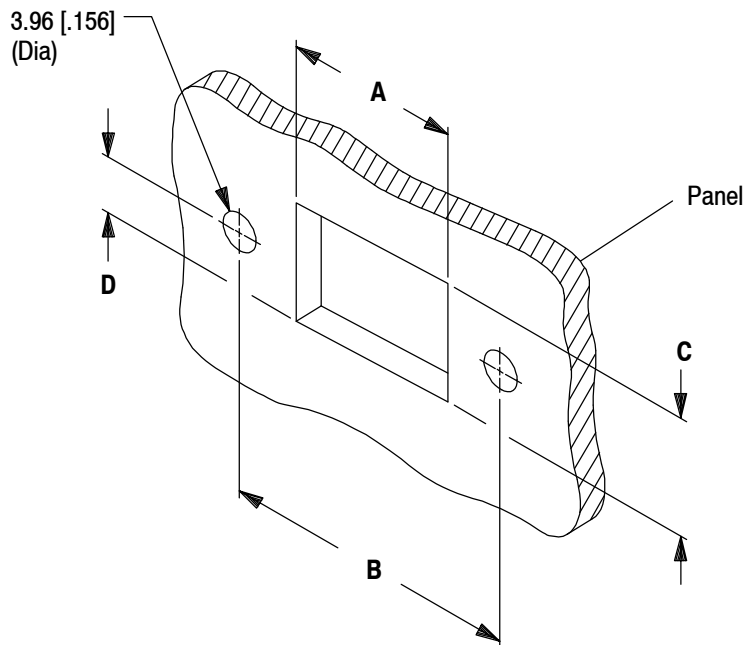
Figure 5

### E. Free-Hanging Applications

In free-hanging applications, excess weight of wires, or vibration during shipping or system operation could cause the pc board to loosen from the housing. Wires must be supported or housings must be secured to prevent overstress on the contacts and ensure peak performance of the assembly. Refer to Paragraph 3.5.D.

## F. Panel Mounting

Wire-to-board housings designed with mounting ears can be mounted to a panel with screws, nuts, and rivets, or other hardware compatible with your system. Dimensions for the panel cutout are shown in Figure 6.



HOUSING POSITIONS	PANEL CUTOUT DIMENSIONS			
	A	B	C	D
3	26.01 [1.024]	39.07 [1.538]	12.70 [.500]	0.63 [.025]
4	33.93 [1.336]	46.99 [1.850]	11.10 [.437]	5.56 [.219]
6	49.78 [1.960]	62.84 [2.474]		
8	65.63 [2.584]	78.69 [3.098]	12.70 [.500]●	0.63 [.025]
9	73.56 [2.896]	86.61 [3.410]	11.10 [.437]	5.56 [.219]
10	81.48 [3.208]	94.54 [3.722]		
12	97.33 [3.832]	110.39 [4.346]		

● Dimension applies to housings designed to accept 2.36 mm [.093 in.]-thick daughter boards.

Figure 6

## 3.4. Board-to-Board Connector Housings

### A. Mating PC Board (Mother Board and Daughter Board)

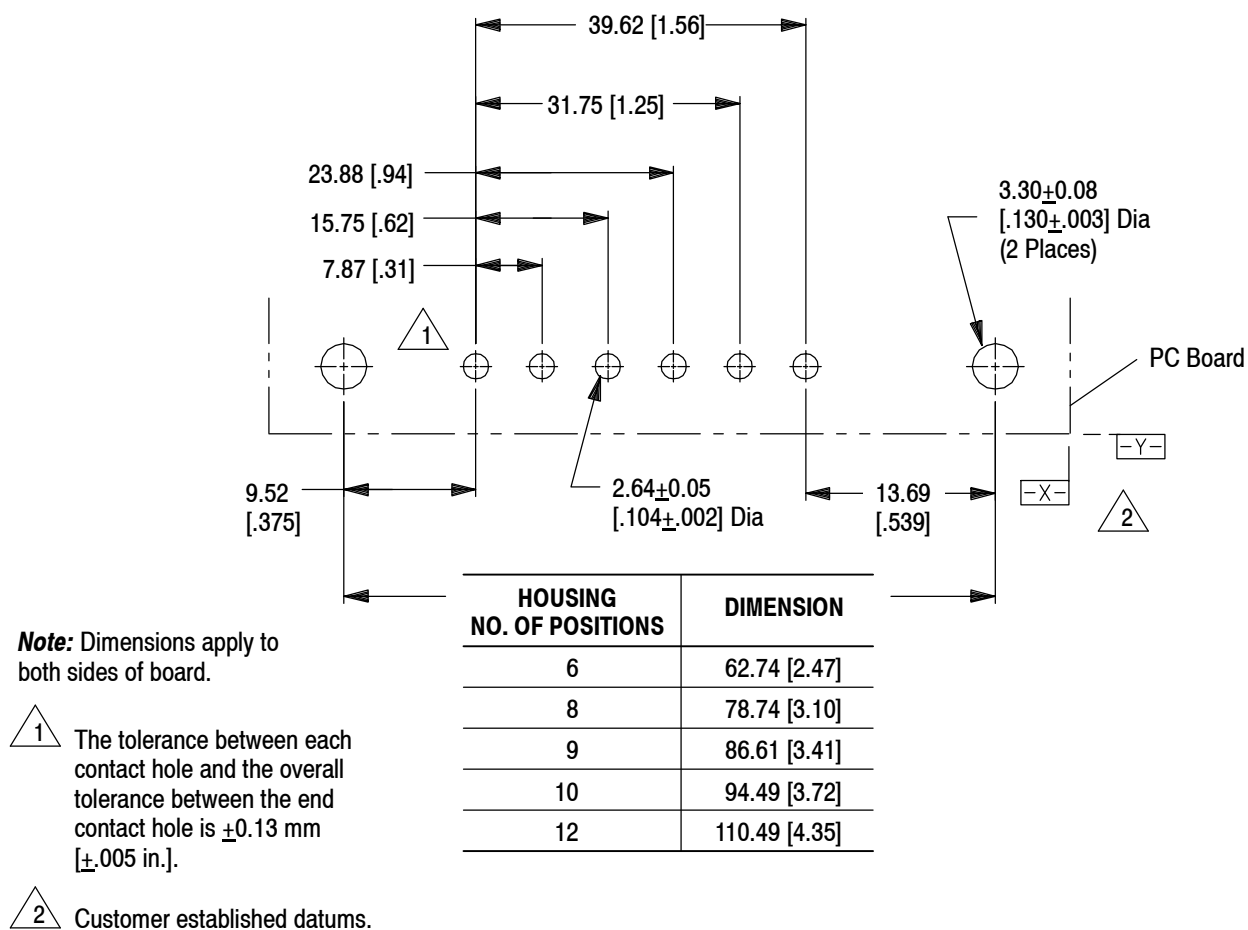
Refer to Figure 5 for mating pc board pad layout.



*When mating pc board with housing, reasonable care should be taken to insert pc board straight into the housing card slot.*

Care should be taken to prevent deformation of the solder tine contacts prior to placement onto the pc board. The solder tines require precise hole dimensions. The pc board holes must be drilled and prepared according to the dimensions provided in Figure 7.

## Mating PC Board (Mother Board) Hole Layout



## PC Board Hole Dimensions

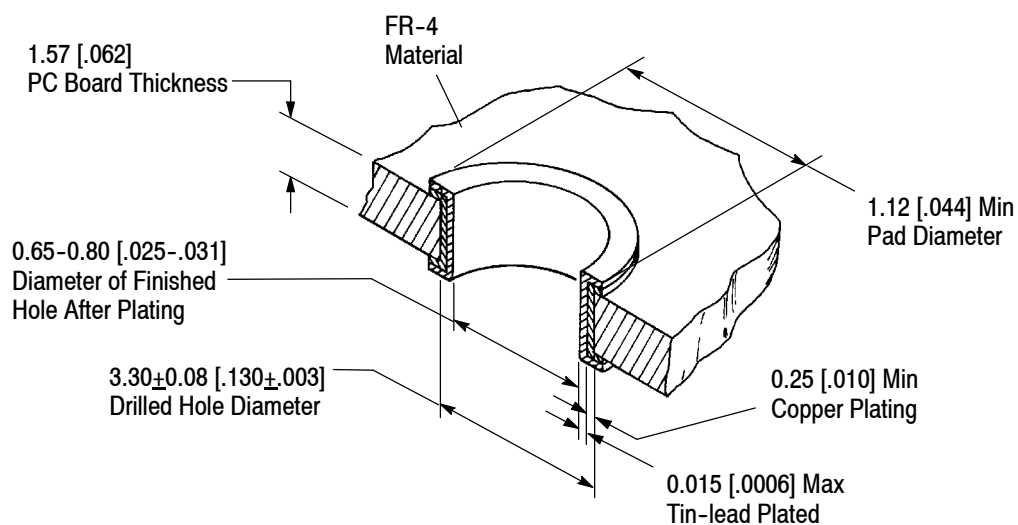


Figure 7



## B. Connector Housing Placement

Connector housings must be placed on the pc board manually with the housing standoffs seated on the surface of the pc board.

## C. Soldering

It is recommended that these housings be soldered using wave solder or equivalent soldering technique. The housings will withstand operating temperatures of  $-55^{\circ}\text{C}$  to  $105^{\circ}\text{C}$  [ $-67^{\circ}\text{F}$  to  $220^{\circ}\text{F}$ ].

### NOTE



A 1.57 mm [.062 in.]-thick dummy pc board should be inserted into the board-to-board housing and held in place during soldering of the contacts to the pc board.

### 1. Flux Selection

The solder contacts must be fluxed prior to soldering with a water soluble white rosin base flux Type R (MIL-F-14256). Selection of the proper flux will depend on the type of pc board and other components mounted on the board. The flux must be compatible with the wave solder line, manufacturing, and safety requirements.

Flux and solder contamination of the internal components must be avoided to ensure reliable performance and operation of the connector.

### 2. 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 cleaners that will not affect the connectors for the times and temperatures shown. See Figure 8.

### DANGER



Consideration must be given to toxicity and other safety requirements recommended in the Material Safety Data Sheet (MSDS) supplied by the solvent manufacturer for characteristics and handling of cleaners.

CLEANER		TIME (Minutes)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
ALPHA 2110	Aqueous	1	132	270
BIOACT EC-7	Solvent	5	100	212
Butyl CARBITOL	Solvent	1	Room Ambient	
Isopropyl Alcohol	Solvent	5	100	212
KESTER 5778	Aqueous	5	100	212
KESTER 5779	Aqueous	5	100	212
LONCOTERGE 520	Aqueous	5	100	212
LONCOTERGE 530	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

Figure 8

### 3. Drying

When drying cleaned assemblies and pc boards, make certain that temperature limitations of  $-55^{\circ}$  to  $105^{\circ}\text{C}$  [ $-67^{\circ}$  to  $222^{\circ}\text{F}$ ] are not exceeded. Excessive temperatures may cause housing degradation.

### 4. Soldering Guidelines

Refer to Paragraph 2.4 for information that is available for establishing soldering guidelines.

## D. Inspecting Soldered Connector Housing

Connector housing must be seated on the pc board so that the housing standoffs are within the dimension provided in Figure 9.

Solder fillets must be evenly formed around each contact solder tine. See Figure 9.

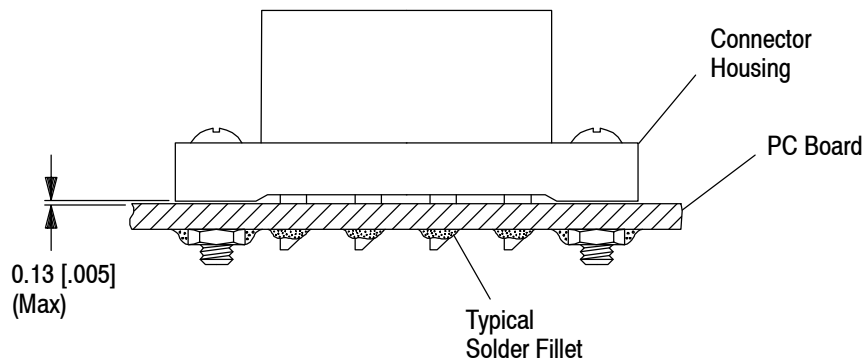


Figure 9

## 3.5. Ancillary Items

### A. Card Guides

Card guides are recommended when daughter boards exceed 76.2 mm [3.00 in.] in length. The size and configuration of the card guides will depend on your system design and are not available through TE.

### B. Keying Plugs

Keying plugs prevent mismatching of similar daughter boards used in the same vicinity. Two different keying plug sizes are available to accommodate all pc board thicknesses. The keying plugs are inserted into the housing keying plug track using a blunt-edged instrument. Board cutout slot dimensions to accommodate keying plugs are provided in Figure 10.

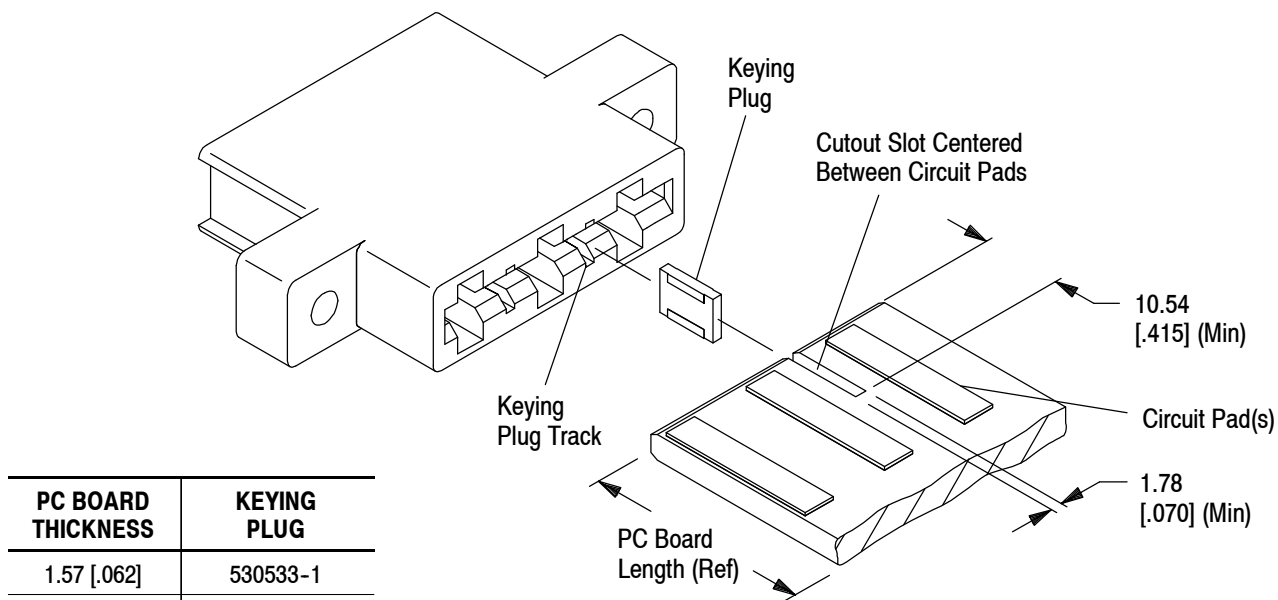


Figure 10

## C. Mounting Hardware

### 1. Wire-to-Board Connector Housings

These housings with mounting ears are designed to be secured to a panel with commercially available hardware such as screws, nuts, and rivets, or other hardware compatible with your system.

### 2. Board-to-Board Connector Housings

Pre-loaded housings with mounting ears must be seated and securely attached to the pc board prior to soldering it to the pc board. The housings are designed to be attached with commercially available hardware such as screws, nuts, and rivets, or other hardware compatible with your system. All components must be completely covered with solder after the soldering process has been finished.

## D. Strain Relief

If required, wires can be bundled together with cable ties or secured with fixed clamps. Wires must not be stretched or confined in any way that would restrict the floating action of the contacts in the housings. Therefore, the wires must remain perpendicular to the housing or be bent at a 90° right angle *before* the wire bundle is secured. The minimum distance for the cable tie or fixed clamp, measured from the back of the housing to cable tie or fixed clamp, is shown in Figure 11.

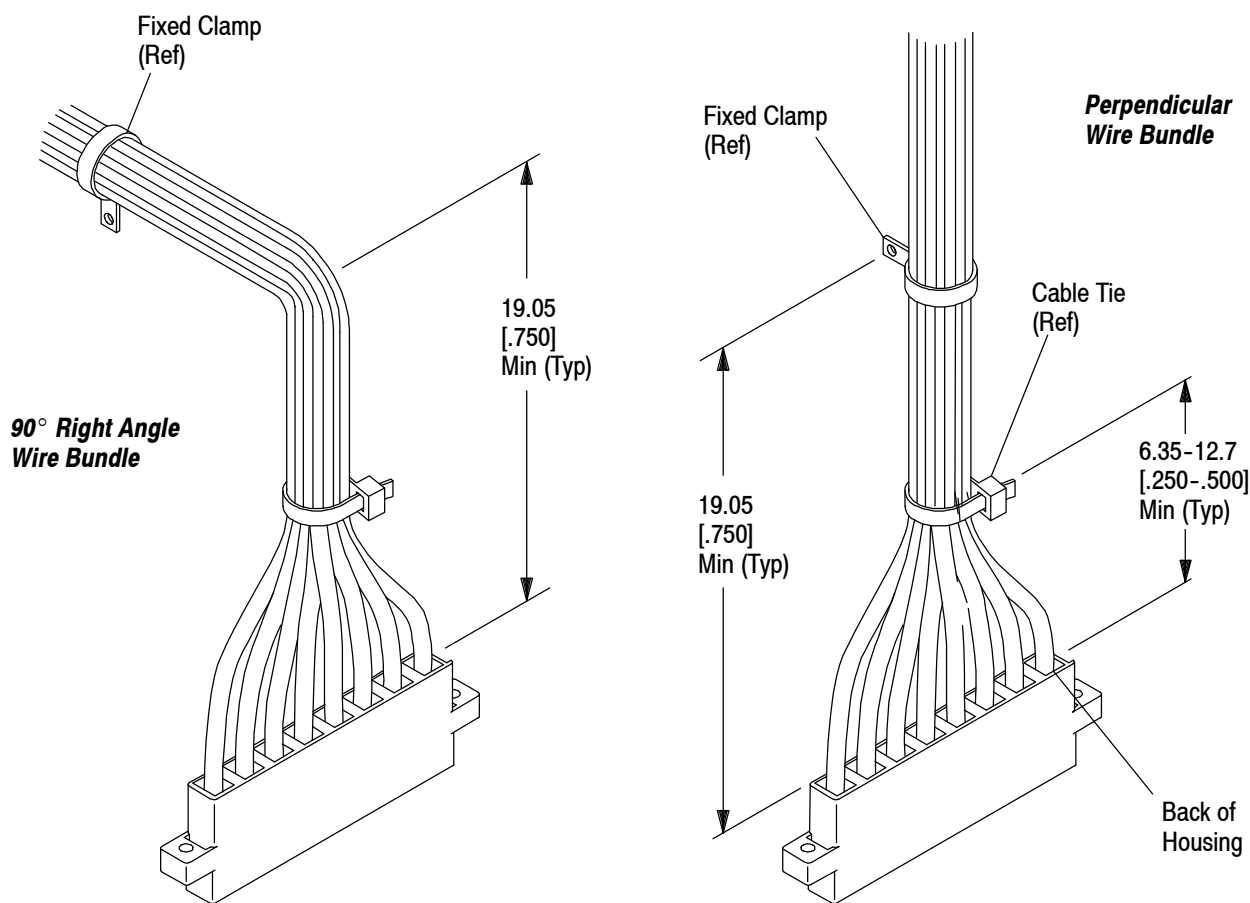


Figure 11

### 3.6. Repair and Replacement

Damaged crimped contacts or housings must be removed, discarded, and replaced with new components.

#### NOTE



*If a damaged contact is evident before the contacts are inserted into the housing, cut the wire in back of the contact and re-terminate the wire end. If contact or housing is damaged after insertion, remove the contact with the extraction tool and cut wire in back of the contact and re-terminate wire end.*

#### CAUTION



*When removing housings from pc boards, reasonable care should be taken to remove housings straight and in-line in relation to the pc boards. In free-hanging applications, the wires must be supported during removal to prevent excess strain on the contacts. Improper removal could result in damage to the wires, housing, contacts, or pc board.*

If the locking lance on a contact becomes flattened, it can be carefully re-adjusted to the dimensions shown in Figure 2.

#### CAUTION



*To avoid further damage, do not overstress the locking lance when re-adjusting it.*

## 4. QUALIFYING SUPPORT

High Current Edge Connector Contacts and Housings are Recognized under the Component Program of Underwriters Laboratories Inc. (UL) File E28476 and Certified by CSA International File LR7189.

## 5. TOOLING

Crimp-type contacts can be terminated to wire using hand, semi-automatic, or automatic crimping tools. The pc board connectors are placed on pc boards manually. Recommended tooling and instructional material for crimp-type contacts is provided in Figure 12.

### 5.1. Hand Crimping Tool

Hand crimping tools that accommodate the full wire size range are designed for prototype and low-volume applications such as repair of damaged contacts. Crimping tools must be fitted with the appropriate die assembly according to the wire size being used.

### 5.2. Applicator

Applicators are designed for the full wire size range of strip-fed, precision formed contacts, and provide for high volume, heavy duty, production requirements. The applicators can be used in bench or floor model power units.

#### NOTE



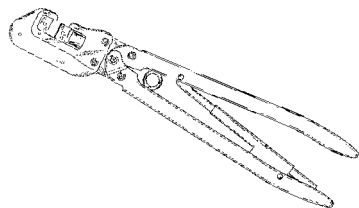
*Each applicator is shipped with a metal identification tag attached. DO NOT remove this tag or disregard the information on it. Also, a packet of associated paperwork is included in each applicator shipment. This information should be read before using the applicator; then it should be stored in a clean, dry area near the applicator for future reference.*

### 5.3. Power Unit

A power unit is an automatic or semi-automatic device used to assist in the application of a product. Power unit includes the power source used to supply the force or power to an applicator.

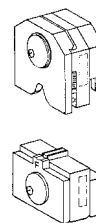
### 5.4. Extraction Tool

The extraction tool is designed to remove individual contacts and keying plugs from housings.

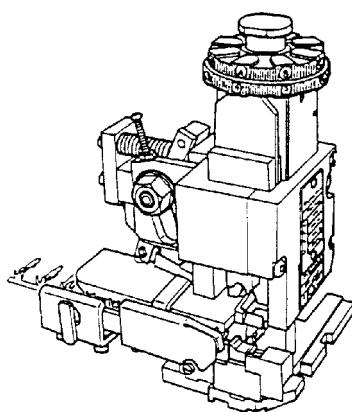


Hand Crimping Tool  
69710-1  
(408-2095)

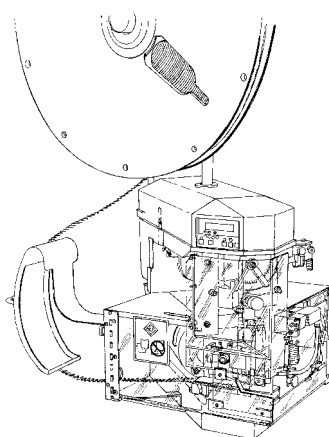
Crimping Die  
Assembly  
(See Chart)



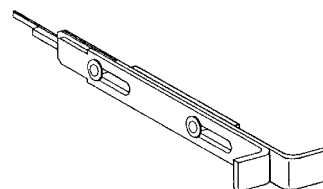
WIRE SIZE (AWG)	CRIMPING DIE ASSEMBLY	INSTRUCTION SHEET
16-14	90333-1	408-7802
12-10	90332-1 90332-2	408-7783



Miniature Quick Change  
Applicator 466438-1 or 466439-2  
(408-8040)



AMP-O-LECTRIC Model "G"  
Terminating Machine 354500-1  
(408-5842)



Extraction Tool  
91116-1  
(408-7782)

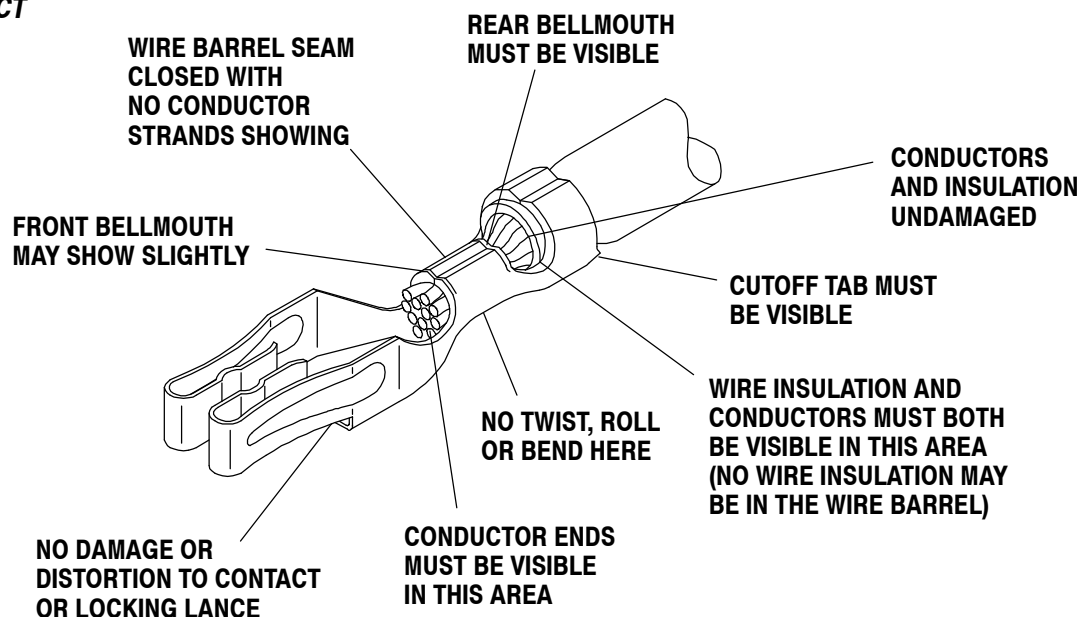
Figure 12

92-109, 35T-25, 48T-30, 93-279, 45T-15

## 6. VISUAL AID

Figure 13 shows typical application of High Current Edge 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.

### CRIMPED CONTACT



### TYPICAL APPLICATION SHOWING FREE HANGING WIRE-TO-BOARD HOUSING WITHOUT MOUNTING EARS

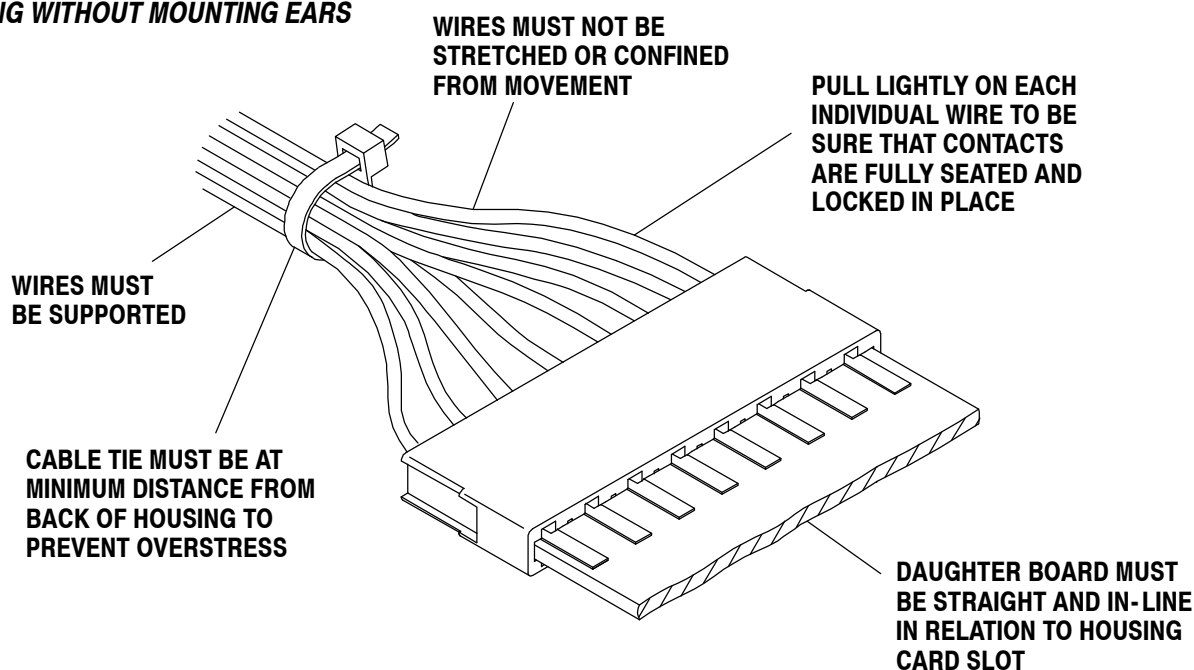
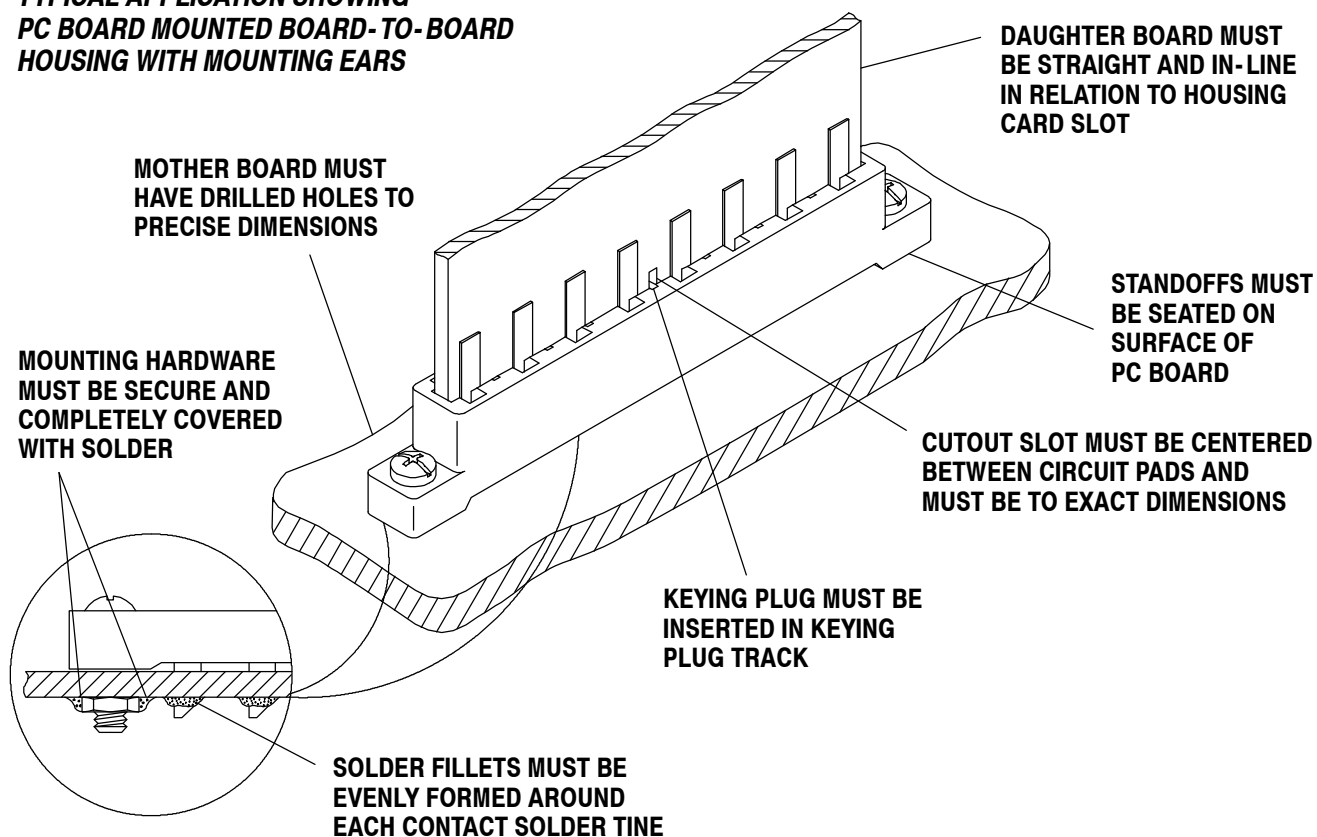
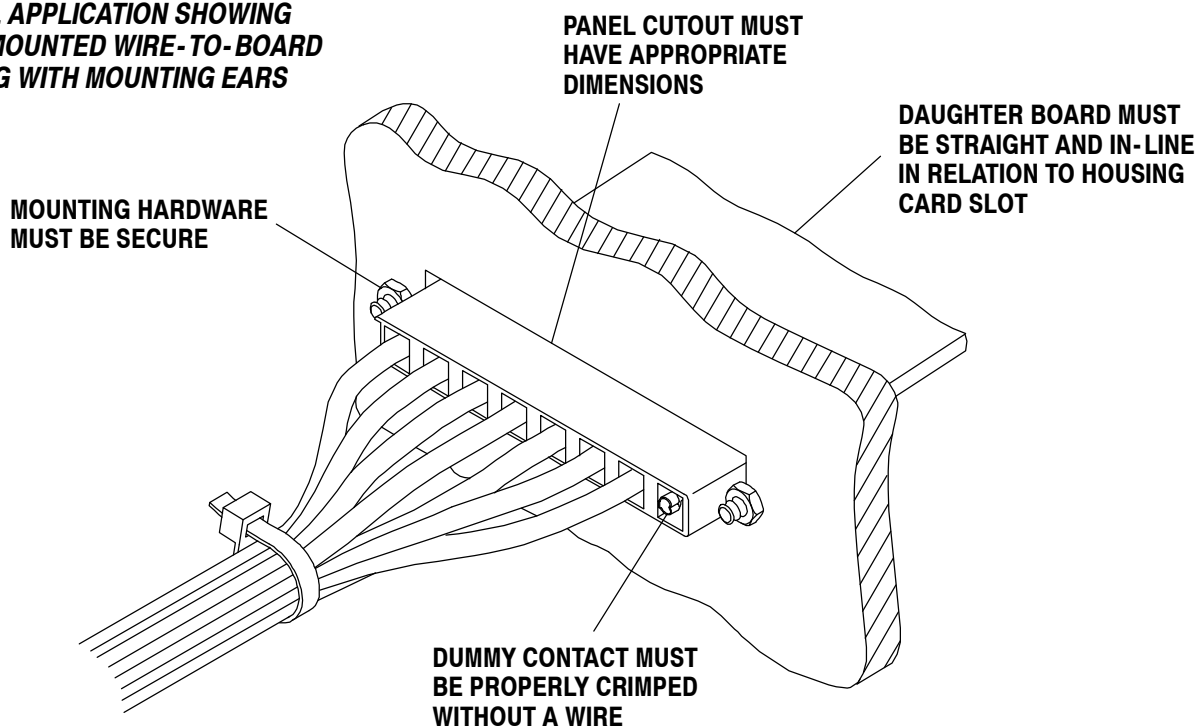


FIGURE 13. VISUAL AID (CONTINUED)

**TYPICAL APPLICATION SHOWING  
PC BOARD MOUNTED BOARD-TO-BOARD  
HOUSING WITH MOUNTING EARS**



**TYPICAL APPLICATION SHOWING  
PANEL MOUNTED WIRE-TO-BOARD  
HOUSING WITH MOUNTING EARS**



**FIGURE 13. VISUAL AID (END)**