

**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 MULTILOCK 040/070 and 070/250 Series Hybrid Connectors. The 040/070 series I/O (input/output) connectors are available in wire-to-board configurations incorporating mixed 040-series (signal) and 070-series (power). The 070/250 mixed series connectors are a wire-to-wire configuration with 11, 13, and 15 positions. The 040/070 series plug connectors are available 10 through 26 positions and the cap connectors are available in 16 through 76 positions. The contacts are on 2.5 mm [.098 in.] centerlines. Plug connectors are available in either hinge lock or side lock features. The cap assembly is available in a horizontal (right-angle) position with some positions available in a vertical position.

When corresponding with TE Connectivity Representatives, use the terminology provided in this specification to facilitate your inquiry for information. Basic terms and features of the connectors and contacts are provided in Figure 1.

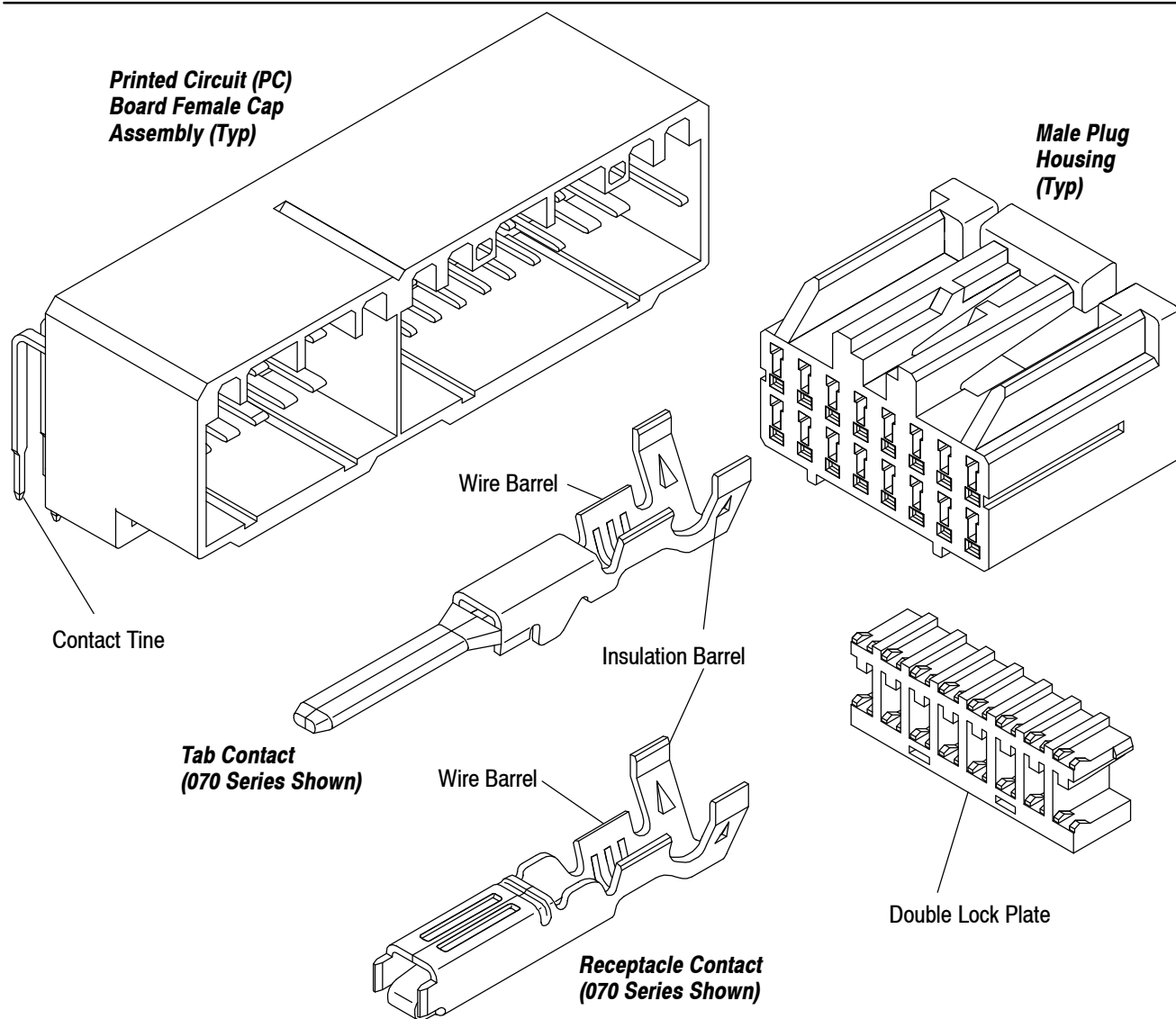


Figure 1

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## 2. REFERENCE MATERIALS

### 2.1. Revision Summary

- Updated document to corporate requirements.

### 2.2. Customer Assistance

Reference Part Number 638211 and Product Code 0417 are representative numbers that identify the MULTILOCK 040/070 and 070/250 Series Hybrid Connectors. These numbers are used in the network of customer service to access tooling and product application information. This service is provided by your local TE Representative or, after purchase, by calling the Product Information number at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for specific products are available from the responsible TE Engineering Department via the service network. The information contained in the Customer Drawings takes priority if there is a conflict with this specification or with any other technical documentation supplied by TE.

### 2.4. Specifications

The following Product Specifications (108-series) provide test and performance results, and Application Specifications (114-series) provide related application information:

| <u>Specification Number</u> | <u>Specification Title</u>                                             |
|-----------------------------|------------------------------------------------------------------------|
| 108-5244                    | 040 Series, MULTILOCK I/O Connector                                    |
| 108-5280                    | 040/070 Hybrid I/O Connector for PC Board                              |
| 108-5216                    | 070 Series, MULTILOCK I/O Connector                                    |
| 108-5281                    | 040 Series MULTILOCK I/O Connector MK II                               |
| 108-5342                    | 040 II/070 II Hybrid I/O Connector MK II for Wire-to-Board Termination |
| 108-5352                    | 040 Series MULTILOCK Connector Wire to Wire Type                       |
| 114-5091                    | 070 Series Receptacle Contact                                          |
| 114-5092                    | 070 Series Tab Contact                                                 |
| 114-5094                    | 040 Series Receptacle Contact                                          |
| 114-5108                    | 040 Series Tab Contact                                                 |
| 114-5133                    | 040 Series Receptacle Contact for CAVUS Wires                          |
| 114-5134                    | 070 Series Receptacle Contact for CAVUS Wires                          |
| 114-5159                    | 040 II Series Tab and Receptacle Contact                               |
| 114-5160                    | 070 II Series Tab and Receptacle Contact                               |
| 114-5162                    | 040 Receptacle Contact for CAVUS                                       |

### 2.5. Manuals

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 included in the manual as a guide for information on soldering problems.

### 2.6. Instructional Material

The following list includes available instruction sheets (408-and 411-series) that provide assembly procedures for product, operation, maintenance and repair of tooling, as well as setup and operation procedures of applicators; and customer manuals (409-series) that provide setup, operation, and maintenance of machines. Also included are Hand Books (410-series) which are written for operator training and reference material for customers on various product lines and procedures.

| <u>Document Number</u> | <u>Document Title</u>                                                 |
|------------------------|-----------------------------------------------------------------------|
| 408-3295               | Preparing Reel Of Contacts for Application Tooling                    |
| 408-3326               | Disengaging Double Lock Plate on .040/.070 Hybrid MULTILOCK Connector |
| 408-7424               | Checking Terminal Crimp Height or Gaging Die Closure                  |
| 408-8024               | Miniature Quick-Change Applicator (End-Feed Type)                     |
| 408-8039               | Heavy Duty Miniature Quick-Change Applicators (End-Feed Type)         |

| Document Number | Document Title                                                        |
|-----------------|-----------------------------------------------------------------------|
| 408-8040        | Heavy Duty Miniature Quick-Change Applicators (Side-Feed Type)        |
| 408-8053        | Conversion Guide for Miniature Quick-Change Applicators               |
| 408-8547        | CERTI-CRIMP* II Straight Action Hand Tools                            |
| 408-9640        | Crimp Quality Monitor Applicators for Side and End Feed Applications  |
| 408-9816        | Handling Of Reeled Products                                           |
| 408-9853        | PRO-CRIMPER* Hand Tool Assembly 90652-1 with Die Assembly 90652-2     |
| 408-9854        | PRO-CRIMPER Hand Tool Assembly 90653-1 with Die Assembly 90653-2      |
| 408-9855        | PRO-CRIMPER Hand Tool Assembly 90654-1 with Die Assembly 90654-2      |
| 408-9992        | PRO-CRIMPER III Hand Tool Assembly 58521-1                            |
| 408-9997        | PRO-CRIMPER III Hand Tool Assembly 58528                              |
| 409-5128        | Basic AMP-O-LECTRIC* Model "K" Terminating Machine                    |
| 409-5842        | AMP-O-LECTRIC Model "G" Terminating Machine 354500-[ ]                |
| 409-5852        | AMPOMATOR CLS III-G Lead-Making Machine                               |
| 409-5855        | AMP-O-MATIC* Side Feed Stripper-Crimper Model II Machine 854040-3, -4 |
| 409-5878        | AMPOMATOR CLS IV+ Lead-Making Machine                                 |
| 409-10012       | AMP-O-MATIC Side-Feed Stripper-Crimper III Machine 1320895-[ ]        |
| 410-5721        | Setup and Operation Handbook for the Model II AMPOMATOR CLS Machine   |
| 410-5841        | Customer Training Guide for AMP-O-LECTRIC Model "G" Terminator        |
| 411-5287        | Extraction Tool 755430-2 for 070 Series Contacts                      |
| 411-5288        | Extraction Tool 755430-1 for 040 Series Contacts                      |
| 411-5338        | DAHT 755223-1 for 070 Series Contacts                                 |
| 411-5417        | SAHT 911738-1, -2 for 040 Series Contacts                             |
| 411-5480        | SAHT 911788 -2 for 070 Series Contacts                                |
| 411-5655        | Double Action Tool 934192-1                                           |
| 411-5658        | Double Action Tool 934195-1                                           |

### 3. REQUIREMENTS

#### 3.1. Storage

##### A. Ultraviolet Light

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

##### B. Reel Storage

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 those components. The components should be used on a first in, first out basis to avoid storage contamination that could adversely affect signal transmissions.

##### D. Chemical Exposure

Do not store contacts near any chemicals listed below as they may cause stress corrosion cracking in the contacts.

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

#### NOTE



Where the above environmental conditions exist, phosphor-bronze contacts are recommended instead of brass if available.

#### 3.2. Wire Selection and Preparation

##### A. Type

The wire size range for MULTILOCK 040/070 and 070/250 Series Hybrid Connectors is 24 to 12 AWG stranded or solid copper wire. Refer to the specific application specifications or instructional material supplied with the products or application tooling.

## B. Preparation

The wire must be stripped to the dimensions provided in the specific application specifications or instructional material supplied with the products or application tooling.



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



*There are tool designs available to meet various application requirements. The developed crimp configuration is unique for each tool design and is acceptable provided the crimp height is within the functional range. For crimp dimensions of a specific tool, refer to instruction sheet packaged with manual tools and applicator log packaged with power tools.*

### 3.3. Crimped Contact Requirements

Refer to Paragraphs 2.4 and 2.6 for related documentation which provide specific parameters for crimp requirements. Locate the contact to be crimped in the appropriate tooling according to the instructions packaged with that tooling. Detailed instructions covering the placement of contacts in the tooling and the use of such tooling is packaged with each tool.

Terminate the contact according to the directions shipped with the appropriate tooling. See Section 5, TOOLING.



*Wire insulation shall NOT be cut or broken during the crimping operation, nor shall the insulation be crimped into the contact wire barrel. Reasonable care should be taken by tooling operators to provide undamaged wire terminations.*

A typical contact as it should appear after crimping is shown in Figure 2.

#### A. Crimp Height

The crimp applied to the wire portion of the contact is the most compressed area and is most critical in ensuring optimum electrical and mechanical performance of the crimped contact. The crimp height must be within the dimensions provided.

#### B. Crimp Length

For optimum crimp effectiveness, the crimp must be within the area shown in Figure 2. Effective crimp length shall be defined as that portion of the wire barrel, excluding bellmouth(s), fully formed by the crimping tool. Instructions for adjusting, repairing, and inspecting tools are packaged with the tools. See Figure 15.

#### C. Bellmouths

Front and rear bellmouths shall be evident and conform to the dimensions provided in the supplied documentation.

#### D. Cutoff Tab

The cutoff tab shall be cut to the dimensions provided in the supplied documentation.

#### E. Burrs

The cutoff burr shall not exceed the dimensions provided in the supplied documentation.

#### F. Wire Barrel Flash

The wire barrel flash shall not exceed the dimensions provided in the supplied documentation.

#### G. Conductor Location

The conductor may extend beyond the wire barrel to the maximum dimensions provided in the supplied documentation.

#### H. Wire Barrel Seam

The wire barrel seam must be closed with no evidence of loose wire strands visible in the seam.

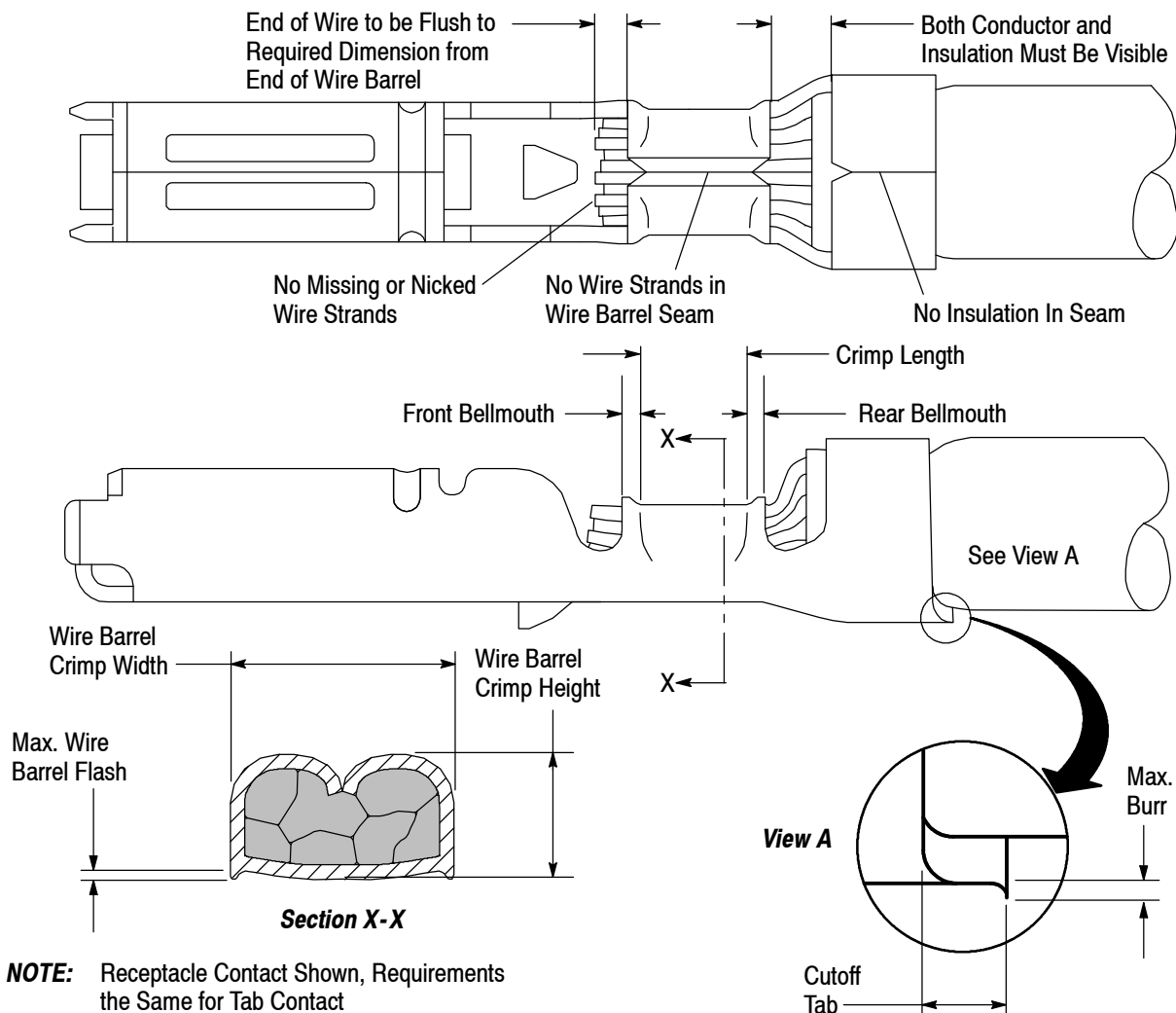


Figure 2

### I. Twist and Roll

There shall be no twist, roll, deformation or other damage to the mating portion of the crimped contact that will prevent proper mating. See Figure 3.

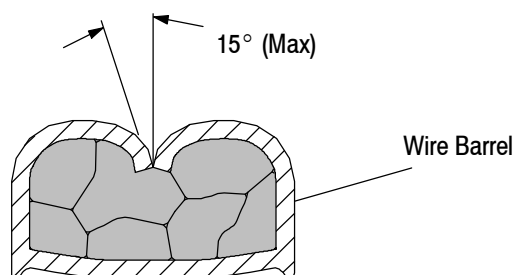


Figure 3

### J. Straightness

The force applied during crimping may cause some bending between the crimped wire barrel and the mating portion of the contact. Such deformation is acceptable within the limits as shown in Figure 4.

### 1. Up and Down

The crimped contact, including cutoff tab and burr, shall not be bent above or below the datum line more than the amount shown in Figure 4.

### 2. Side to Side

The side-to-side bending of the contact may not exceed the limits provided in Figure 4.

#### NOTE

*Periodic inspections must be made to ensure crimped contact formation is consistent as shown.*



**NOTE:** Angles are drawn for clarification only and are not to scale.

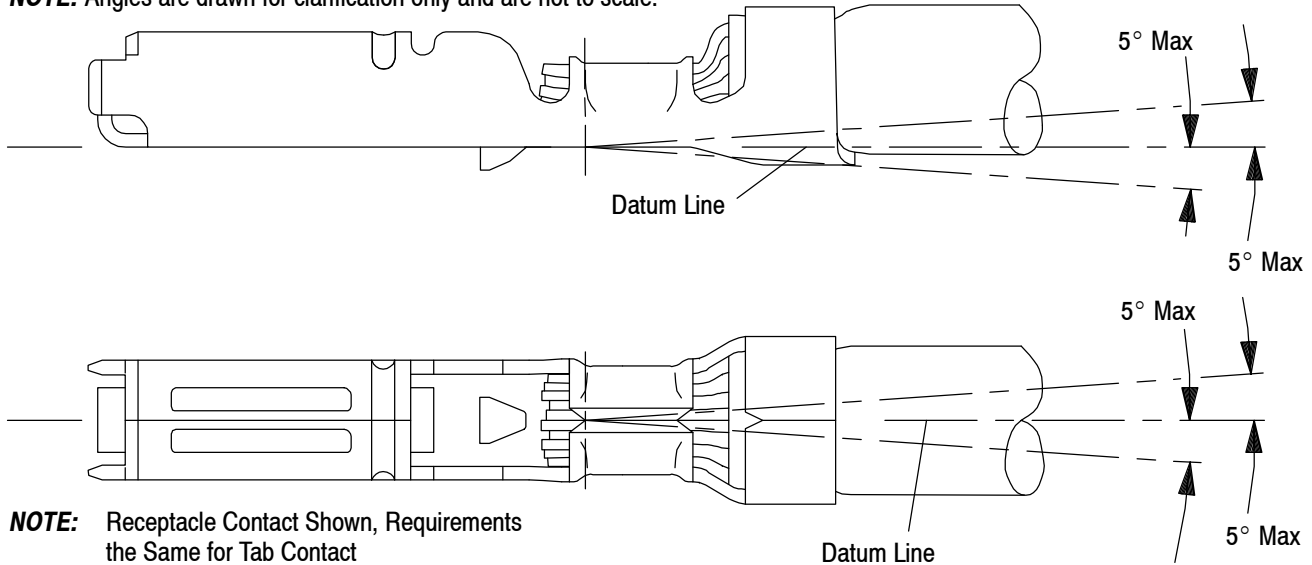


Figure 4

### 3.4. Strain Relief

The MULTILOCK product family is designed so all wire crimped contacts float inside the circuit cavity. This float helps the contact to find their centers during connector mating. In order to maintain proper contact float and avoid excessive tension on wire crimps, the wire harness should not be taped, or otherwise secured within 30 mm [1.181 in.] of the connector assembly body. The individual wire leads between the connector and the point of bundling must be able to move freely. Refer to Application Specification 114-5763, Figure 15.

#### NOTE

*If the installation is to be subject to bending forces, strain relief should be provided on the wire bundle approximately 25.4 mm [1.00 in.] from the back of the housing.*



When bending or forming wires, hold the wire bundle at least 30 mm [1.181 in.] beyond the back of the housing before bending in any direction.

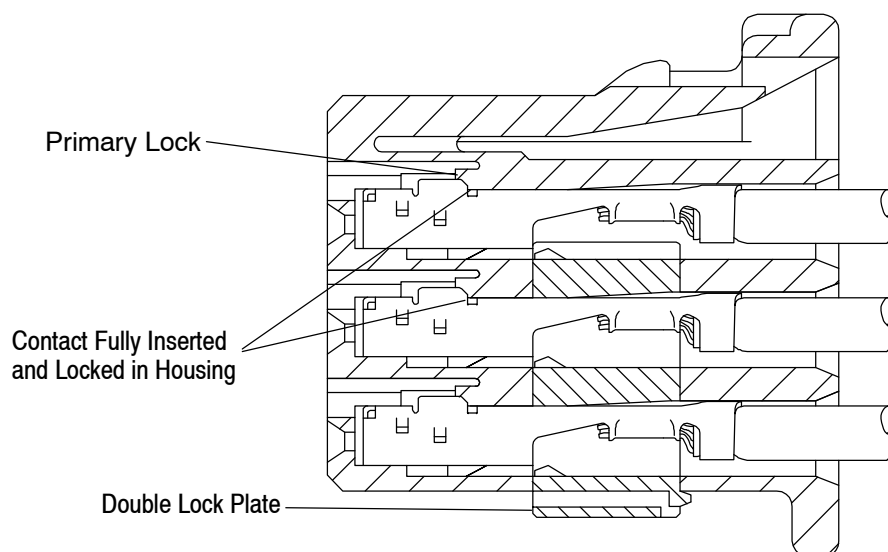
#### CAUTION

*Do not bend unsupported wires as this may cause strain on the contacts inside the housing.*



### 3.5. Placement of Crimped Contact in Housing

The contact must be inserted in the back of the plug housing and snapped into place. When fully inserted, the contact will engage the internal housing latch and prevent backing out during mating of the connector. After inserting contact into housing, pull back lightly on the wire to ensure contact is fully seated. See Figure 5.



**NOTE:** Secondary lock shown pre-staged before final engagement

Figure 5

### 3.6. Mating and Unmating

The design of the MULTILOCK Hybrid Connectors prevents mis-mating of connectors. The plug and cap housing features an internal lock system to ensure positive retention. See Figure 6.

#### A. Mating

Make sure all contacts are locked in position, and the double lock plate is fully engaged in the locked position. If the double lock plate is in the pre-staged position, it must be changed to the final locked position. For plugs with hinge locks, rotate lock towards crimped wires, and press closed until it latches.

Insert the plug into the female cap assembly until you hear a click. This will ensure the plug connector has bottomed. Pull back slightly on the plug connector to ensure the connectors can not be unmated.

#### B. Unmating

Grasp the female cap assembly by the ends. Release the hinge lock on the back of the plug connector, by depressing the lever. Pull straight out from the female cap assembly.

#### CAUTION

*Do NOT pull the plug assembly out from the female cap assembly by the wires. This could damage the connectors.*

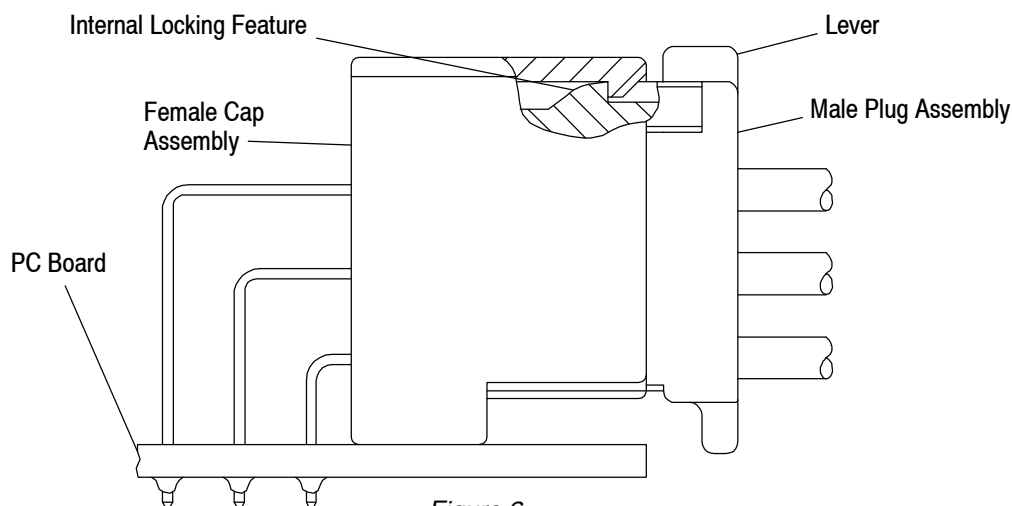


Figure 6

### 3.7. PC Board

#### A. Material and Thickness

1. Board material will be glass epoxy (FR-4, G-10).
2. The female cap assembly connector can be installed on 1.57 mm [.062 in.] thick pc boards. Board thickness may vary depending upon the application; however, contact tine length through the pc board becomes important for wave soldering operations. A recommended minimum of 1.02 mm [.040 in.] of the contact solder tine should protrude through the pc board.

Contact the Product Information Center or the Tooling Assistance Center number listed at the bottom of page 1 for suitability of other board materials, thicknesses, specialized board designs or applications.

#### B. Tolerance

Maximum allowable bow of the pc board shall be 0.03 mm [.001 in.] over the length of the female cap assembly.

#### C. PC Board Layout

The mounting and contact holes in the pc board must be precisely located to ensure proper placement and optimum performance of the connector. See Figure 7. The connectors may be placed on the pc board manually or by machine.

#### NOTE



Figure 7 represents a **typical** pc board layout for this product. For dimensions and hole pattern layout for specific product, obtain the appropriate customer drawing through your TE Representative or refer to the telephone numbers at the bottom of page 1.

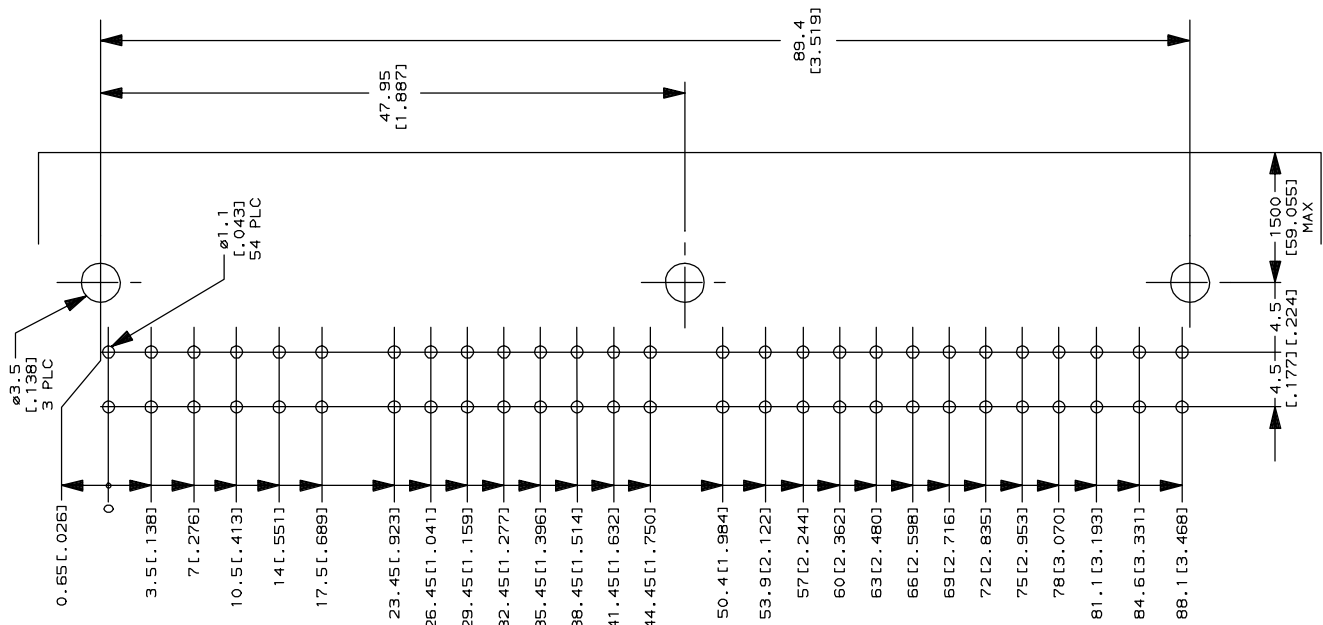


Figure 7

### 3.8. PC Board Contact Tine Holes

These connectors may be used with or without plated through holes. If plated, the drilled hole size, plating types and plating thickness are dependent on customer application requirements. The finished hole size must be as stated in Figure 8 to provide unrestricted insertion and ensure adequate application of the solder to the connector solder tines.



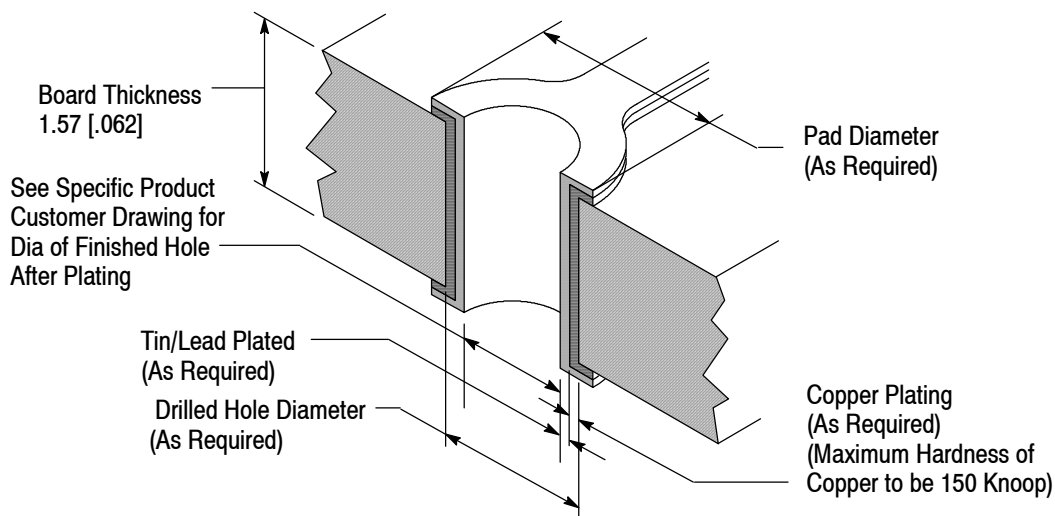


Figure 8

### 3.9. PC Board Female Cap Assembly Placement

#### NOTE



The female cap assembly should be handled only by the housing body to prevent deformation, contamination, or other damage to the contact tines or boardlocks.

Determine the number one contact tine hole, then orient the connector so the number one solder tine is aligned with the hole. Start all solder tines into the pc board. When the boardlocks (if applicable), start to engage the pc board, press on the connector until it fully seats on the pc board.

After the connector is snapped into the pc board, the boardlocks (if applicable) are soldered with the connector solder tines during the soldering process.

### 3.10. Methods of Attaching Female Cap Assembly to PC Board (See Figure 9)

These connectors have been designed to be used with 3 mm dia x 6 mm long [.118 in. dia x .236 in. long] pan head class 2 self-tapping screws as specified in JIS B1115 and JIS B1122 or equivalent. Maximum tightening torque is provided on the specific product customer drawings. In addition to boardlocks available from TE, these connectors will also accept other types of commercially available mating hardware.

The connector may be affixed to the pc board by using commercially available hardware such as screws, lock washers, nuts, rivets, or similar devices. TE applied boardlocks have shoulders that pass through the pc board at the same time the connector solder tines are inserted through the pc board. The boardlocks lock into position when the connector is seated on the pc board. The initial insertion and extraction forces are 41.15N [9.25 lb] maximum for insertion, and 6.68N [1.50 lb] minimum for extraction per connector with two boardlocks.

**NOTE:** Boardlocks are NOT designed to be a strain relief for the connector. And for maximum torque requirements on screws, refer to the specific product customer drawings.

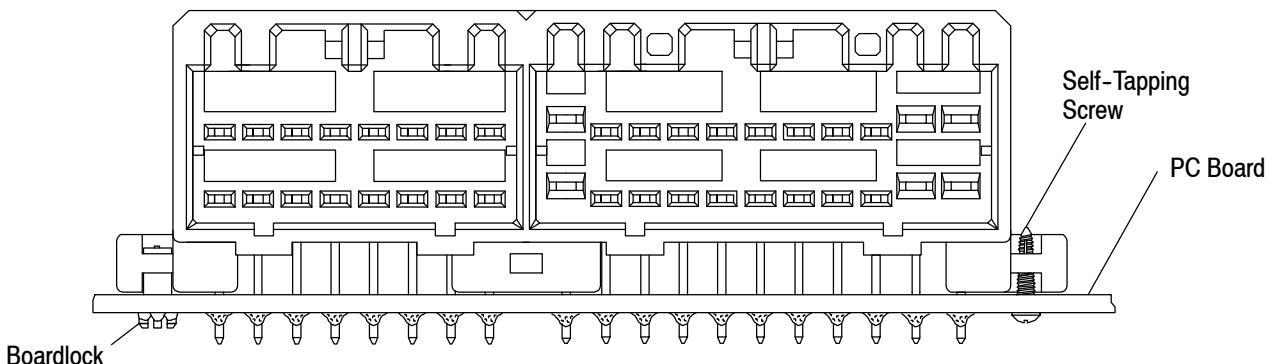


Figure 9

### 3.11. Soldering

#### A. Flux Selection

Contact 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 phone number at the bottom of page 1 for consideration of other types of flux. Some fluxes that are compatible with these connectors are provided in Figure 10.

| FLUX TYPE                   | ACTIVITY | RESIDUE      | COMMERCIAL DESIGNATION |       |
|-----------------------------|----------|--------------|------------------------|-------|
|                             |          |              | KESTER                 | ALPHA |
| Type RMA (Mildly Activated) | Mild     | Noncorrosive | 186                    | 611   |

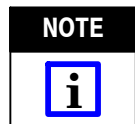
Figure 10

#### 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. The following is a listing of common cleaning solvents that will not affect the connectors for the time and temperature specified. See Figure 11.



*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 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.*



*If you have a particular solvent that is not listed, contact the Tooling Assistance Center or Product Information number at the bottom of page 1.*

| CLEANER           |         | TIME<br>(Minutes) | TEMPERATURES<br>(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        |

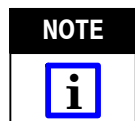
Figure 11

#### C. Drying

When drying cleaned assemblies and printed circuit boards, make certain that temperature limitations are not exceeded: -55° to 105°C [-67° to 221°F] for standard temperature products. Excessive temperatures and dwell time may cause housing degradation.

#### D. Soldering Guidelines

MULTILOCK Hybrid Connectors can be soldered using wave, vapor phase (VPR), double sided non-focused infrared reflow processes (IR) or equivalent soldering techniques. The temperatures and exposure time shall be within the ranges specified in Figure 12. We recommend using SN60 or SN62 solder for these connectors.



*Manual 402-40 provides some guidelines for establishing soldering practices. Refer to Paragraph 2.5, Manuals.*

| SOLDERING PROCESS         | TEMPERATURE |            | TIME<br>(At Max Temperature) |
|---------------------------|-------------|------------|------------------------------|
|                           | CELSIUS     | FAHRENHEIT |                              |
| WAVE SOLDERING            | 260         | 500        | 5 Seconds                    |
| VAPOR PHASE SOLDERING     | 215         | 419        | 5 Minutes                    |
| INFRARED REFLOW SOLDERING | 230         | 446        | 5 Minutes                    |

Wave Temperature

Figure 12

### 3.12. Checking Installed Connector

MULTILOCK Hybrid Connectors must be seated on the pc board to the dimensions shown in Figure 13.

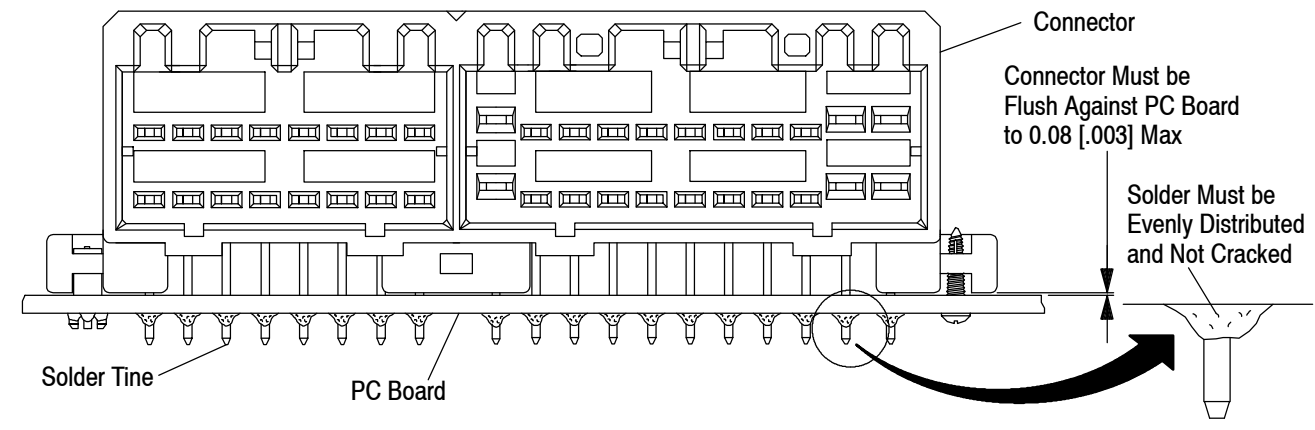


Figure 13

### 3.13. Connector Spacing

Care must be used to avoid interference between adjacent connectors and/or other components. The information provided in Figure 14 is to ensure proper mating.

#### NOTE



The information provided is for manual placement of connectors. If robotic equipment is used, other space allowances will be required for the grippers.

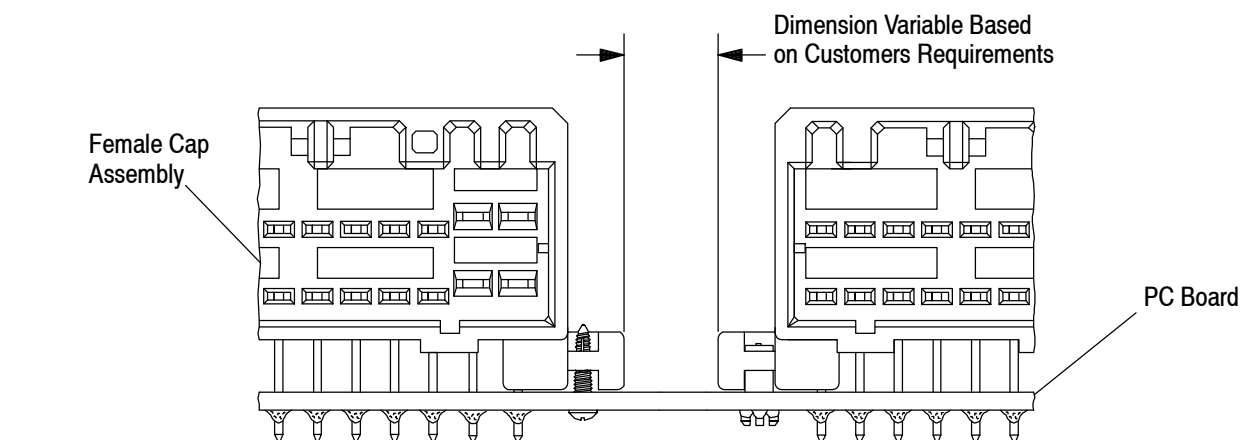


Figure 14

### 3.14. Repair/Replacement

Use an extraction tool to remove individual contacts from male plug connectors for replacement or for relocation to another housing cavity. Extraction Tool 755430-[ ] (Instruction Sheets 411-5287 or 411-5288) is used to extract contacts from male plug connectors. Damaged or worn contacts may be replaced provided there is sufficient slack, after restripping the wire, to insert the new contact into the connector. Damaged pc board connectors may be removed from the pc board by standard de-soldering methods.

## 4. QUALIFICATIONS

MULTILOCK 040/070 and 070/250 Series Hybrid Connectors are not required to be agency evaluated.

## 5. TOOLING

This section provides a selection of tools for various application requirements. They include hand tools for manual application of loose piece form contacts, and semi-automatic and automatic machines for power assist application of strip form contacts. Modified designs and additional tooling concepts may be available to meet other application requirements. For additional information, contact one of the service groups at the bottom of page 1. A listing of tooling recommendations covering the full wire size range is provided in Figure 15.

### NOTE



*TE Tool Engineers have designed machines for a variety of application requirements. For assistance in setting up prototype and production line equipment, contact TE Tool Engineering through your local TE Representative or call the Tooling Assistance Center number at the bottom of page 1.*

### • Applicators

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. Some changes may have to be made to the applicators to run in all related power units. Contact the Tooling Assistance Center number at the bottom of page 1 for specific changes.*

### • Power Units

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.

### NOTE



*The Model "K" AMP-O-LECTRIC Terminating Machine PN 565435-5 (409-5128) has been superseded by the Model "G" Terminating Machine PN 354500-1 (409-5842) for new applications. For existing applications, the Model "K" is still recommended because of the large number of installed machines.*

### • Hand Crimping Tools

Hand crimping tools that accommodate the full wire size range are designed for prototype and low-volume applications such as repair of damaged contacts.

### • Extraction Tools

Extraction tools are designed to release the contacts inside the plug connector without damaging the housing or contacts. Refer to Paragraph 3.14.

### • PC Board Support

A pc board support must be used to prevent bowing of the pc board during insertion of the connector. It should have a flat surface with holes or a channel large enough to receive the contact tines during installation.

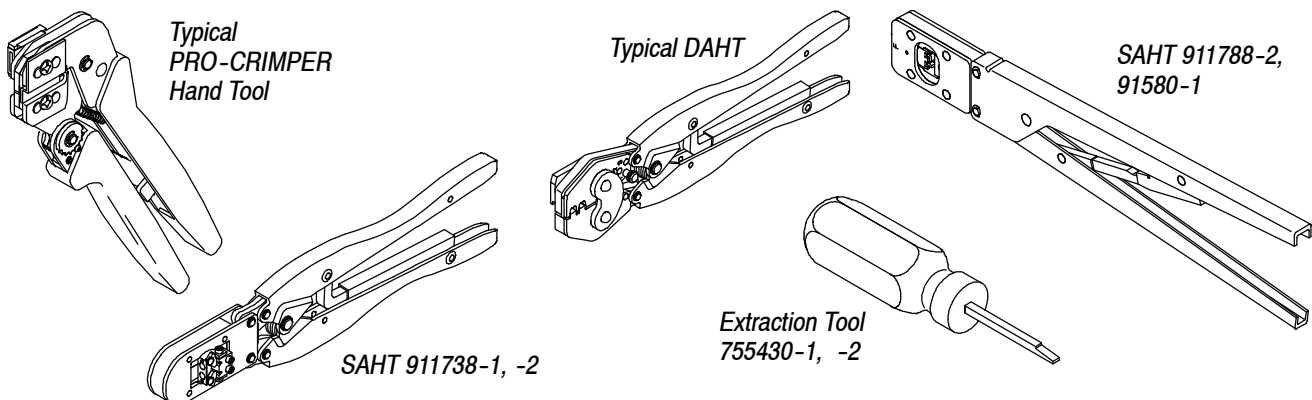
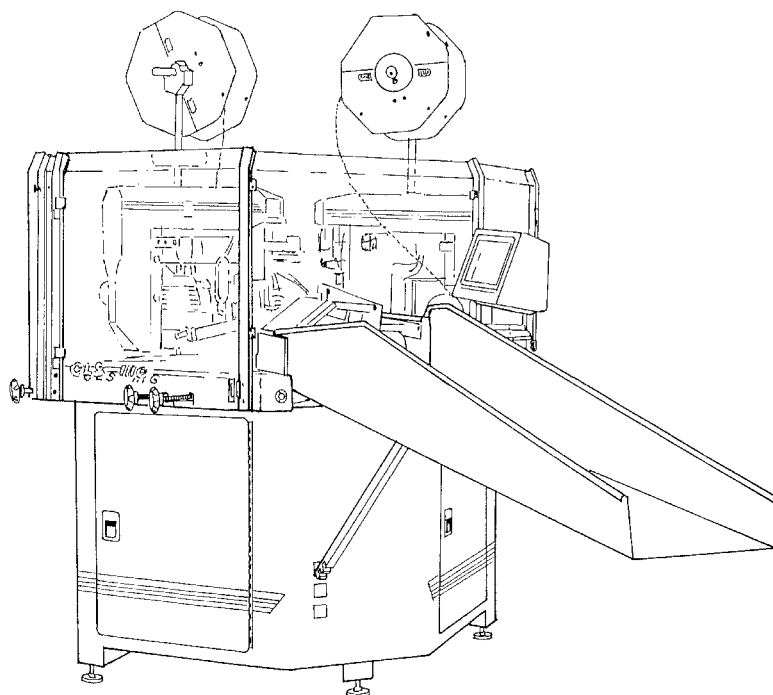
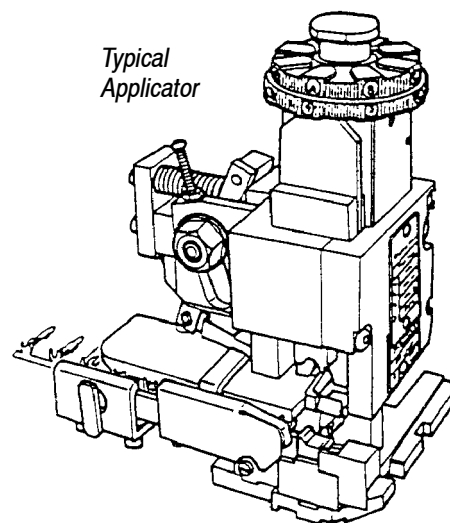


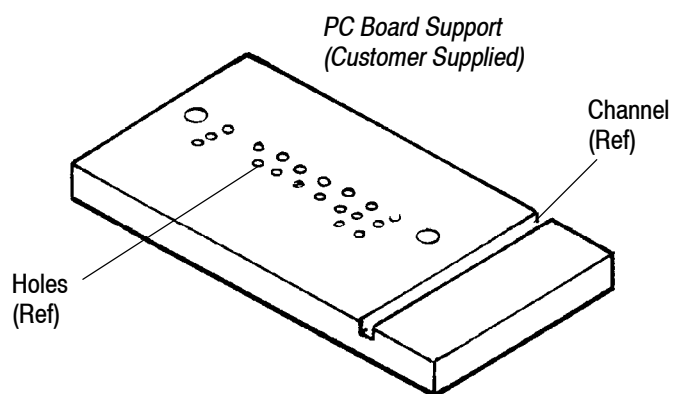
Figure 15 (cont'd)



*AMPOMATOR CLS III-G  
Machine 22500-[]*



*Typical  
Applicator*

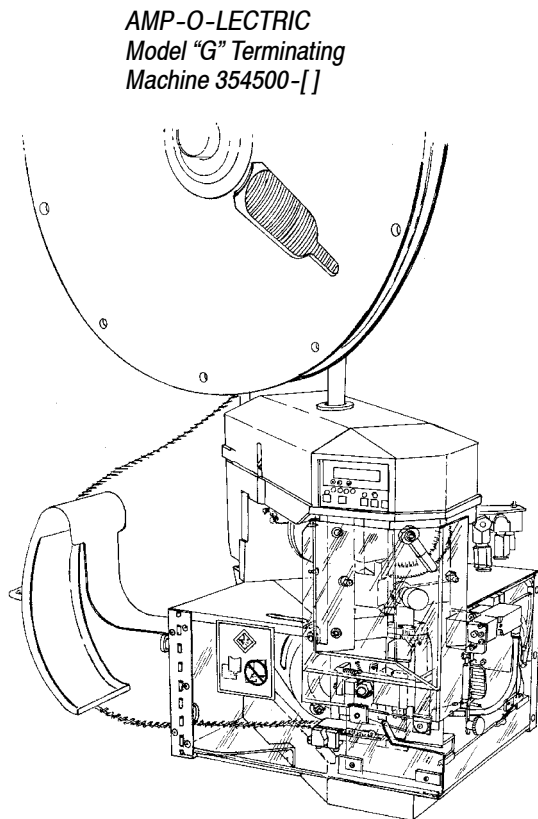
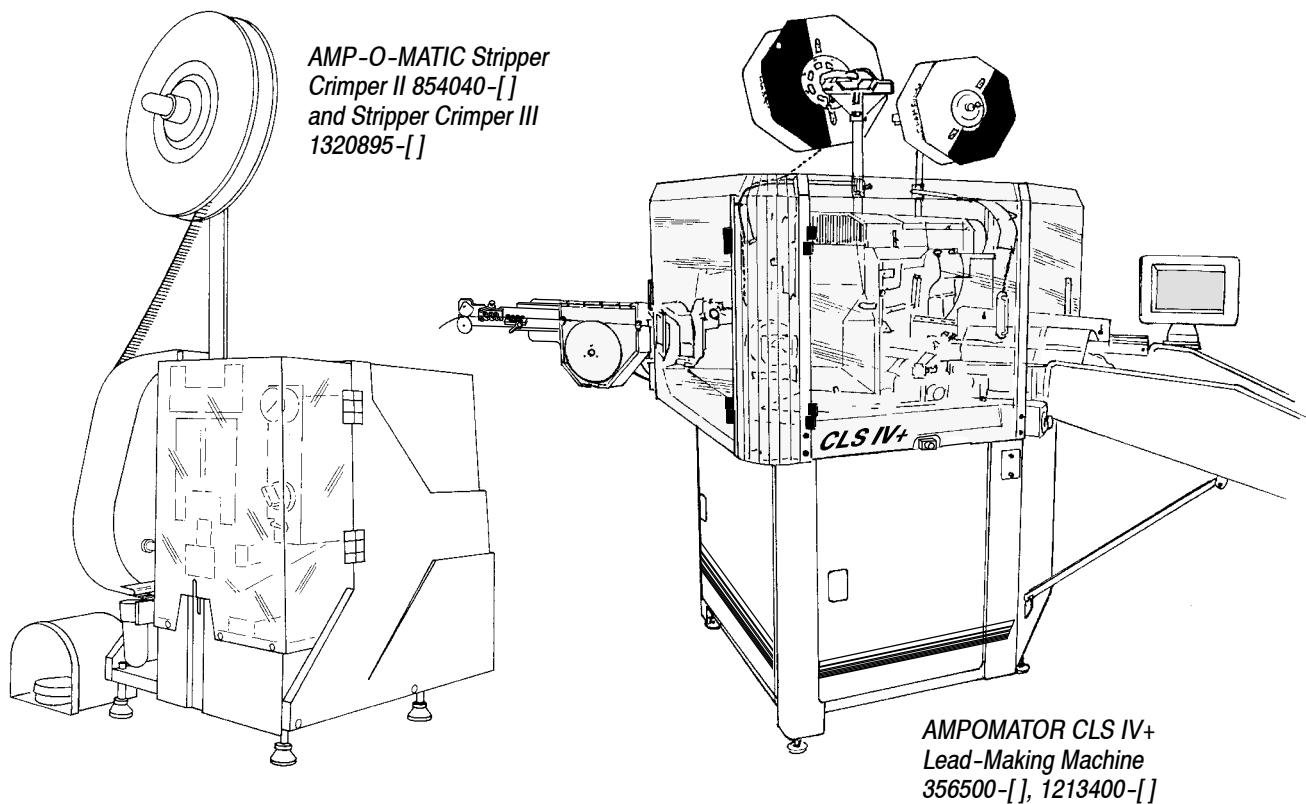


*PC Board Support  
(Customer Supplied)*

*Channel  
(Ref)*

*Holes  
(Ref)*

*Figure 15 (cont'd)*



AMP-O-LECTRIC  
Model "K" Terminating Machine  
565435-5, U-2 Assy 722460-1

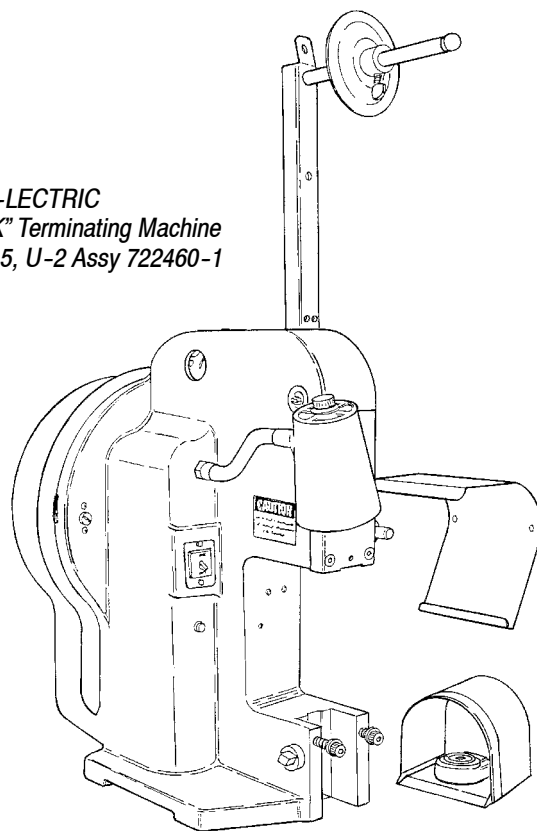


Figure 15 (cont'd)

| CONTACT TYPE | SERIES SIZE | WIRE SIZE, AWG | INSUL DIA RANGE        | APPLICATOR (DOCUMENT)  | POWER UNIT (DOCUMENT)        | HAND TOOL (DOCUMENT)                                  | EXTRACTION TOOL (DOCUMENT) |  |  |
|--------------|-------------|----------------|------------------------|------------------------|------------------------------|-------------------------------------------------------|----------------------------|--|--|
| RECEPT       | 040         | 24-20          | 1.4-2.1<br>[.055-.083] | 567381-1<br>(408-8040) | 122500-2 (409-5852)          | 58528-1<br>(408-9997)                                 | 755430-1<br>(411-5288)     |  |  |
|              |             |                |                        |                        | 122500-3 (409-5852)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 356500-1 (409-5878)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 356500-2 (409-5878)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 1213400-1 (409-5878)         |                                                       |                            |  |  |
|              |             |                |                        |                        | 1213400-2 (409-5878)         |                                                       |                            |  |  |
|              |             |                |                        | 567381-2<br>(408-8040) | 354500-1 (409-5842)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 565435-5 (409-5128)          |                                                       |                            |  |  |
|              |             |                |                        | 567381-3<br>(408-8040) | 354500-[ ] (409-5842)        |                                                       |                            |  |  |
|              |             |                |                        | 567732-1<br>(408-8040) | 122500-2 (409-5852)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 122500-3 (409-5852)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 356500-2 (409-5878)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 1213400-2 (409-5878)         |                                                       |                            |  |  |
|              |             |                |                        | 567949-1<br>(409-5855) | 854040-3 (409-5855)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 1320895-1, -3<br>(409-10012) |                                                       |                            |  |  |
|              |             | 22-20          | 1.0-1.4<br>[.039-.055] | 9-482414-0             | ---                          | 911738-1<br>(411-5417)                                |                            |  |  |
|              |             |                |                        | 911924-2               | ---                          |                                                       |                            |  |  |
|              |             | 22-18          | 1.1-1.8<br>[.043-.071] | 567442-1<br>(408-8040) | 122500-2 (409-5852)          | 90652-1<br>(408-9853)<br>or<br>934192-1<br>(411-5655) | 755430-1<br>(411-5288)     |  |  |
|              |             |                |                        |                        | 122500-3 (409-5852)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 356500-1 (409-5878)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 356500-2 (409-5878)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 1213400-1 (409-5878)         |                                                       |                            |  |  |
|              |             |                |                        |                        | 1213400-2 (409-5878)         |                                                       |                            |  |  |
|              |             |                |                        | 567442-2<br>(408-8040) | 354500-1 (409-5842)          |                                                       |                            |  |  |
|              |             |                |                        |                        | 565435-5 (409-5128)          |                                                       |                            |  |  |
|              |             |                |                        | 567442-3<br>(408-8040) | 354500-[ ] (409-5842)        |                                                       |                            |  |  |
|              |             |                |                        |                        |                              |                                                       |                            |  |  |

Figure 15 (cont'd)

| CONTACT TYPE | SERIES SIZE | WIRE SIZE, AWG | INSUL DIA RANGE        | APPLICATOR (DOCUMENT)  | POWER UNIT (DOCUMENT)        | HAND TOOL (DOCUMENT)                                                   | EXTRACTION TOOL (DOCUMENT) |
|--------------|-------------|----------------|------------------------|------------------------|------------------------------|------------------------------------------------------------------------|----------------------------|
| RECEPT       | 070         | 24-22          | 1.4-1.9<br>[.055-.075] | 567454-1<br>(408-8040) | 122500-2 (409-5852)          | 58528-1<br>(408-9997)<br>or<br>91580-1<br>(408-8547)<br>or<br>755221-1 | 755430-2<br>(411-5287)     |
|              |             |                |                        |                        | 122500-3 (409-5852)          |                                                                        |                            |
|              |             |                |                        |                        | 356500-1 (409-5878)          |                                                                        |                            |
|              |             |                |                        |                        | 356500-2 (409-5878)          |                                                                        |                            |
|              |             |                |                        |                        | 1213400-1 (409-5878)         |                                                                        |                            |
|              |             |                |                        |                        | 1213400-2 (409-5878)         |                                                                        |                            |
|              |             |                |                        | 567454-2<br>(408-8040) | 354500-1 (409-5842)          |                                                                        |                            |
|              |             |                |                        |                        | 565435-5 (409-5128)          |                                                                        |                            |
|              |             |                |                        | 567454-3<br>(408-8040) | 354500-[ ] (409-5842)        |                                                                        |                            |
|              |             |                |                        | 567929-1<br>(409-5855) | 854040-3 (409-5855)          |                                                                        |                            |
|              |             |                |                        |                        | 1320895-1, -3<br>(409-10012) |                                                                        |                            |
|              |             |                |                        | 680386-1<br>(408-8040) | 122500-2 (409-5852)          |                                                                        |                            |
|              |             |                |                        |                        | 122500-3 (409-5852)          |                                                                        |                            |
|              |             |                |                        |                        | 356500-1 (409-5878)          |                                                                        |                            |
|              |             |                |                        |                        | 356500-2 (409-5878)          |                                                                        |                            |
|              |             |                |                        |                        | 1213400-1 (409-5878)         |                                                                        |                            |
|              |             |                |                        |                        | 1213400-2 (409-5878)         |                                                                        |                            |
|              |             |                |                        | 680386-2<br>(408-8040) | 354500-1 (409-5842)          |                                                                        |                            |
|              |             |                |                        |                        | 565435-5 (409-5128)          |                                                                        |                            |
|              |             |                |                        | 680386-3<br>(408-8040) | 354500-[ ] (409-5842)        |                                                                        |                            |
|              |             | 22-20          | 1.0-1.4<br>[.039-.055] | 913281-2               | ---                          | 90653-1<br>(408-9854)                                                  |                            |
|              |             | 22-18          | 1.1-1.8<br>[.043-.071] | 567488-2<br>(408-8040) | 354500-1 (409-5842)          | 934195-1<br>(411-5658)                                                 |                            |
|              |             |                |                        |                        | 565435-5 (409-5128)          |                                                                        |                            |
|              |             | 20-16          | 1.2-1.9<br>[.047-.075] | 567491-2<br>(408-8040) | 354500-1 (409-5842)          | ---                                                                    |                            |
|              |             |                |                        |                        | 565435-5 (409-5128)          |                                                                        |                            |

Figure 15 (cont'd)



| CONTACT TYPE | SERIES SIZE | WIRE SIZE, AWG | INSUL DIA RANGE        | APPLICATOR (DOCUMENT)    | POWER UNIT (DOCUMENT)                                     | HAND TOOL (DOCUMENT)                                                                  | EXTRACTION TOOL (DOCUMENT) |     |
|--------------|-------------|----------------|------------------------|--------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------|-----|
| RECEPT       | 070         | 20-16          | 1.8-2.5<br>[.071-.098] | 567441-1<br>(408-8040)   | 122500-2 (409-5852)                                       | 90654-1<br>(408-9855)                                                                 | 755430-2<br>(411-5287)     |     |
|              |             |                |                        |                          | 122500-3 (409-5852)                                       |                                                                                       |                            |     |
|              |             |                |                        |                          | 356500-1 (409-5878)                                       |                                                                                       |                            |     |
|              |             |                |                        |                          | 356500-2 (409-5878)                                       |                                                                                       |                            |     |
|              |             |                |                        |                          | 1213400-1 (409-5878)                                      |                                                                                       |                            |     |
|              |             |                |                        |                          | 1213400-2 (409-5878)                                      |                                                                                       |                            |     |
|              |             |                |                        | 567441-2<br>(408-8040)   | 354500-1 (409-5842)                                       |                                                                                       |                            |     |
|              |             |                |                        |                          | 565435-5 (409-5128)                                       |                                                                                       |                            |     |
|              |             |                | 2.0-2.6<br>[.079-.102] | 567375-1<br>(408-8040)   | 122500-2 (409-5852)                                       | 58521-1<br>(408-9992)<br>or<br>755223-1<br>(411-5338)<br>or<br>911788-2<br>(411-5480) |                            |     |
|              |             |                |                        |                          | 122500-3 (409-5852)                                       |                                                                                       |                            |     |
|              |             |                |                        |                          | 356500-1 (409-5878)                                       |                                                                                       |                            |     |
|              |             |                |                        |                          | 356500-2 (409-5878)                                       |                                                                                       |                            |     |
|              |             |                |                        |                          | 1213400-1 (409-5878)                                      |                                                                                       |                            |     |
|              |             |                |                        |                          | 1213400-2 (409-5878)                                      |                                                                                       |                            |     |
|              |             |                |                        | 567375-2<br>(408-8040)   | 354500-1 (409-5842)                                       |                                                                                       |                            |     |
|              |             |                |                        |                          | 565435-5 (409-5128)                                       |                                                                                       |                            |     |
|              |             |                |                        | 567375-3<br>(408-8040)   | 354500-[ ] (409-5842)                                     |                                                                                       |                            |     |
|              |             |                |                        | 567838-1<br>(409-5855)   | 854040-4 (409-5855)<br>or<br>1320895-2, -4<br>(409-10012) |                                                                                       |                            |     |
|              |             |                |                        | 567854-1<br>(409-5855)   |                                                           |                                                                                       |                            |     |
|              |             |                |                        | 567855-1<br>(409-5855)   |                                                           |                                                                                       |                            |     |
|              |             |                |                        | 567908-1<br>(409-5855)   | 854040-3 (409-5855)                                       |                                                                                       |                            |     |
|              |             |                |                        |                          | 1320895-1, -3<br>(409-10012)                              |                                                                                       |                            |     |
|              | 250         | 22-20          | 1.5-2.2<br>[.059-.087] | 2-541611-2               | ---                                                       | ---                                                                                   |                            | --- |
|              |             |                |                        | 2-541611-6               |                                                           |                                                                                       |                            |     |
|              |             |                |                        | 9-541611-2               |                                                           |                                                                                       |                            |     |
|              |             |                |                        | 9-541611-6               |                                                           |                                                                                       |                            |     |
|              |             |                |                        | 722788-1<br>(408-8024)   |                                                           |                                                                                       |                            |     |
|              |             |                |                        | 722788-2<br>(408-8024)   | 722460-1                                                  |                                                                                       |                            |     |
|              |             |                |                        | 1-755816-1<br>(408-8024) | ---                                                       |                                                                                       |                            |     |
|              |             |                |                        |                          |                                                           |                                                                                       |                            |     |

Figure 15 (cont'd)

| CONTACT TYPE | SERIES SIZE | WIRE SIZE, AWG | INSUL DIA RANGE          | APPLICATOR (DOCUMENT)  | POWER UNIT (DOCUMENT) | HAND TOOL (DOCUMENT)   | EXTRACTION TOOL (DOCUMENT) |
|--------------|-------------|----------------|--------------------------|------------------------|-----------------------|------------------------|----------------------------|
| RECEPT       | 250         | 20-14          | 2.2-3.4<br>[.087-.134]   | 466250-1<br>(408-8039) | 122500-2 (409-5852)   | ---                    | ---                        |
|              |             |                |                          |                        | 122500-3 (409-5852)   |                        |                            |
|              |             |                |                          |                        | 356500-1 (409-5878)   |                        |                            |
|              |             |                |                          |                        | 356500-2 (409-5878)   |                        |                            |
|              |             |                |                          |                        | 1213400-1 (409-5878)  |                        |                            |
|              |             |                |                          |                        | 1213400-2 (409-5878)  |                        |                            |
|              |             |                |                          | 466250-2<br>(408-8039) | 354500-1 (409-5842)   |                        |                            |
|              |             |                |                          |                        | 565435-5 (409-5128)   |                        |                            |
|              |             | 14-12          | 2.9-3.8<br>[.114-.150]   | 680086-1<br>(408-8039) | 122500-2 (409-5852)   |                        |                            |
|              |             |                |                          |                        | 122500-3 (409-5852)   |                        |                            |
|              |             |                |                          |                        | 356500-1 (409-5878)   |                        |                            |
|              |             |                |                          |                        | 356500-2 (409-5878)   |                        |                            |
|              |             |                |                          |                        | 1213400-1 (409-5878)  |                        |                            |
|              |             |                |                          |                        | 1213400-2 (409-5878)  |                        |                            |
|              |             |                |                          | 680086-2<br>(408-8039) | 354500-1 (409-5842)   |                        |                            |
|              |             |                |                          |                        | 565435-5 (409-5128)   |                        |                            |
|              |             |                |                          | 680086-3<br>(408-8039) | 354500-[ ] (409-5842) |                        |                            |
| TAB          | 070         | 24-22          | 1.4-1.9<br>[.055-.075]   | 567478-2<br>(408-8040) | 354500-1 (409-5842)   | 58528-1<br>(408-9997)  | 755430-2<br>(411-5287)     |
|              |             |                |                          | 567478-1<br>(408-8040) | 565435-5 (409-5128)   |                        |                            |
|              |             |                |                          |                        | 122500-2 (409-5852)   |                        |                            |
|              |             |                |                          |                        | 122500-3 (409-5852)   |                        |                            |
|              |             |                |                          |                        | 356500-1 (409-5878)   |                        |                            |
|              |             |                |                          |                        | 356500-2 (409-5878)   |                        |                            |
|              |             |                |                          |                        | 1213400-1 (409-5878)  |                        |                            |
|              |             |                |                          |                        | 1213400-2 (409-5878)  |                        |                            |
|              |             | 22-20          | 1.19-2.49<br>[.047-.098] | ---                    | ---                   | 90653-1<br>(408-9854)  |                            |
|              |             | 22-18          | 1.1-2.2<br>[.043-.087]   | ---                    | ---                   | 934195-1<br>[411-5658] |                            |

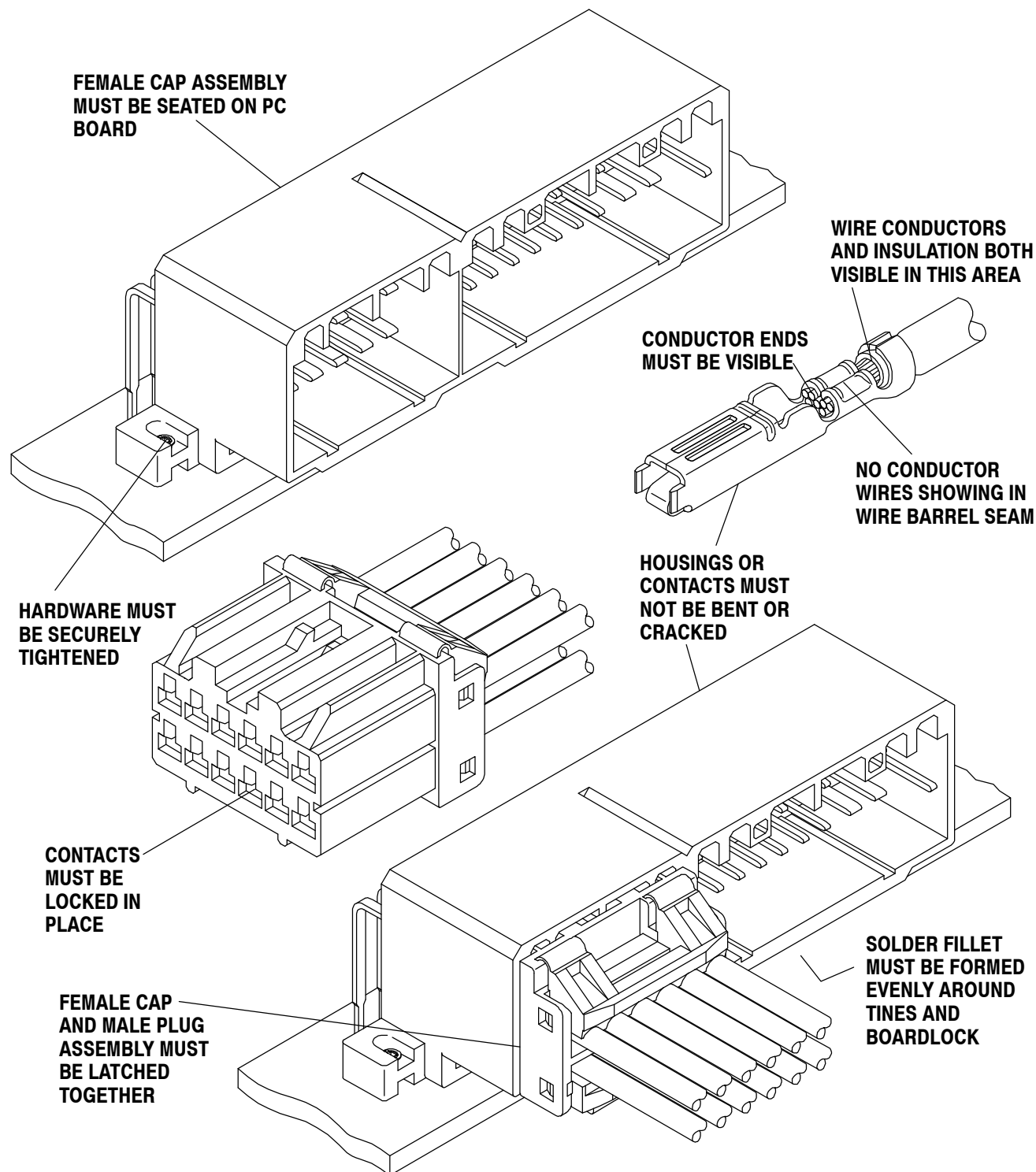
Figure 15 (cont'd)

| CONTACT TYPE | SERIES SIZE | WIRE SIZE, AWG | INSUL DIA RANGE          | APPLICATOR (DOCUMENT)  | POWER UNIT (DOCUMENT) | HAND TOOL (DOCUMENT)   | EXTRACTION TOOL (DOCUMENT) |     |
|--------------|-------------|----------------|--------------------------|------------------------|-----------------------|------------------------|----------------------------|-----|
| TAB          | 070         | 20-16          | 2.0-2.6<br>[.079-.102]   | 567908-1<br>(409-5855) | 854040-3 (409-5855)   | ---                    | 755430-2<br>(411-5287)     |     |
|              |             |                | 1.68-2.59<br>[.066-.102] | ---                    | ---                   | 58521-1<br>(408-9992)  |                            |     |
|              |             |                | 1.75-2.59<br>[.069-.102] | ---                    | ---                   | 90654-1<br>(408-9855)  |                            |     |
|              |             |                | 2.0-2.6<br>[.078-.102]   | 567375-1<br>(408-8040) | 122500-2 (409-5852)   | 755224-1<br>(411-5338) |                            |     |
|              |             |                |                          |                        | 122500-3 (409-5852)   |                        |                            |     |
|              |             |                |                          |                        | 356500-1 (409-5878)   |                        |                            |     |
|              |             |                |                          |                        | 356500-2 (409-5878)   |                        |                            |     |
|              |             |                |                          |                        | 1213400-1 (409-5878)  |                        |                            |     |
|              |             |                |                          |                        | 1213400-2 (409-5878)  |                        |                            |     |
|              |             |                | 567375-2<br>(408-8040)   | 354500-1 (409-5842)    |                       |                        |                            |     |
|              |             |                |                          | 565435-5 (409-5128)    |                       |                        |                            |     |
|              |             |                | 567375-3<br>(408-8040)   | 354500-[ ] (409-5842)  |                       |                        |                            |     |
|              | 250         | 22-20          | 1.5-2.2<br>[.059-.087]   | 680050-2<br>(408-8039) | 354500-1 (409-5842)   |                        | ---                        | --- |
|              |             |                |                          |                        | 565435-5 (409-5128)   |                        |                            |     |
|              |             | 20-14          | 2.1-3.4<br>[.083-.134]   | 567457-2<br>(408-8039) | 354500-1 (409-5842)   |                        |                            |     |
|              |             |                |                          |                        | 565435-5 (409-5128)   |                        |                            |     |
|              |             | 14-12          | 2.9-3.8<br>[.114-.150]   | 567462-1<br>(408-8039) | 122500-2 (409-5852)   |                        |                            |     |
|              |             |                |                          |                        | 122500-3 (409-5852)   |                        |                            |     |
|              |             |                |                          |                        | 356500-1 (409-5878)   |                        |                            |     |
|              |             |                |                          |                        | 356500-2 (409-5878)   |                        |                            |     |
|              |             |                |                          |                        |                       |                        |                            |     |
|              |             |                |                          |                        | 1213400-1 (409-5878)  |                        |                            |     |
|              |             |                |                          | 1213400-2 (409-5878)   |                       |                        |                            |     |
|              |             |                |                          | 567462-2<br>(408-8039) | 354500-1 (409-5842)   |                        |                            |     |
|              |             |                |                          |                        | 565435-5 (409-5128)   |                        |                            |     |
|              |             |                |                          | 567462-3<br>(408-8039) | 354500-1 (409-5842)   |                        |                            |     |

Figure 15 (end)

## 6. VISUAL AID

Figure 16 shows a typical application of MULTILOCK 040/070 and 070/250 Series Hybrid Connector. 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 16. VISUAL AID**

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