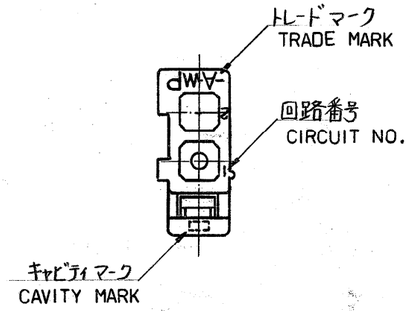
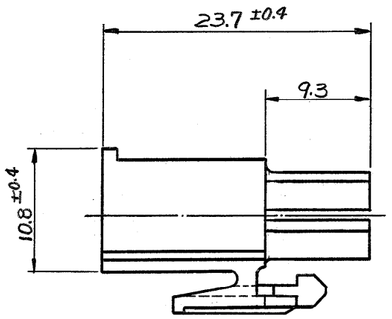
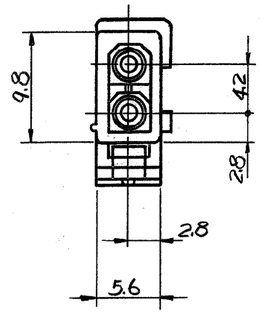
勝特力電材超市-龍山店 886-3-5773766
勝特力電材超市-光復店 886-3-5729570
胜特力电子(上海) 86-21-34970699
胜特力电子(深圳) 86-755-83298787
http://www.100y.com.tw



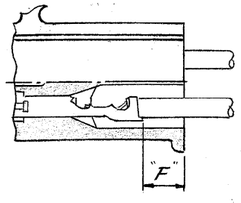




NOTES :
1, APPLIED CONTACT P/N : 170359,170360,170361,170362,171636,171637
2, MATING CONN : CAP HOUSING P/N 172328
3. INSTRUCTION SHEET : IS-105J.
4, PRODUCT SPEC : 108-5151
⑥ OBSOLETE PARTS: OBSOLETE CIS STREAMLINING PER D.RENAUD/D.SINISI

注：

1. 使用端子型番は 170359, 170360, 170361, 170362. 171636. 171637.
2. 嵌合相手ハウジング型番は. 172328
3. 取扱、説明書 : IS-105J
4. 適用製品仕様書: 108-5151
5. 端子とハウジング端面までの絶縁ギリ(F)は下記参照.




| "F" mm | 端子型番 |
|---|---|
| 3.2 | 170359 ~ 170362 |
| 2.5 | 171636, 171637 |

⑥ OBSOLETE

| | |
|---|---|
| 黄 (YELLOW) | 1-172336-4 |
| 黒 (BLACK) | 1-172336-9 |
| 青 (BLUE) | 1-172336-6 |
| 緑 (GREEN) | 1-172336-5 |
| 赤 (RED) | 1-172336-2 |
| 自然色 (NATURAL) | 172336-1 |
| 色 (COLOR) | 型番 (P/N) |

材料 (MATERIAL)
6/6 ナイロン (UL94V-2)
(NYLON 6/6 UL94V-2)

一般公差
TOLERANCE EXCEPT AS NOTED ±0.3 ±1°

仕上 (FINISH)
色 ; 表参照
HOUSING COLOR : SEE TABLE

DR. R Yuasa 4/21/81
CHK.
DE. T. Tamiyama 4/21/81
APP.

TE Connectivity

名称 (NAME) MINI-UNIVERSAL MATE-N-LOCK CONN
PLUG HOUSING 2Pos. (UL94V-2)
2極 ミニ ユニバーサル メイテン ロック コネクタ
プラグ ハウジング (UL94V-2)

SIZE B | LOC J | 番号 (NO.) C-172336

尺度 (SCALE) 2 : 1 | REV. C3 | SHEET 1

(CUSTOMER DRAWING) 参考図面

| LTR. | 変更 (REVISION RECORD) | DR. | CHK. | DATE |
|---|---|---|---|---|
| C3 | REVISED PER ECR-16-010553 | BW | SG | 02AUG2017 |

PRINT DIST

単位：粍 DIMENSIONS IN MM. DO NOT SCALE PRINT

***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 ±0.13 [±.005] and angles have a tolerance of ±2°. 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* connectors for free-hanging, panel-mount, and printed circuit (pc) board applications. These connectors provide a reliable and economic means of grouping multiple-lead connections in computers, computer/peripheral equipment, business machines, entertainment centers, and appliances.

The connectors are available in hermaphroditic housing and positively polarized: plug housing, vertical pin header, right-angle pin header, and cap housing. The housings accept socket contacts and pin contacts. Each contact features a contact stop to ensure proper insertion depth of the contact in the contact cavity of the housing. The contacts are available in strip form for machine application and loose piece for manual tooling application.

The hermaphroditic housing is available with 2, 3, or 4 circuits for free-hanging applications. The cap housing is available in 1, 2, or 3 circuits for free-hanging application and 2, 3, 4, 6, 8, 9, 12, or 15 circuits for panel mounting or free-hanging application.

The plug housing and vertical pin header is available with 2, 3, 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 22, or 24 circuits; the vertical blind-mate pin header is available in 4, 6, 8, 9, 10, 12, or 15 circuits for panel mounting or free-hanging application. The right-angle pin header is available in 2, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, or 24 circuits for pc board application.

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 sealing plug. See 408-16017 for more information and sealed connector assembly instructions.

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.

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.

***DANGER***
*To avoid personal injury, these connectors are not to be used for interrupting current.*

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.

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*Trademark



TE Connectivity, TE connectivity (logo), and TE (logo) are trademarks. Other logos, product, and/or company names may be trademarks of their respective owners.

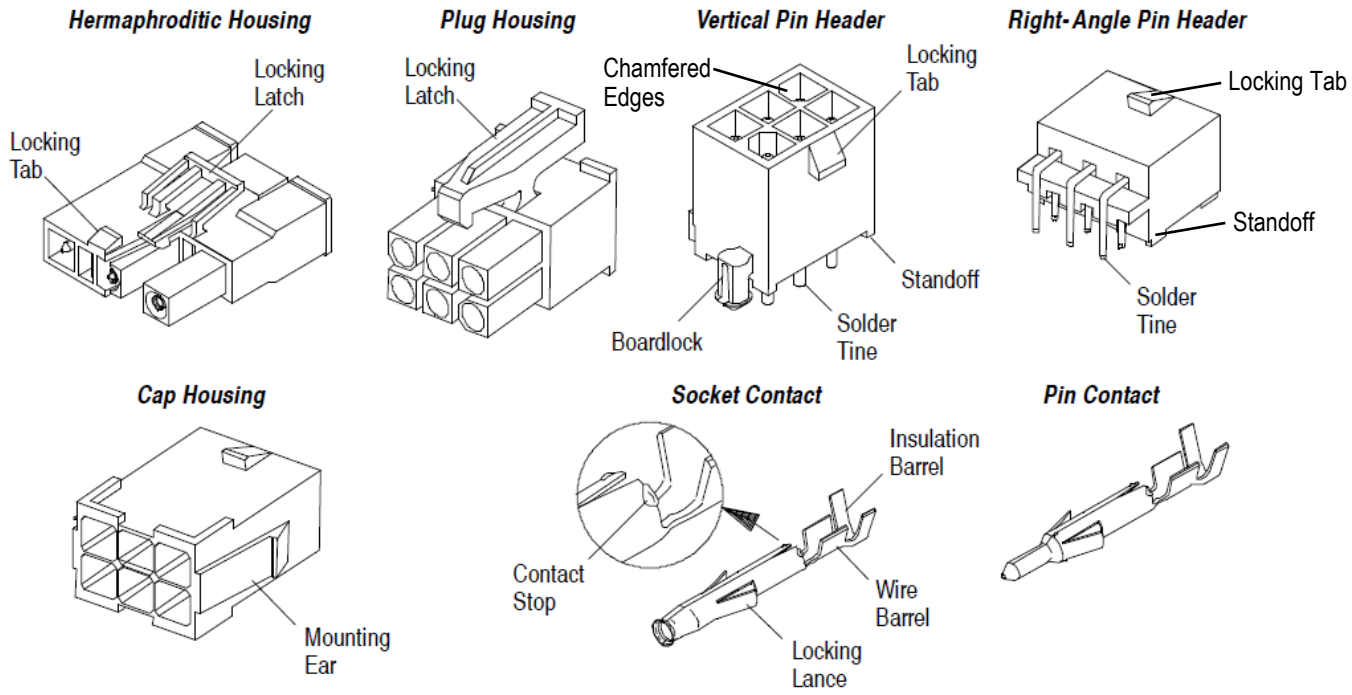



**Figure 1 (continued)**

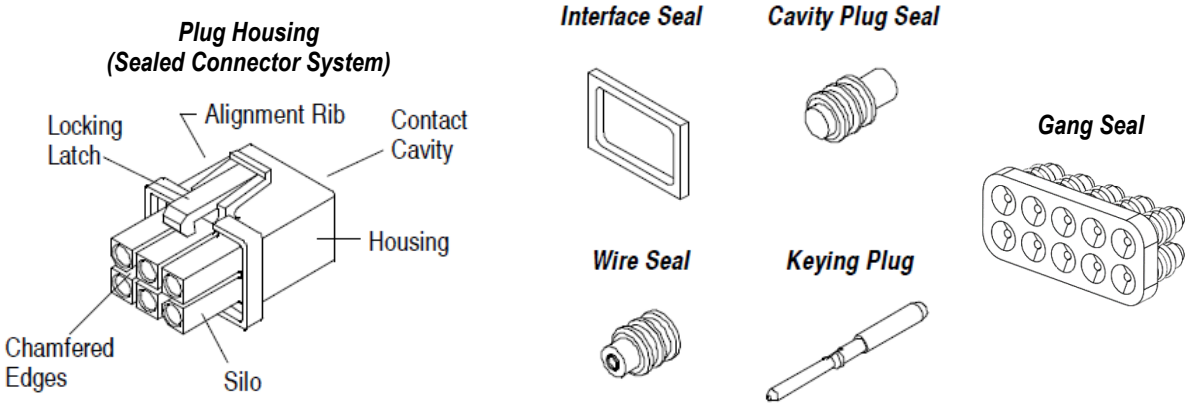



**Figure 1 (end)**

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

- Combined information with 114-13089

### 2.2. Customer Assistance

Reference Product Base Part Number 770166, 794895 and Product Code 1311, 7167 are representative of Mini-Universal MATE-N-LOK connectors and seals. Use of these numbers will identify the product line and help you to obtain product and tooling information when visiting www.te.com or calling the number at the bottom of page 1.

### 2.3. Drawings

Customer drawings for product part numbers are available from www.te.com. Information contained in the customer drawing takes priority.

### 2.4. Specifications

Product Specification 108-5138 provides product performance and test results for connectors (94V-0), and 108-5151 provides expected performance and test results for connectors (94V-2). Product Specification 108-1542 provides product performance and test information for the plug housing, and 108-1543 provides product performance and test information for the header assembly. Product Specification 108-1542-1 provides product performance and test information for the refrigerator door hinge connectors, and 108-1542-2 provides product performance and test information for the splash-proof seals (interface seal, wire seal, and cavity plug seal).

### 2.5. Instructional Material

Instruction sheets (408-series) provide product assembly instructions or tooling setup and operation procedures and customer manuals (409-series) provide machine setup and operating procedures. Instructional material that pertain to this product are:

408-16017 Instruction Sheet – Mini-Universal MATE-N-LOK* Connector System
408-3234 Mini-Universal MATE-N-LOK Connectors
408-4118 Extraction Tool 189727-1
408-4148 Straight Action Hand Tool 90710-2
408-4443 Straight Action Hand Tool 90717-2
408-7347 Insertion Tool 91002-1
408-8040 Heavy Duty Miniature Quick-Change Applicators (Side-Feed)
408-8059 General Preventative Maintenance for Applicators
408-8547 CERTI-CRIMP* II Straight Action Hand Tools 91522-1 and 91536-1
408-9965 PRO-CRIMPER* III Hand Crimping Tool 90870-1
408-35042 Ocean 2.0 Side Feed Applicators Instruction Sheet
408-35046 Ocean 2.0 End Feed Applicators Instruction Sheet
409-10204 AMP 3K 2161400-[ ] and AMP 5K 2161500-[ ] Terminating Machines
409-32035 AMP-O-LECTRIC Model GII and GII+ Terminators 2217000-[ ]

### 2.6. Manual

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

## 3. REQUIREMENTS

### 3.1. Safety

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

### 3.2. Storage

#### A. Ultraviolet Light

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

### B. Shelf Life

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

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

### C. Chemical Exposure

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

| | | | | |
|---|---|---|---|---|
| Alkalies | Ammonia | Citrates | Phosphates Citrates | Sulfur Compounds |
| Amines | Carbonates | Nitrites | Sulfur Nitrites | Tartrates |

## 3.3. Wire Selection and Preparation

The contacts used in unsealed applications accept stranded wire sizes 30 to 16 AWG within the insulation diameter range listed in Figure 2.

The contacts used in sealed applications accept stranded copper or tin-coated wire sizes 26 to 18 AWG with an insulation diameter range of 1.02-2.11 [.040-.083]. See Figure 2.

| 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 2**

The wire insulation shall be stripped to a length from 3.20 to 3.71 [.126 to .146] for one-wire crimping and 3.50 to 3.99 [.138 to .157] for two-wire crimping. See Figure 3.

***NOTE***
*Two-wire crimping is not compatible with wire seal applications.*

***CAUTION***
*Care must be taken not to nick, scrape, or cut any part of the wire during the stripping operation. 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.*

**Note:** Not to Scale

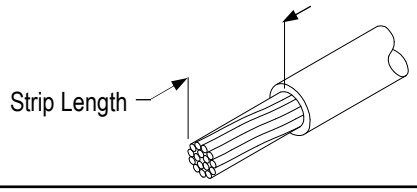



**Figure 3**

For wires using individual wire seals, prepare the wire by stripping the wire to the dimensions specified in Figure 3. Install the wire seal onto the wire, flanged end (end opposite the throat) first. Ensure that the wire seal is located such that the wire insulation is flush with or extends beyond the wire seal to the dimensions stated in Figure 4.

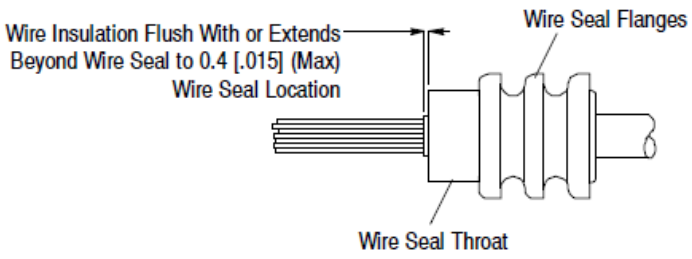



**Figure 4**

***NOTE***
*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.*

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

## 3.4. Contact Crimp Requirements

### A. Carrier Cutoff Tab and Burr

The cutoff tab is the remaining portion of the carrier strip after the contact is cut from the strip. There shall be no burrs that exceed the dimensions given in Figure 5 on the cutoff tab. The carrier cutoff tab length shall not exceed the dimension given in Figure 5.

### B. Crimp Height

The insulation barrel shall be formed around but not cut into the wire insulation. The wire barrel and insulation barrel crimp height and width is given in Figure 5.

***NOTE***
*The applied crimp dimension (within the function range of the product) is dependent on the termination tooling being used. Refer to the documentation (applicator logs and instruction sheets) supplied with the termination tooling for the applied crimp height.*

### C. Contact Stop

The contact stop must not be crimped. Any deformation to the contact stop will compromise the insertion depth of the contact in the contact cavity of the housing.

### D. 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.

### E. Front and Rear Bellmouths

The front bellmouth shall be visible. The rear bellmouth shall conform to the dimensions given in Figure 5.

### F. 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.

### G. 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.

### H. 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 7 and Figure 8.

### I. Insulation Barrel Crimp

The insulation barrel shall grip the insulation firmly and legs of the insulation support crimp barrel may deform or cut into the insulation but must not penetrate the conductor. This product has two styles of insulation crimp. Most common is the F-crimp. For F-crimp style, the legs of the insulation barrel touch each other. For some cases, the O-Crimp is used. The O-Crimp allows the legs of the insulation barrel to touch as shown. See Figure 5.

For wire with individual wire seals, the insulation barrel must capture the throat of the wire seal and the wire insulation. The insulation barrel crimp width must be within the dimensions provided in Figure 7 and Figure 8. See Figure 6 for individual wire seal requirements.

### J. Effective Crimp Length

The 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.

### K. Wire Barrel Seam

The seam between the two sides of the wire barrel must be completely closed to confine all strands of the wire. 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.

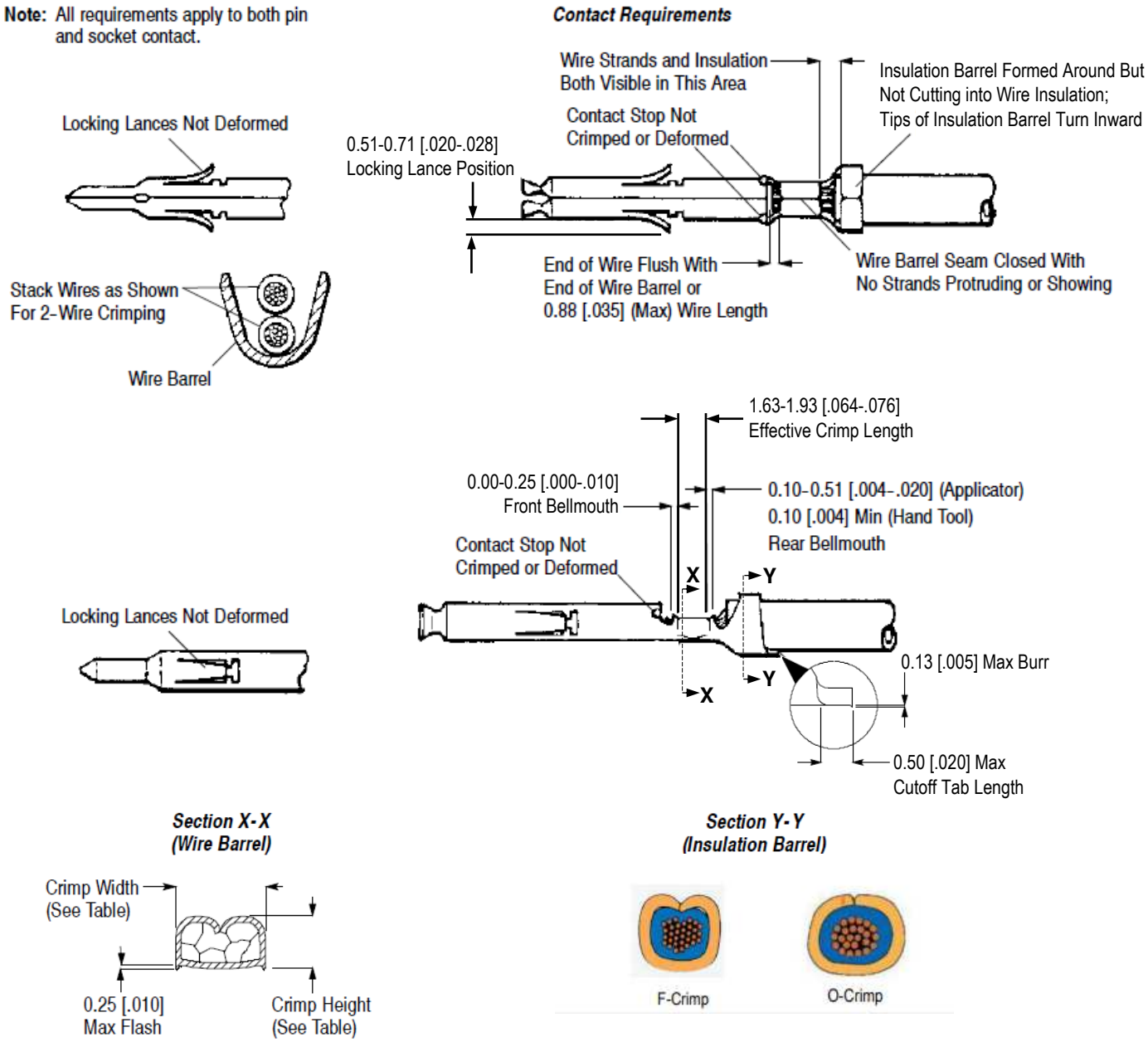
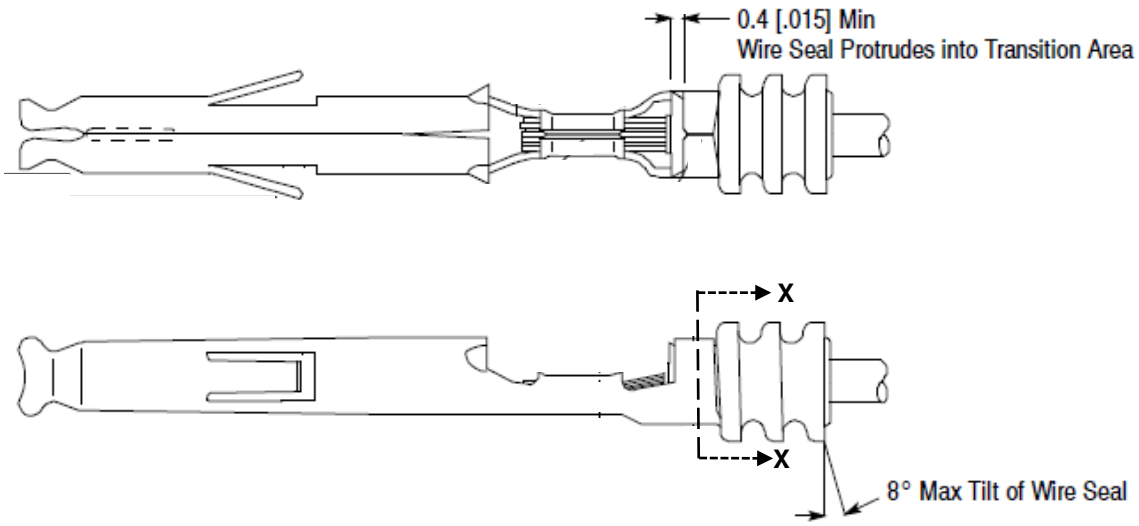



**Figure 5 (end)**

### L. Wire Seal Location and Workmanship

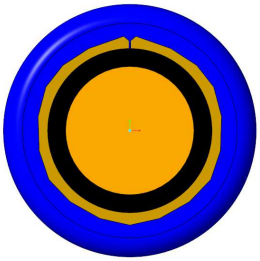
For wires with individual wire seals, the wire seal shall not enter the wire barrel. The throat of the wire seal must protrude into the transition area (between the wire barrel and insulation barrel) to the minimum stated in Figure 6.

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 6.




**Section X-X**

**(Insulation Barrel)**



When using wire seals, the insulation barrel crimp must be round. The insulation barrel crimp width must be within 0.00015 [.004] of the insulation barrel crimp height. For example, if the insulation barrel crimp width is 0.00456 [.116] and the insulation barrel crimp height is 0.00448 [.114], the crimp is acceptable; if the insulation barrel crimp width is 0.00460 [.117] and the insulation barrel crimp height is 0.00440 [.112], the crimp is not acceptable and must be adjusted

**Figure 6:** Individual Wire Seal Requirements

| AUTOMATIC MACHINE (STRIP FORM CONTACT) | | | | |
|---|---|---|---|---|
| WIRE (Stranded Only) | | WIRE BARREL CRIMP | | INSULATION BARREL CRIMP WIDTH (Ref) |
| SIZE (AWG) | INSULATION DIAMETER | HEIGHT ±0.05 [±.002] | WIDTH | |
| 30 | 0.88-1.27 [.035-.050] | 0.50 [.020] | 1.06 [.042] | 1.78 [.070] |
| 28 | | 0.55 [.022] | | |
| 26 | | 0.60 [.024] | | |
| 26 | 1.20-1.75 [.047-.069] | 0.63 [.025]● | 1.22 [.048] | 2.03 [.080] |
| 24 | | 0.69 [.027] | | |
| 22 | | 0.78 [.031] | | |
| 22 | 1.50-2.18 [.059-.086] † | 0.81 [.032] | 1.57 [.062] † | 2.36 [.093] † |
| 20 | | 0.91 [.036] | | |
| 18 | | 1.07 [.042] | | |
| 22 | 1.50-2.79 [.059-.110] | 0.81 [.032] | 1.57 [.062] | 2.79 [.110] |
| 20 | | 0.91 [.036] | | |
| 18 | | 1.07 [.042] | | |
| 22 (2 wires) | 1.70 [.067] Max (2 Wires) | 0.91 [.036] | | |
| 20 | 2.0-3.20 [.079-.126] | 1.07 [.042] | 1.78 [.070] | 3.56 [.140] |
| 18 | | 1.21 [.048] | | |
| 16 | | 1.30 [.051] | | |
| 20 (2 wires) | 1.91 [.075] Max (2 Wires) | 1.30 [.015] | | |

●For tin-coated 7-strand wire size 26 AWG with 0.15 [.006] insulation diameter, crimp height must be controlled to +0.03/-0.05 [+.001/-.002].
† For terminal part numbers 2825156 and 2825157 only.

| HAND TOOL (LOOSE PIECE CONTACT) | | | | | |
|---|---|---|---|---|---|
| WIRE (Stranded Only) | | WIRE BARREL CRIMP | | | INSULATION BARREL CRIMP WIDTH (Ref) |
| SIZE (AWG) | INSULATION DIAMETER | ANVIL DIE LETTER | HEIGHT ±0.05 [±.002] | WIDTH | |
| 30 | 1.52 [.060] Max | — | 0.58 [.023] | 1.07 [.042] | 1.78 [.070] |
| 28 | | | 0.58 [.023] | | |
| 26 | | | 0.64 [.025] | | |
| 26 | 1.20-1.75 [.047-.069] | A | 0.69 [.027] | 1.07 [.042] | 2.03 [.080] |
| 24 | | | 0.69 [.027] | | |
| 22 | | B | 0.78 [.031] | | |
| 22 | 1.50-2.79 [.059-.110] | A | 0.79 [.031] | 1.58 [.062] | 2.79 [.110] |
| 20 | | | 0.79 [.031] | | |
| 18 | | B | 1.04 [.041] | | |
| 22 (2 Wires) | 1.70 [.067] Max (2 Wires) | | 1.04 [.041] | | |
| 20 | 2.00-3.20 [.079-.126] | A | 1.07 [.042] | 1.78 [.070] | 3.56 [.140] |
| 18 | | | 1.07 [.042] | | |
| 20 (2 Wires) | 1.91 [.075] Max (2 Wires) | B | 1.27 [.050] | | |
| 16 | 2.48-3.20 [.098-.126] | | 1.27 [.050] | | |

**Figure 7:** Crimping Requirements for Unsealed Applications

| AUTOMATIC MACHINE (STRIP FORM CONTACT) | | | | |
|---|---|---|---|---|
| WIRE | | WIRE BARREL CRIMP | | INSULATION BARREL WIDTH (Ref) |
| SIZE (AWG) | INSULATION DIAMETER RANGE | 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/-.002]● | | |
| 24 | | 0.69±0.05 [.027±.002] | | |
| 22 | | 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] | | |

| HAND TOOL (LOOSE PIECE CONTACT) | | | | |
|---|---|---|---|---|
| WIRE | | WIRE BARREL CRIMP | | INSULATION BARREL WIDTH (Ref) |
| SIZE (AWG) | INSULATION DIAMETER RANGE | 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 tin-coated 7-strand wire with insulation diameter of 0.15 [.006].

† When using wire seals, the insulation barrel crimp must be round. The insulation barrel crimp width must be within 0.00015 [.004] of the insulation barrel crimp height. For example, if the insulation barrel crimp width is 0.00456 [.116] and the insulation barrel crimp height is 0.00448 [.114], the crimp is acceptable; if the insulation barrel crimp width is 0.00460 [.117] and the insulation barrel crimp height is 0.00440 [.112], the crimp is not acceptable and must be adjusted.

**Figure 8:** Crimping Requirements for Sealed Applications

### M. Straightness

The force applied during crimping may cause some bending between the crimped portion and wire. The contact, including the cutoff tab, shall not be bent above or below the datum line more than the amount shown in Figure 9.

### N. Twist and Roll

There shall be no twist or roll in crimped portion that will impair usage of the contact. See Figure 9.

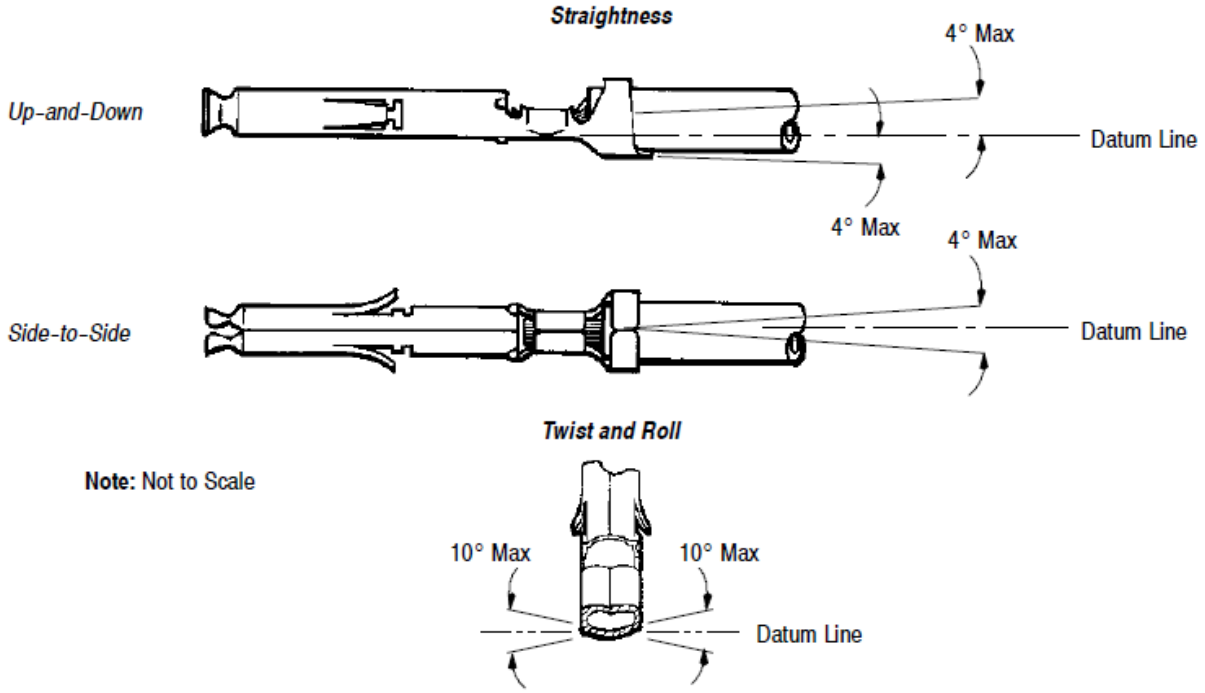



**Figure 9**

## 3.5. Assembly

A crimped contact (pin or socket) must be inserted into the housing by aligning it with the desired contact cavity in the BACK (wire side) of the housing. The wire must be grasped directly behind the insulation barrel and the contact pushed straight into the contact cavity until the contact bottoms (there will be an audible click).

***CAUTION***

*Excessive force must NOT be used when inserting the contact into the contact cavity. The contact stop of the contact is designed to ensure proper insertion depth of the contact. Over-insertion will cause damage to the contact or contact cavity of the housing and prevent the contact from floating in the contact cavity, which is necessary for optimum performance of the connector.*

The wire must be pulled back lightly to ensure that the contact is locked in place.

See 408-16017 for specific assembly instructions for sealed applications.

## 3.6. Panel Mounting (Cap Housing)

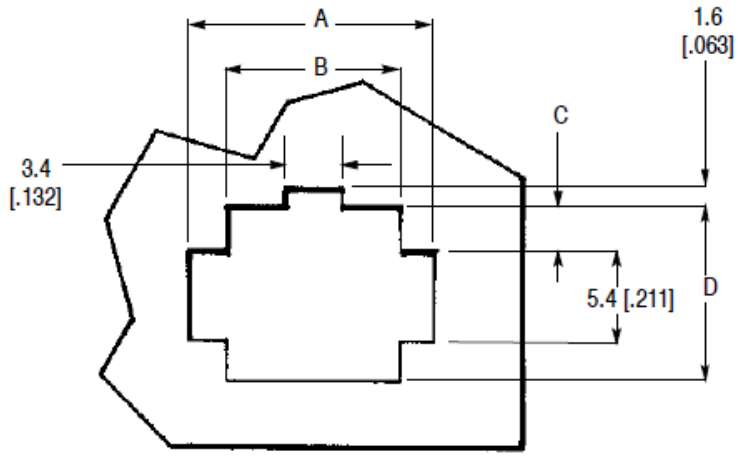
### A. Thickness

The panel thickness range shall be 0.79 through 2.01 [.031 through .079].

### B. Cutout

The dimensions of the panel cutout for panel mounting is provided in Figure 10.

*Cap Housing Panel Cutout*




| CAP HOUSING NUMBER OF CIRCUITS | PANEL DIMENSION | | | |
|---|---|---|---|---|
| | A | B | C | D |
| 2 | 10.69 [.421] | 6.15 [.242] | 2.49 [.098] | 10.34 [.407] |
| 3 | 10.69 [.421] | 6.15 [.242] | 4.60 [.181] | 14.55 [.573] |
| 4 | 14.91 [.587] | 10.34 [.407] | 2.49 [.098] | 10.34 [.407] |
| 6 | 19.10 [.752] | 14.55 [.573] | 2.49 [.098] | 10.34 [.407] |
| 8 | 23.29 [.917] | 18.72 [.737] | 2.49 [.098] | 10.34 [.407] |
| 9 | 19.10 [.752] | 14.55 [.573] | 4.60 [.181] | 14.55 [.573] |
| 10● | 27.50 [1.083] | 22.96 [.904] | 2.49 [.098] | 10.34 [.407] |
| 12 | 23.29 [.917] | 18.74 [.738] | 4.60 [.181] | 14.55 [.573] |
| 15 | 27.43 [1.080] | 22.96 [.904] | | |

●Only available in sealed configurations.

**Figure 10**

## 3.7. 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 the range. See Figure 11.

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.

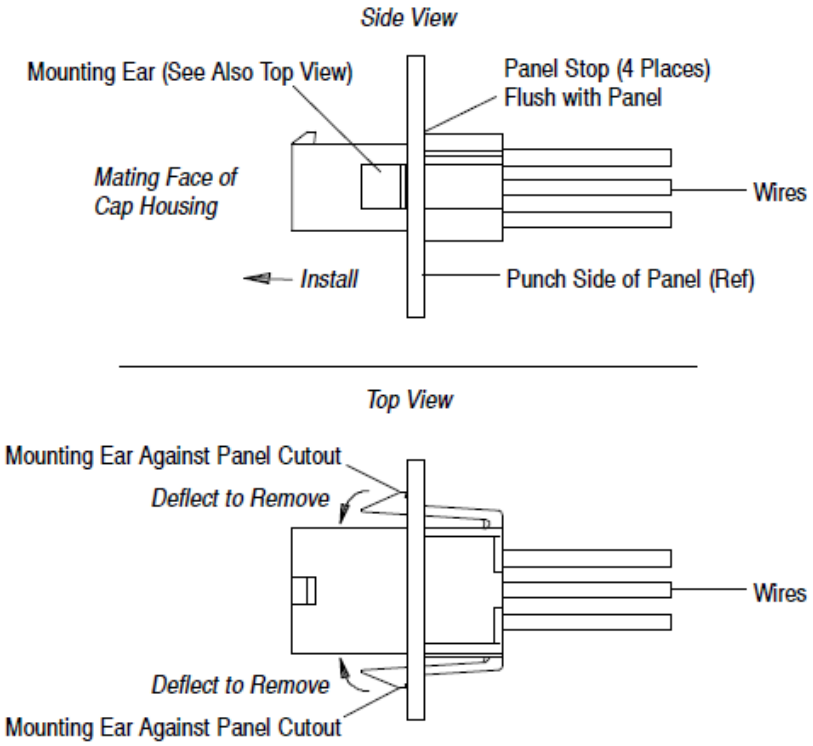



**Figure 11**

### 3.8. 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 after the keying plug is installed. If a keying plug is installed into a housing, the corresponding contact cavity of the mating connector must contain a cavity plug seal. See 408-16017 for sealing instructions and requirements.

## 3.9. PC Board (Vertical and Right-Angle Pin Headers)

### A. Material and Thickness

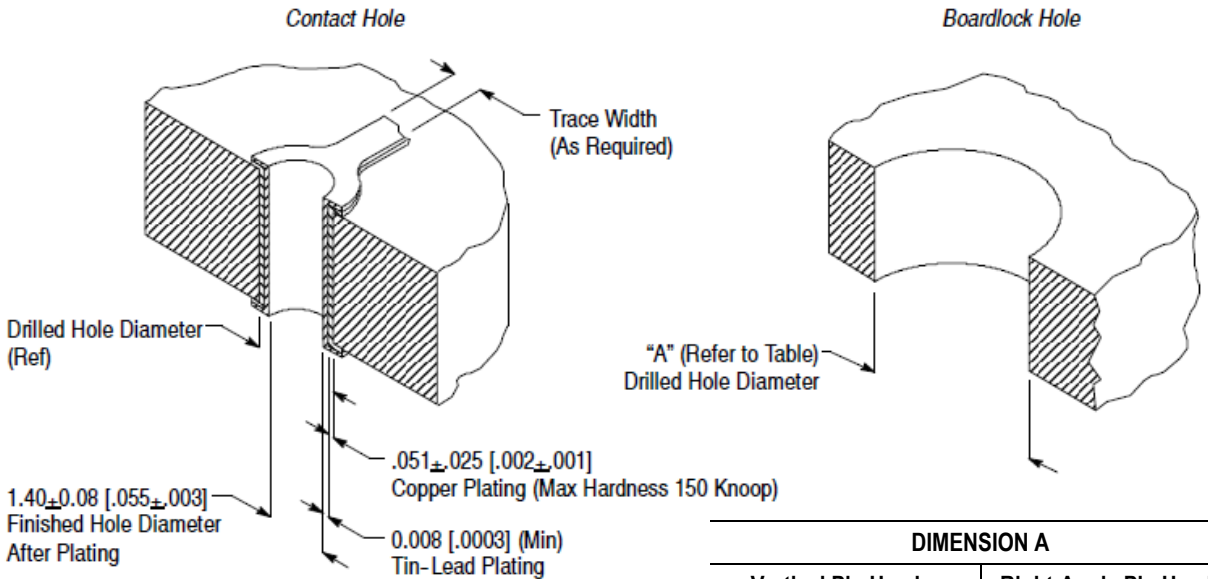
The pc board thickness shall be 1.57 [.062]. Pc board thickness of 2.36 [.093] can also be used, but the plastic boardlock will function only as a press fit. The pc board material shall be glass epoxy (FR-4 or G-10).

### 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 dimension 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 12.




| DIMENSION A | |
|---|---|
| Vertical Pin Header | Right-Angle Pin Header |
| 3.18±0.05 [.125±.002] | 3.86±0.05 [.152±.002] |

**Figure 12**

### D. Layout

The pc board holes must be precisely located to ensure proper placement and optimum performance. The pc board layout must be designed using the dimensions provided on the customer drawing for the specific pin header. Recommended pc board layouts are shown in Figure 13.

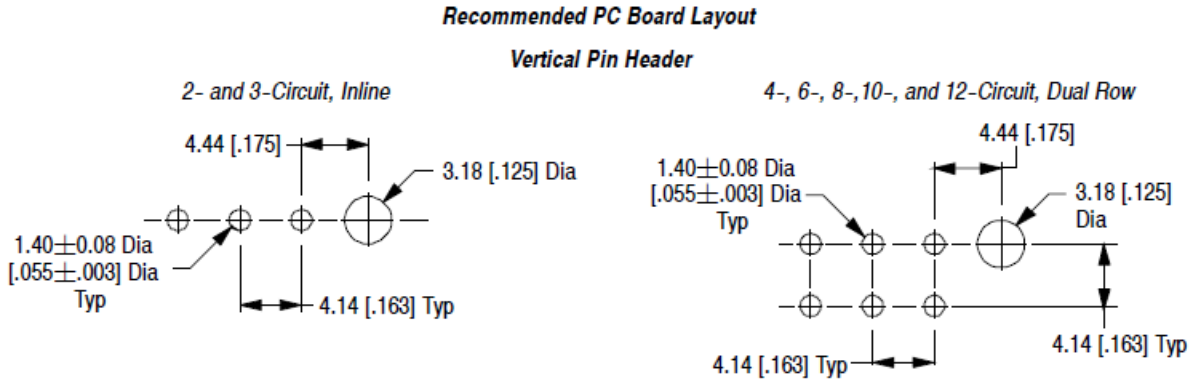



**Figure 13 (continued)**

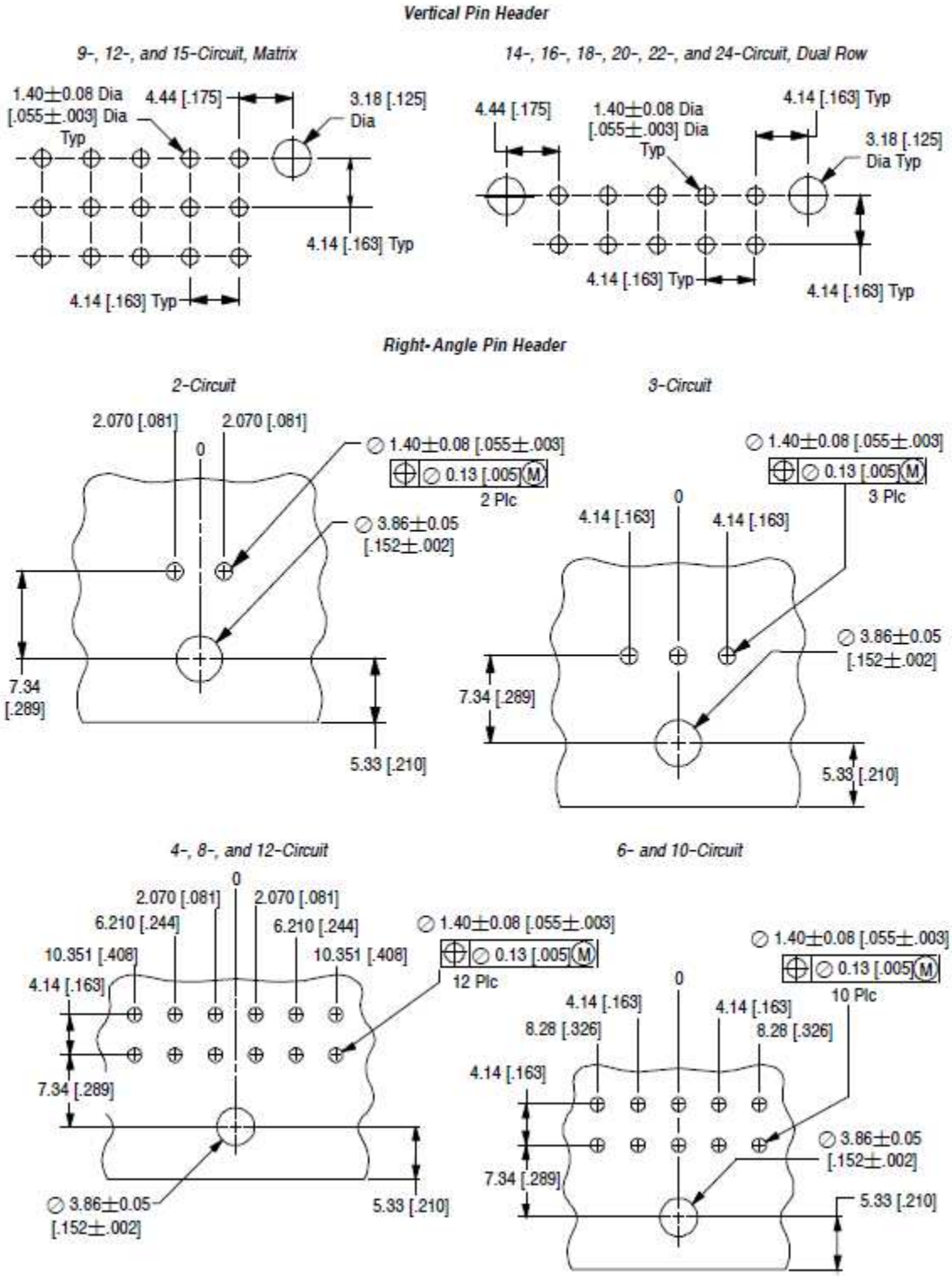



**Figure 13 (continued)**

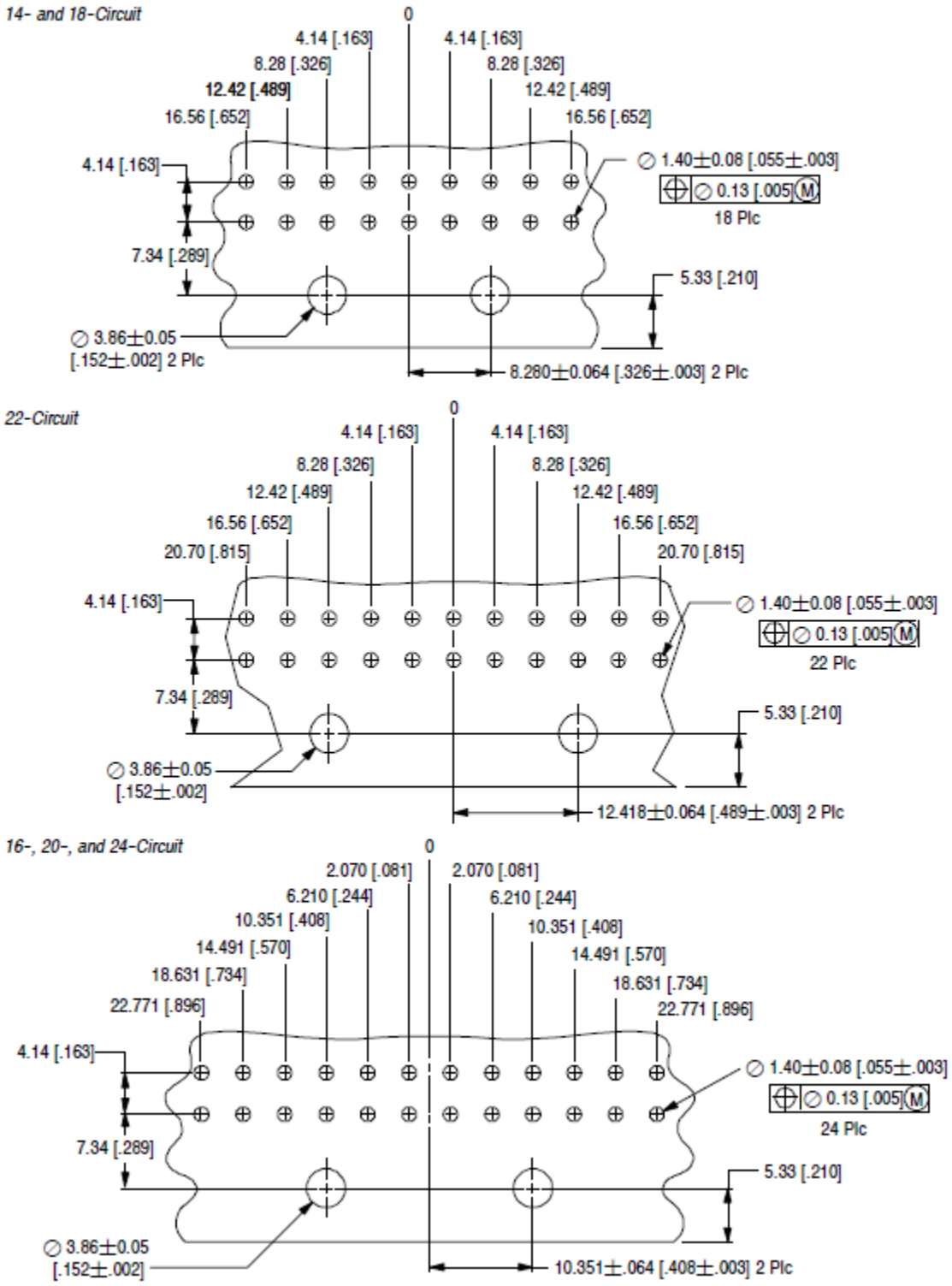



**Figure 13 (end)**

### 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 14.

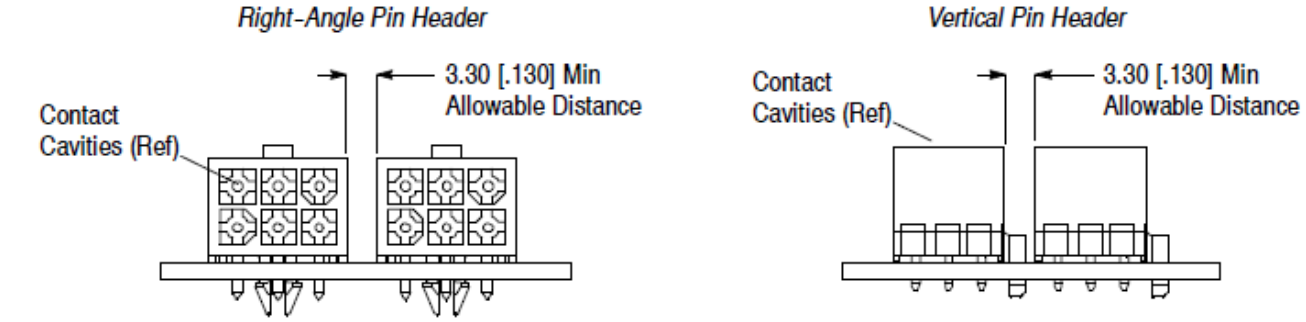



**Figure 14**

## 3.10. Pin Header Placement

***CAUTION***
*Pin headers should be handled on 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 hold. 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 15.

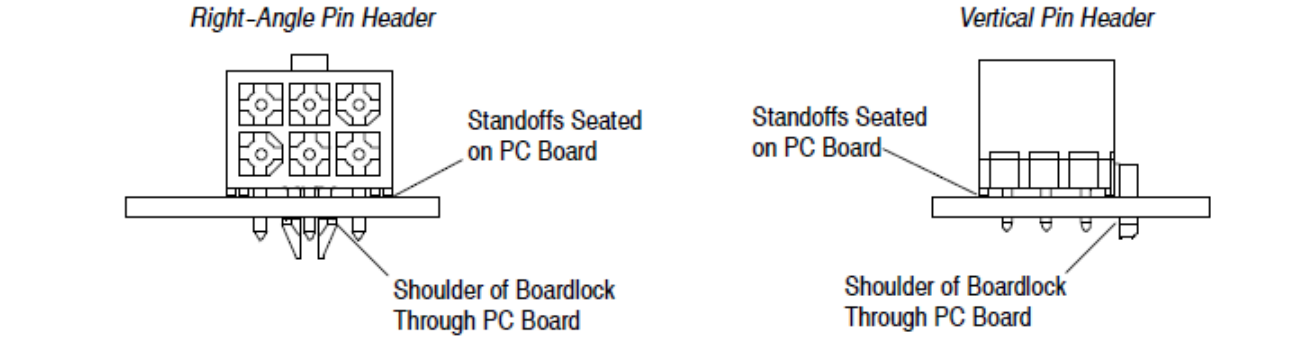



**Figure 15**

## 3.11. 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 Soldering

The solder tines 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 the PRODUCT INFORMATION at the number at the bottom of page 1 for consideration of other types of flux. Fluxes that are compatible with these connectors are provided in Figure 16.

| FLUX TYPE | ACTIVITY | RESIDUE | COMMERCIAL DESIGNATION | |
|---|---|---|---|---|
| | | | KESTER | ALPHA |
| RMA | Mild | Non-Corrosive | 186 | 611 |

**Figure 16**

### B. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. A list of common cleaning solvents and specified time and temperature that will not affect the connectors is given in Figure 17.

***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 can be used with no harmful affect to the connectors; however TE Connectivity does not recommend them because of the harmful occupational and environmental effects. Both are carcinogenic (cancer-causing) and Trichloroethylene is harmful to the earth's ozone layer.*

***NOTE***
*For solvents not listed, contact the PRODUCT INFORMATION at the number at the bottom of page 1.*

| 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 | 5 | |
| KESTER 5779 | Aqueous | 5 | |
| LONCOTERGE 520 | Aqueous | 5 | |
| LONCOTERGE 530 | Aqueous | 5 | |
| Terpene Solvent | Solvent | 5 | |

**Figure 17**

ALPHA, BIOACT, CARBITOL, KESTER, and LONCOTERGE are trademarks of their respective owners.

### C. Drying

When drying cleaned assemblies and pc boards, make certain that temperature limitations of -55 to 105°C [ -67 to 222°F] are not exceeded. Excessive temperatures may cause connector degradation and/or plating deterioration

### D. Process

The connectors and pc boards can be soldered using wave soldering techniques. The temperatures and exposure time shall be within the ranges specified in Figure 18.

| SOLDERING PROCESS | MAXIMUM WAVE TEMPERATURE | | TIME (At Max Temperature) |
|---|---|---|---|
| | CELCIUS | FAHRENHEIT | |
| Wave Soldering | 260 | 500 | 5 Seconds |

**Figure 18**

### 3.12. 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 19.

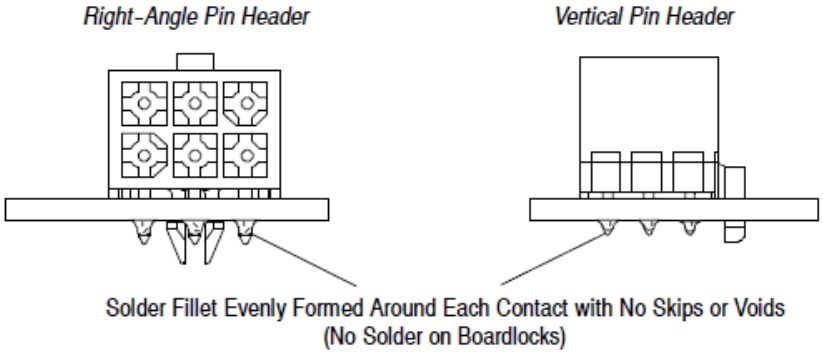



**Figure 19**

### 3.13. 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. See Figure 20.

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 remating the connectors.

#### A. Polarization

The connectors (excluding hermaphroditic) are fully polarized (ribs and slots) to provide proper mating using a positive locking mechanism to prevent accidental disengagement of mated connectors.

#### B. Keying

Keying plugs provide additional polarization for mating connectors. The keying plug may be inserted into the FRONT of the plug housing or cap housing.

#### C. Engagement

The mating connectors must have an identical number of circuit positions. Polarizing features must be properly oriented. The connectors must be inserted straight toward each other until they bottom and the positive locking latch and locking tab engage.

#### D. Disengagement

For panel-mounted and free-hanging connectors, the lock on the plug housing must be pinched and the plug housing must be pulled straight out.

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

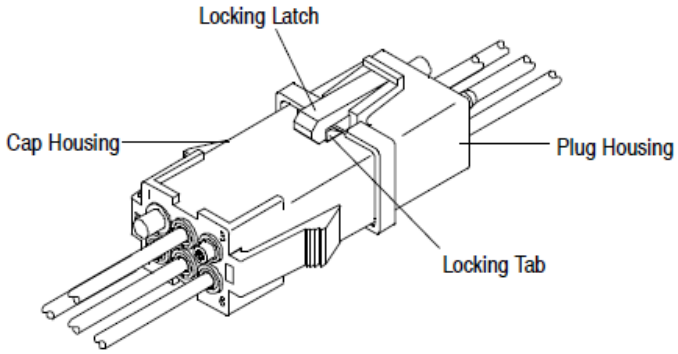



**Figure 20**

### 3.14. Strain Relief and Wire Dress

If required, wires can be bundled together and supported with cable ties. Wires must not be stretched or confined in any way that would restrict the floating action of the contacts. 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 wire end of the connector to the cable tie, must be 76.2 [3.00]. See Figure 21.

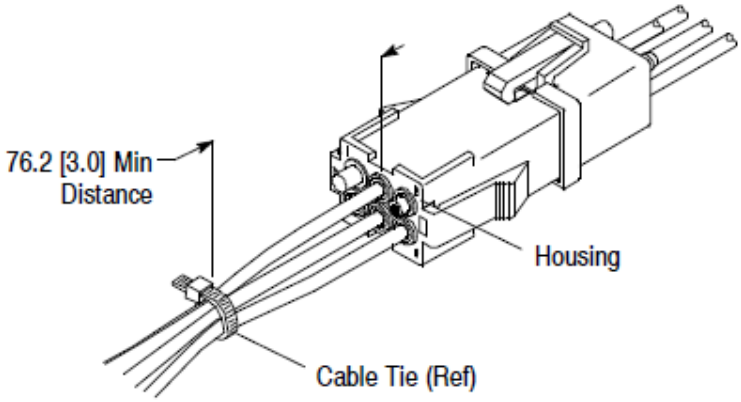



**Figure 21**

### 3.15. Replacement and Repair

Damaged, worn, or improperly crimped contacts and damaged connectors must not be used. Such components should be removed, discarded, and replaced with new components. 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.

### 3.16. Special Assembly Considerations for Sealed Configurations

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.

See 408-16017 for complete instructions on sealed connector assembly.

## 4. QUALIFICATION

### 4.1. Underwriters Laboratories Inc. (UL)

Mini-Universal MATE-N-LOK connectors are recognized by Underwriters Laboratories Inc. (UL) in File E28476.

### 4.2. Canadian Standards Association (CSA)

Mini-Universal MATE-N-LOK connectors are certified to CSA International in File LR 7189.

## 5. TOOLING

Applicators contain the tooling for feeding and crimping strip-form terminals. Automatic machines provide the power to operate the applicator. See Figure 22 for representative images.

Tooling information for product part numbers is available from www.te.com or by calling the Product Information Center at the number at the bottom of page 1.

### 5.1. Crimping Contacts

Strip-form contacts are designed to be crimped with a miniature applicator installed in a semi-automatic or automatic machine. Loose-piece contacts are designed to be crimped with a hand crimping tool.

***NOTE***
*AMP-O-LECTRIC Model "K" Terminating Machine 565435-5 can be used for terminating the contacts; however, it is no longer being manufactured new. It has been superseded by AMP-O-LECTRIC Model "G" Terminating Machine 354500-1.*

### 5.2. Contact Insertion and Extraction

An insertion tool is not usually required for inserting contacts into housings. However, an insertion tool is available for inserting contacts crimped to small wire or when the wire bundle is too large for hand insertion.

An extraction tool is available for removing both pin and socket contacts from the housings.



*AMP-O-LECTRIC Model GII Terminator 2217000-[ ]*



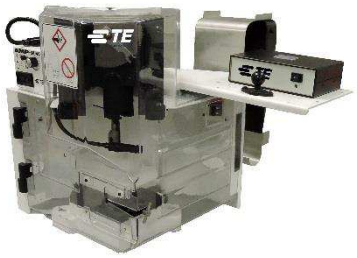
*AMP-O-LECTRIC Model GII+ Terminator 2844800-[ ]*



*Extraction Kit 189727-1*



*Insertion Tool 455830-1*



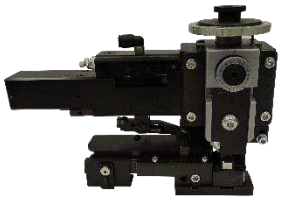
*AMP 5K/40, 5K/30 CE Terminating Machine [ ]-2161500-[ ]*



*AMP 3K/40 CE Terminating Machine 2161400-[ ]*



*Ocean Mechanical 2.0 Applicator*



*Ocean Pneumatic 2.0*



*Hand Tool Assembly*

**Figure 22**

## 5.3. Applicators

Applicators for product part numbers are available from the Applicator Search Portal on www.te.com or by calling the Product Information Center at the bottom of page 1.

## 5.4. Hand Tools

Hand tools for product part numbers are available from the Hand Tool Search Portal on www.te.com or by calling the Product Information Center at the bottom of page 1.

## 6. VISUAL AID

The illustration below shows a typical application of this product. 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.

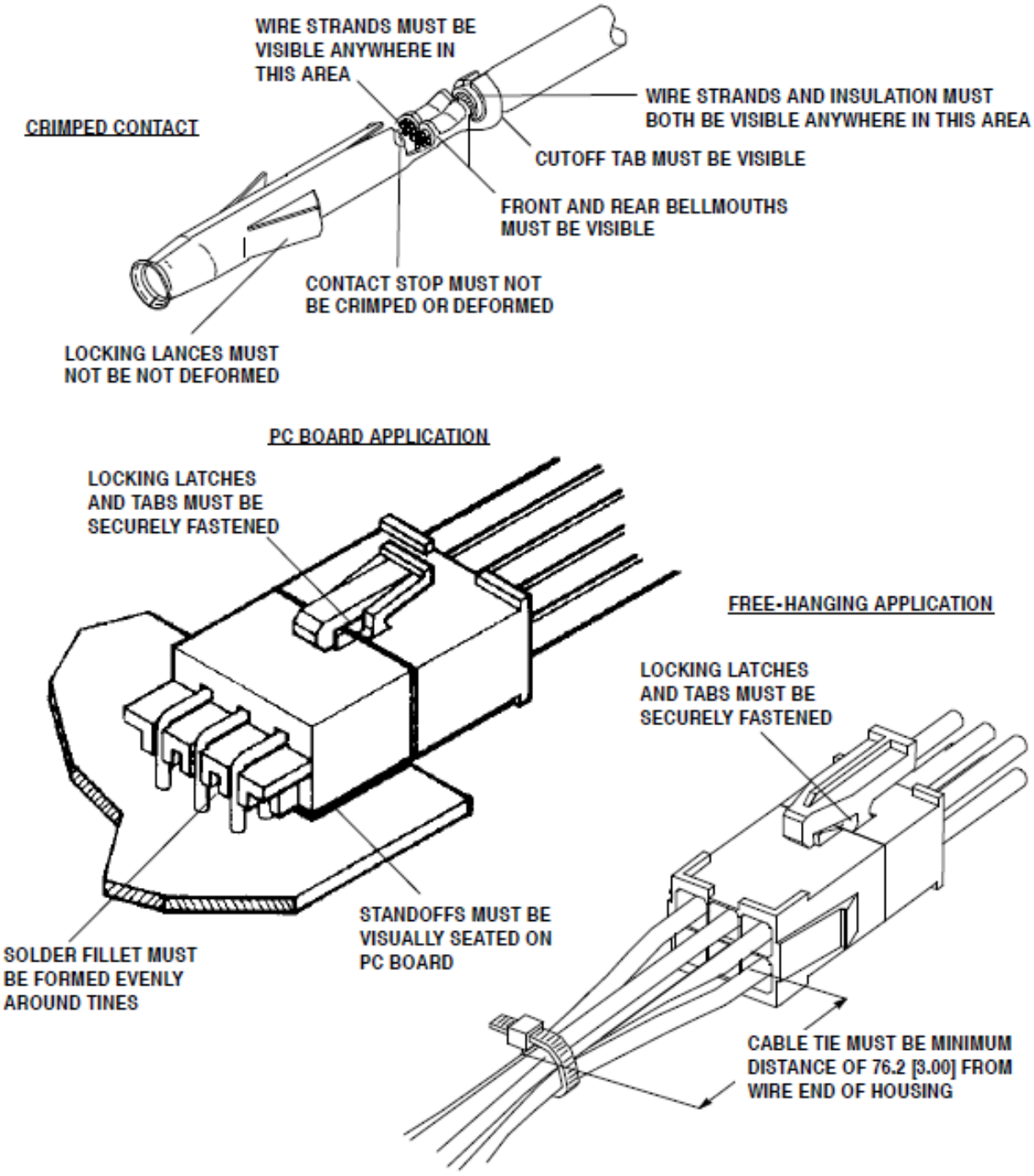



**Figure 23:** Visual Aid **(continued)**

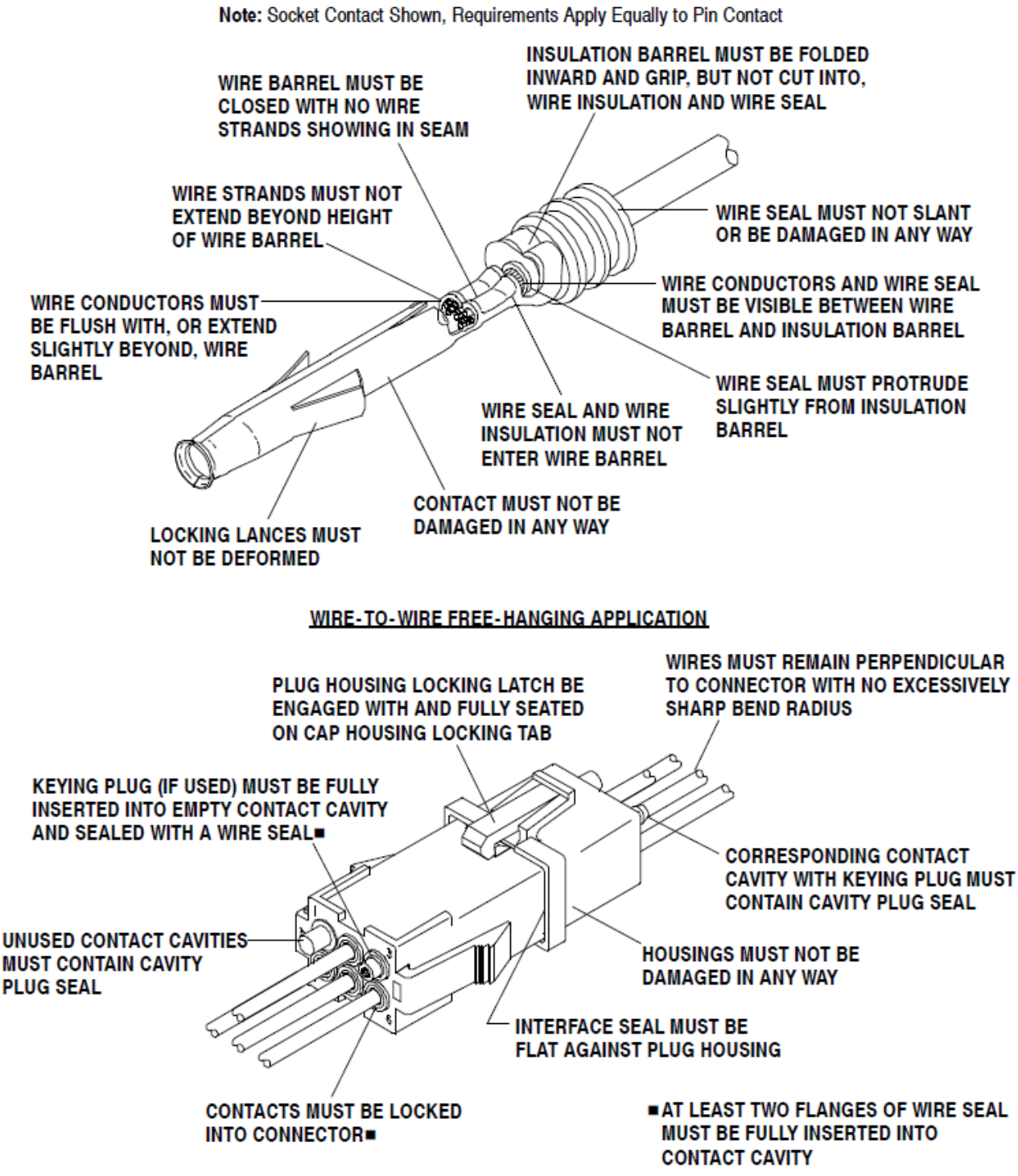
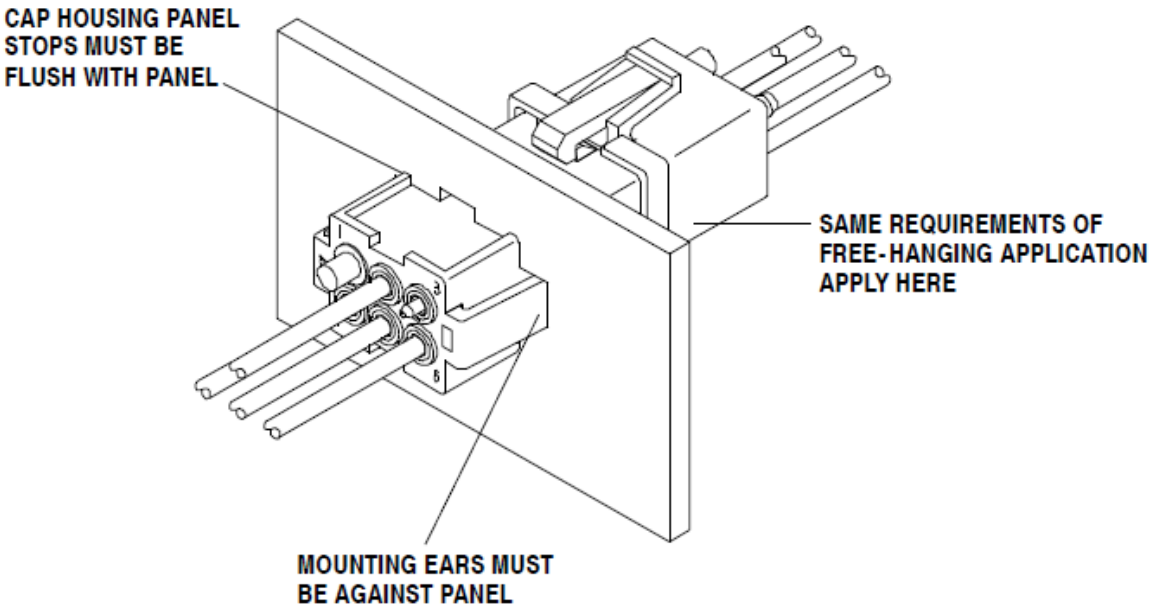



**Figure 23:** Visual Aid **(continued)**

**WIRE-TO-WIRE PANEL MOUNT APPLICATION**




**WIRE-TO-BOARD APPLICATION**

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

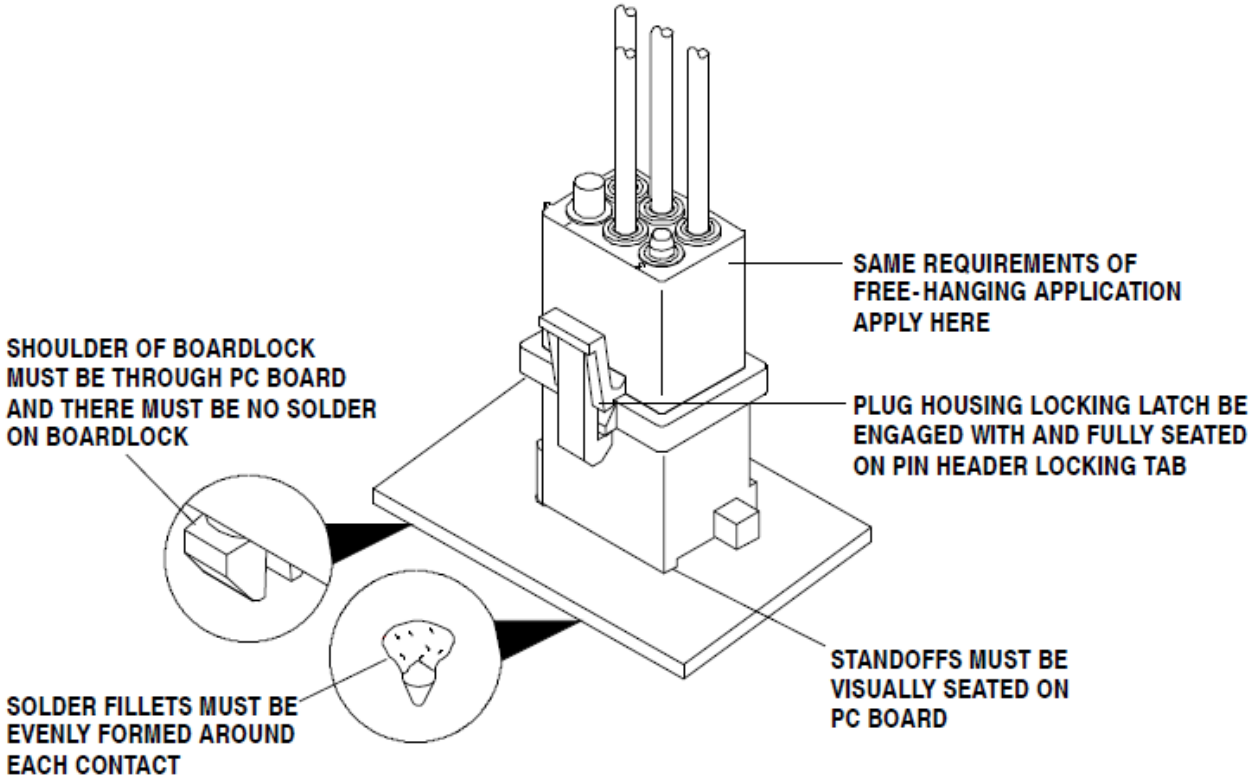



**Figure 23:** Visual Aid **(end)**