



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 [$\pm .005$] and angles have a tolerance of $\pm 2^\circ$. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of Mini-Universal MATE-N-LOK 2 Connectors for free-hanging and printed circuit (PC) board applications. These connectors provide a reliable and economical means of grouping multiple-lead connections in computers, computer/peripheral equipment, business machines, entertainment centers, and appliances. Mini-Universal MATE-N-LOK 2 Connectors are mateable with existing Mini-Universal MATE-N-LOK connectors.

Housings are available in 2-, 3-, 4-, 6-, 8-, 9-, 10-, 12- (dual row and matrix), 14-, 15-, 16-, 18-, 20-, 22-, and 24- circuit positions for free-hanging applications. Vertical PC Board pin headers are available in 2-, 3-, 4-, 6-, 8-, 9-, 10-, 12-, 14-, 15-, 16-, 18-, 20-, 22-, and 24- circuit configurations. Right-angle PC board pin headers are available in 2-, 3-, 4-, 6-, 8-, 10-, 12-, 14-, 16-, 18-, 20-, 22-, and 24- circuit configurations.

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

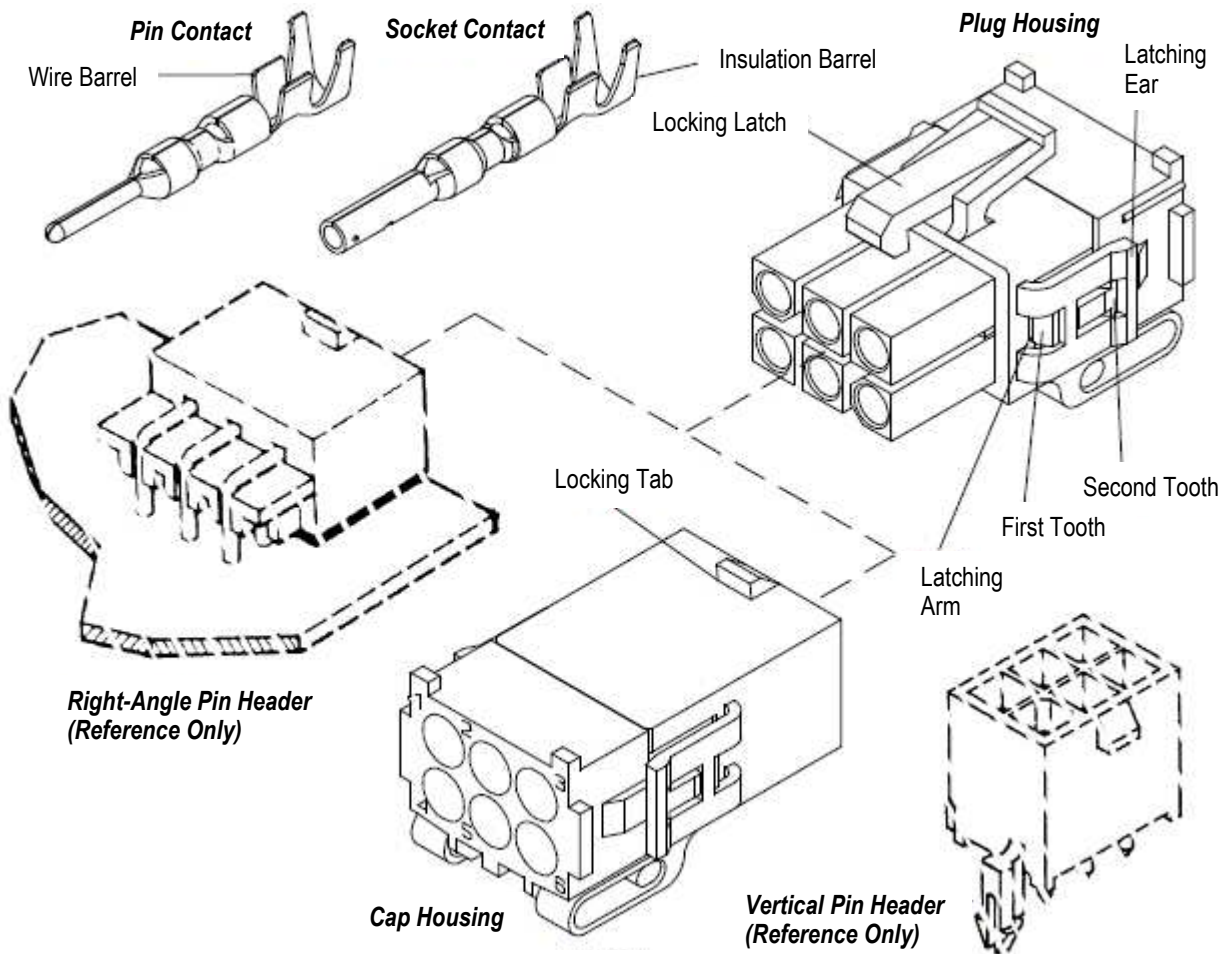


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

- Updated document to corporate requirements, including new logo.
- Updated front bellmouth specification in Figure 3 to 0.25 [.010] max
- Added one more Hand tool PN to 26-22AWG range in figure 11.

2.2. Customer Assistance

Reference Product Base Part Number 794220 and Product Code 0957 are representative of Mini-Universal MATE-N-LOK 2 Connectors. 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 [108-1693](#) provides product performance and test results for Mini-Universal MATE-N-LOK 2 Connectors. Product Specification [108-1694](#) provides performance tests for Mini-Universal MATE-N-LOK 2 Headers. Application Specification [114-16017](#) provides application instructions for Mini-Universal MATE-N-LOK Connectors and Headers.

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:

- [408-3295](#) Preparing (Reel-Wrap) Reel of Contacts for Applicator Tooling
- [408-3393](#) Mini-Universal MATE-N-LOK 2 Connectors
- [408-4118](#) Extraction Tool 189727-1 for Mini-Universal MATE-N-LOK Contacts
- [408-4443](#) Straight Action Hand Crimping Tool 90717-2
- [408-4489](#) Straight Action Hand Crimping Tool 90707-2
- [408-7424](#) Checking Terminal Crimp Height or Gaging Die Closure
- [408-7984](#) Insertion Tool 455830-1
- [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
- [408-9640](#) Crimp Quality Monitor Applicators for Side-Feed and End-Feed Applications
- [408-9816](#) Handling of Reeled Products
- [408-9930](#) PRO-CRIMPER* III Hand Crimping Tool Frame Assembly 354940-1
- [408-9965](#) PRO-CRIMPER III Hand Crimping Tool 90870-1
- [409-5128](#) AMP-O-LECTRIC Model "K" Terminating Machine 565435-5
- [409-5842](#) AMP-O-LECTRIC Model "G" Terminating Machine 354500-[]
- [409-5852](#) AMPOMATOR* CLS III-G Lead Making Machine 122500-[]
- [409-5866](#) AMPOMATOR CLS IV Lead-Making Machine 217500-[]
- [409-5878](#) AMPOMATOR CLS IV Lead Making Machine 356500-[]
- [409-10012](#) AMP-O-MATIC* Side Feed Stripper-Crimper III Machine 1320895-[]
- [409-10016](#) Entry Level Terminator (ELT) Machine 1338600-[]
- [409-10027](#) Stripping Modules 1490500 and 1490502

409-10029 Stripping Modules 1490501 and 1490503

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. Reeled Contacts

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

C. 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.

D. 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



NOTE

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

3.3. Wire Selection and Preparation

Contacts are available for the wire sizes and insulation diameters specified in Figure 2. Insulation shall be stripped for a length of 3.20 to 3.70 mm [.126 to .146 in.] for one-wire crimping and 3.50 to 3.90 mm [.138 to .157 in.] for two-wire crimping.



CAUTION

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



NOTE

The applied crimp dimension (within the functional 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. See Section 5, TOOLING.



NOTE

The wire strip length is approximately 0.79 mm [.031 in.] longer than the contact wire barrel.

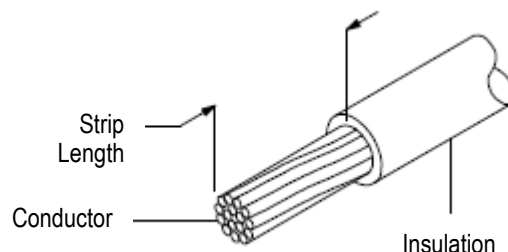


Figure 2 (continued)

AUTOMATIC MACHINE WIRE CRIMP DIMENSION

WIRE (Stranded Only)		WIRE BARREL CRIMP		INSULATION BARREL CRIMP WIDTH (REF)
SIZE (AWG)	INSULATION DIAMETER	HEIGHT ± 0.05 [$\pm .002$]	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	1.49-2.39 [.059-.094]	0.91 [.036]	1.78 [.070]	2.79 [.110]
20		0.99 [.039]		
18		1.14 [.045]		
22 x (2)	1.70 [.067] x (2) Max.	0.99 [.039]		
20	2.0-3.20 [.079-.126]	1.07 [.042]	1.78 [.070]	3.30 [.130]
18		1.21 [.048]		
16		1.30 [.051]		
20 x (2)	1.91 [.075] x (2) Max.	1.30 [.051]		

HAND TOOL WIRE CRIMP DIMENSION

WIRE (Stranded Only)		WIRE BARREL CRIMP		INSULATION BARREL CRIMP WIDTH (REF)
SIZE (AWG)	INSULATION DIAMETER	HEIGHT ± 0.05 [$\pm .002$]	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]	0.69 [.027]	1.07 [.042]	2.03 [.080]
24		0.69 [.027]		
22		0.78 [.031]		
22	1.50-2.39 [.059-.094]	0.79 [.031]	1.58 [.062]	2.79 [.110]
20		0.79 [.031]		
18		1.04 [.041]		
22 x (2)	1.70 [.067] x (2) Max.	1.04 [.041]		
20	2.00-3.20 [.079-.126]	1.07 [.042]	1.78 [.070]	3.30 [.130]
18		1.07 [.042]		
20 x (2)	1.91 [.075] x (2) Max.	1.30 [.051]		
16	2.48-3.20 [.098-.126]	1.30 [.051]		

●When crimping tin-coated 26 AWG wire (0.15 mm [.006 in.] dia., 7 strands) control crimp height to +0.03/-0.05 mm [+0.001/-0.002 in.].

Figure 2 (end)
3.4. Contact Crimp Requirements

The contact must be crimped onto the wire according to instructions packaged with applicable tooling. After crimping, the contact should appear as shown in Figure 3. A typical pin contact is shown as it should appear after crimping; these requirements apply equally to the socket contact.


CAUTION

The wire insulation must not be damaged during the crimping process.

A. Wire Barrel Crimp

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 contact wire barrel crimp height must be within the dimension provided in Figure 2.

B. Effective Crimp Length

For optimum crimp effectiveness, the crimp must be within the area show in Figure 3 and must meet the crimp dimensions provided 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 Section 5, TOOLING.

C. Bellmouths

Front and rear bellmouths shall be evident and conform to the dimensions given in Figure 3.

D. Cutoff Tabs

The cutoff tab shall be cut to the dimensions shown in Figure 3.

E. Burrs

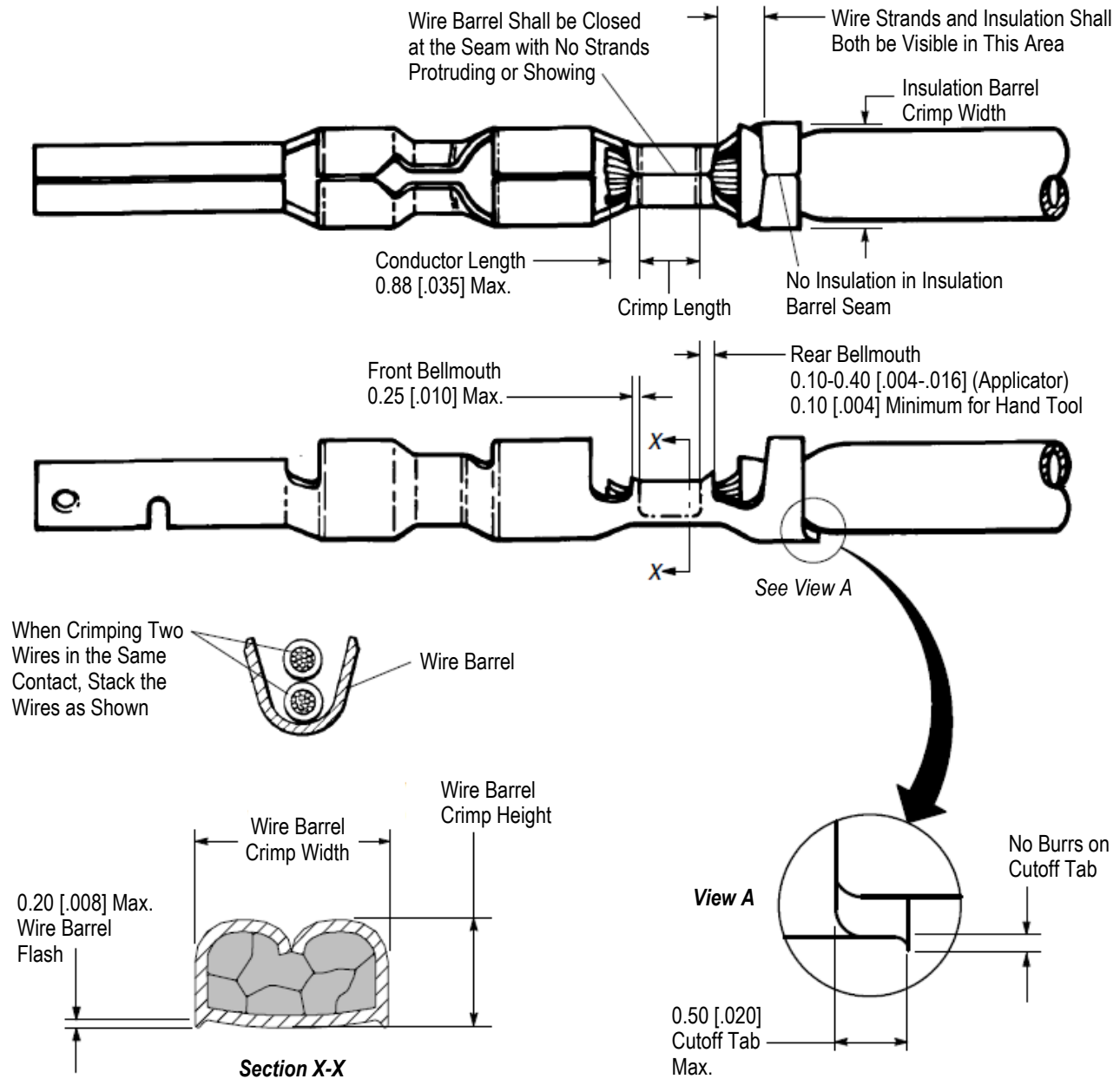
The cutoff burr shall not exceed the dimensions shown in Figure 3.

F. Wire Barrel Flash

The wire barrel flash shall not exceed the dimensions shown in Figure 3, Section X-X.

G. Insulation Barrel Crimp

The insulation barrel crimp shall grip the insulation firmly. A slight cut in the insulation by the insulation barrel is permissible as this causes no problems in actual use. Insulation crimp shall comply to width and height provided in Figure 3.


Figure 3
H. Wire Location

The wire conductor and insulation must be visible in the transition area between the wire and insulation barrels.

I. Conductor Extension

The conductor may extend beyond the wire barrel to the maximum shown.

J. Wire Barrel Seam

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

1. The carrier cutoff tab length shall not exceed the dimensions given in Figure 3.
2. The wire barrel seam shall be closed adequately to confine all strands of the wire. There shall be no loose strands. Wire strands should not be embedded in the outside of the wire barrel.

K. 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 following limits, as shown in Figure 4.

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

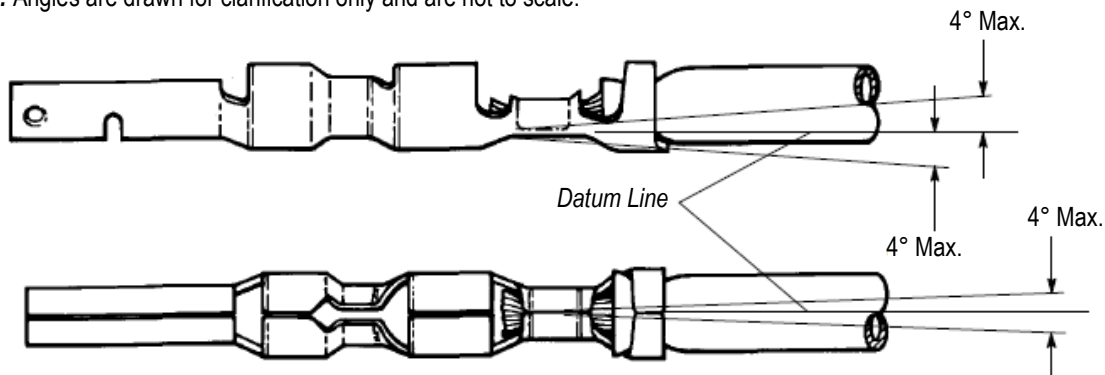


Figure 4

L. 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 4.

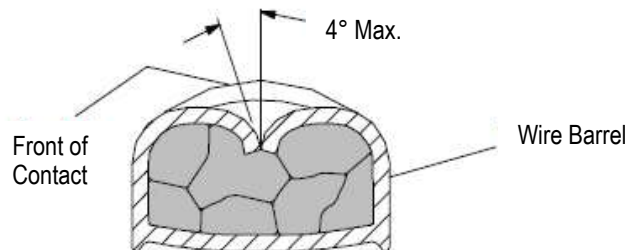


Figure 5

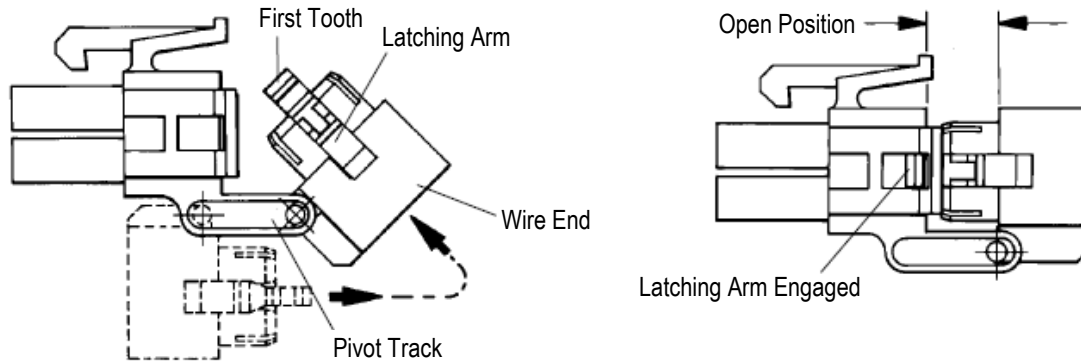
3.5. Assembly Procedures

1. Rotate (wire end) back side of connector housing 180° along the pivot track, until the first tooth of both latching arms engage; this is called the open position. See Figure 6.

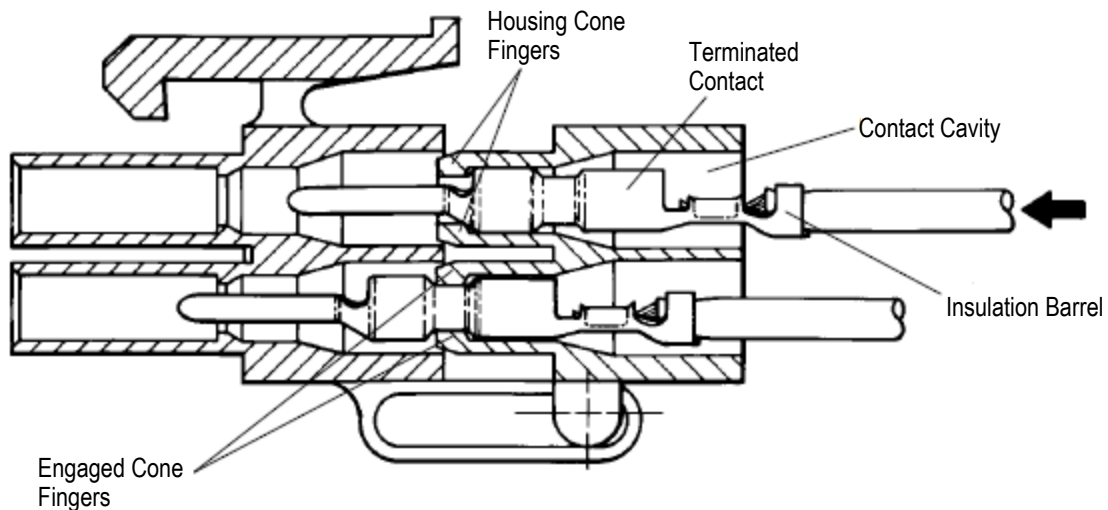


NOTE

The wire end of the housing must be in the open position before insertion of terminated contacts.


Figure 6

2. Select the appropriate contact cavities. Insert terminated pin or socket contacts into wire side of housing by grasping the wire directly behind the insulation barrel and pushing the contact with a twisting motion into the contact cavity until the contact stops and the housing cone fingers engage. See Figure 7.


Figure 7

NOTE

Terminated pin and socket contacts are interchangeable between the plug and cap housing. This feature can be used as an additional polarization.

3. After all required contacts have been inserted, the wire end of the connector must be closed. To close the wire end of the connector housing, grasp the wire end and push forward until the second tooth of both latching arms engage as shown in Figure 8.

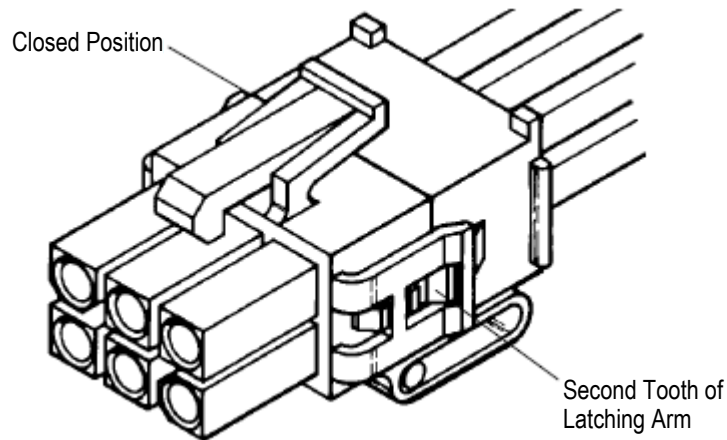


Figure 8

3.6. Disassembly Procedures


CAUTION

To prevent damage to the connector assembly, the wire end must be in the open position before the removal of contacts.

1. Deflect latching arms one at a time, then lightly pull wire end of the plug assembly away from housing until the first tooth of the latching arms engage. See Figure 9.

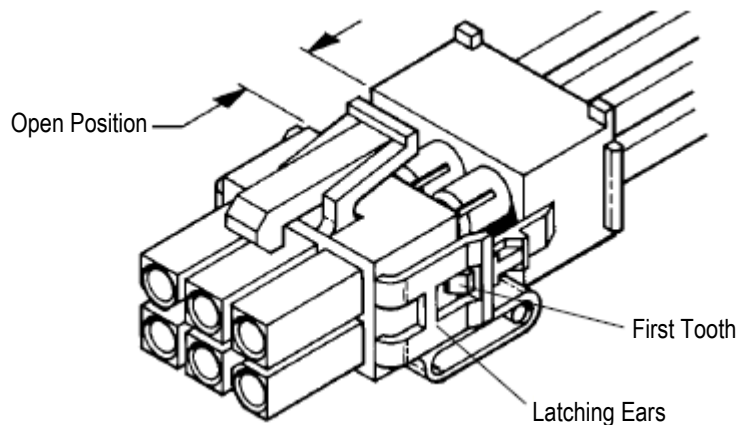


Figure 9

2. Grasp the selected wire by the insulation barrel and pull using a twisting motion, until terminated contact is free from housing as shown in Figure 10
3. Follow step 2 for the remaining contacts.

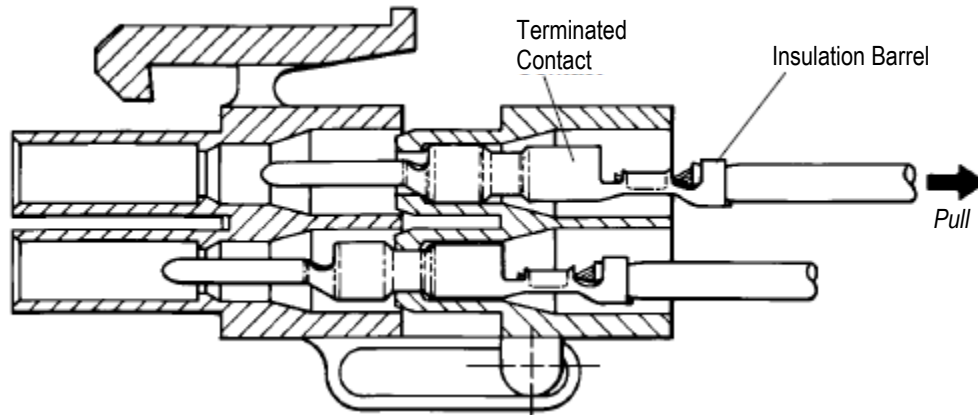


Figure 10

3.7. Polarization, Engagement, and Disengagement

A. Polarization

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

B. Engagement

The plug and cap must have an identical number of circuit positions. Polarizing features must be properly oriented. Insert cap connector straight toward plug connector until it bottoms and the locking latch engages the locking tab. The same technique can be used for the header-plug assembly.

C. Disengagement

For free hanging assemblies, depress locking latch on plug housing and pull straight out.

3.8. Repair/Replacement

Damaged crimped contacts or housings must be removed, discarded, and replaced with new components. Remove any damaged contacts by referring to the procedures given in Paragraph 3.6.

i **NOTE**
 If a damaged contact is apparent before the contacts are inserted into the housing, cut the wire in back of the contact and reterminate the wire end. If contacts or housing are damaged after insertion, the wire must be cut directly in back of the housing and reterminated with new contacts and housing. See Section 5, TOOLING.

4. QUALIFICATION

Mini-Universal MATE-N-LOK 2 Connectors are Recognized by Underwriters Laboratories Inc. (UL) in File E28476 and Certified with CSA International in File LR7189.

5. TOOLING

Figure 11 provides tool part numbers and instructional material related to wire size.

i **NOTE**
 TE Tooling 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 at the number on the bottom of page 1.

- **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.

• **Applicator**

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



NOTE

Each applicator is shipped with a metal identification tag attached. DO NOT remove this tag or disregard the information on it. Also, a packet of associated paperwork is included in each applicator shipment. This information should be read before using the applicator; then it should be stored in a clean, dry area near the applicator for future reference. Some changes may have to be made to the applicators to run in all related power units. Contact the Product Information Line at the number on 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.

• **Insertion/Extraction Tooling**

Insertion Tools are designed for contacts crimped to small fragile wire. They are designed to stabilize the contact during insertion. For use of Insertion Tool 455830-1 which may be used with these contacts, refer to Instruction Sheet 408-7984. Extraction Tools are designed to release the locking lance inside the connector housing without damaging the housings or contacts. For use of Extraction Tool 189727-1 which may be used with these contacts, refer to Instruction Sheet 408-4118.

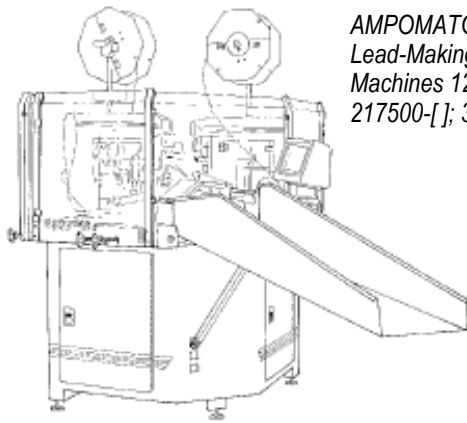
SIZE, AWG	INSULATION DIAMETER	APPLICATOR (408-8040)	POWER UNIT (DOCUMENT)	ANVIL LETTER	HAND TOOL (DOCUMENT)	INSERTION TOOL (408-7984)	EXTRACTION TOOL (408-4118)
30-26	0.88-1.27 [.035-.050]	567418-1	122500-2, -3 (409-5852)	—	90717-2 (408-4443)	455830-1	189727-1
			217500-1, -2 (409-5866)				
			356500-1, -2 (409-5878)				
		567418-2	354500-1 (409-5842)				
			565435-5 (409-5128)				
			1338600-3, -4 (409-10016)				
		567418-3	354500-1 (409-5842)				

Figure 11 (Continued)

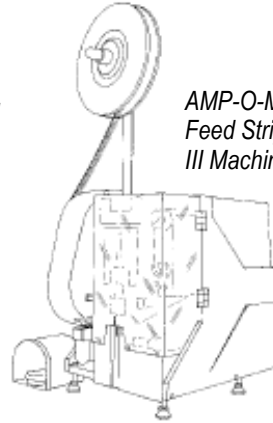
SIZE, AWG	INSULATION DIAMETER	APPLICATOR (408-8040)	POWER UNIT (DOCUMENT)	ANVIL LETTER	HAND TOOL (DOCUMENT)	INSERTION TOOL (408-7984)	EXTRACTION TOOL (408-4118)
26-22	1.20-1.75 [.047-.069]	466990-2▲	1320895-1, -3 (409-10012)	26-24 (A) and 22 (B)	90758-1 (408-9938) or 91529-1 (408-8547) or 2280977-1 (408-8547)	455830-1	189727-1
		567066-3	122500-2, -3 (409-5852)				
			217500-1, -2 (409-5866)				
			356500-1, -2 (409-5878)				
		567066-4	354500-1 (409-5842)				
			565435-5 (409-5128)				
			1338600-3, -4 (409-10016)				
		567066-5	354500-[] (409-5842)				
1338600-[] (409-10016)							
567829-1▲	1320895-2, -4 (409-10012)						
22‡-18	1.50-2.39 [.059-.094]	680854-1	122500-2, -3 (409-5852)	22-20 (A) and 18 & 22 x (2) (B)	90759-1 (408-9962) or 91522-1 (408-8547)	455830-1	189727-1
			217500-1, -2 (409-5866)				
			356500-1, -2 (409-5878)				
		680854-2	354500-1 (409-5842)				
			565435-5 (409-5128)				
		680854-3	354500-[] (409-5842)				
20‡-16	2.00-3.20 [.079-.126]	680582-1	122500-2, -3 (409-5852)	20-18 (A) and 16 & 20 x (2) (B)	58707-1 (408-4503) or 90707-2 (408-4489) or 91594-1 (408-8547)	455830-1	189727-1
			217500-1, -2 (409-5866)				
			356500-1, -2 (409-5878)				
		680582-2	354500-1 (409-5842)				
			565435-5 (409-5128)				
			1338600-3, -4 (409-10016)				
		680582-3	354500-[] (409-5842)				
			1338600-[] (409-10016)				

†For wire size 22 x (2), insulation diameter 1.70 mm [.067 in.] is maximum. ‡For wire size 20 x (2), insulation diameter 1.91 mm [.075 in.] is maximum. ▲ No documents listed.

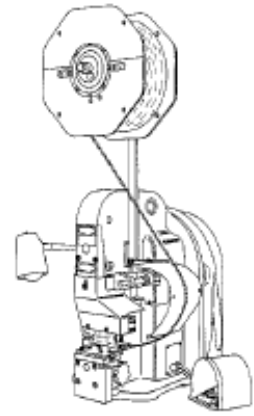
Figure 11 (end)



AMPOMATOR CLS
Lead-Making
Machines 122500-[];
217500-[]; 356500-[]

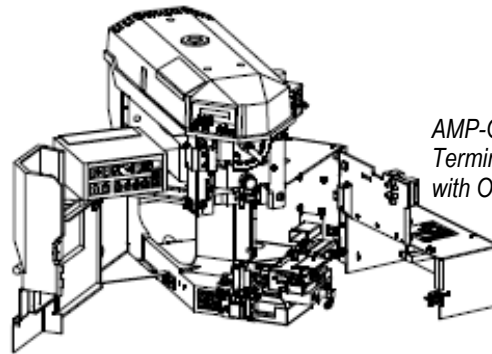
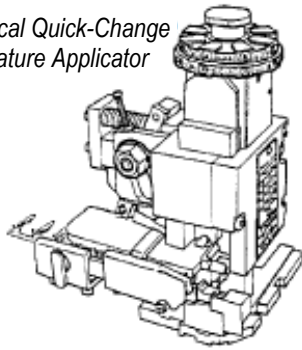


AMP-O-MATIC Side
Feed Stripper-Crimper
III Machine 1320895-[]



AMP-O-LECTRIC Model "K"
Terminating Unit 565435-[]

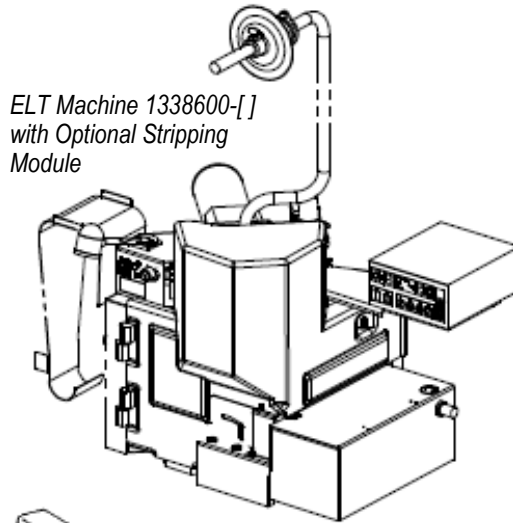
Typical Quick-Change
Miniature Applicator



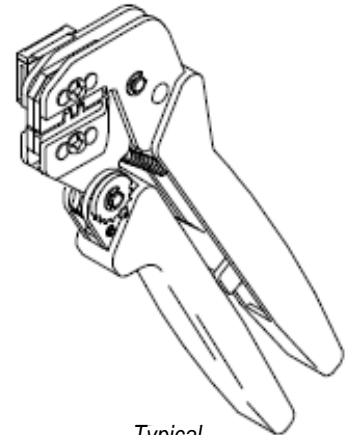
AMP-O-LECTRIC Model "G"
Terminating Machine 354500-[]
with Optional Stripping Module



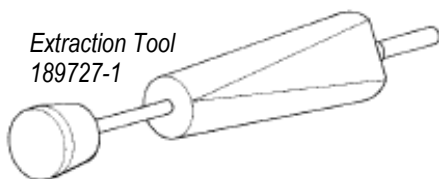
Typical CERTI-CRIMP II
Straight Action Hand Tool



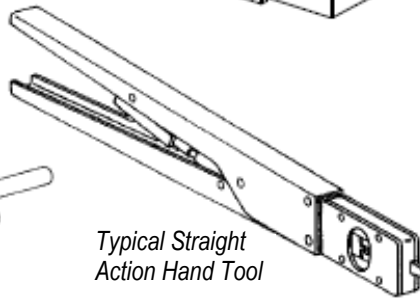
ELT Machine 1338600-[]
with Optional Stripping
Module



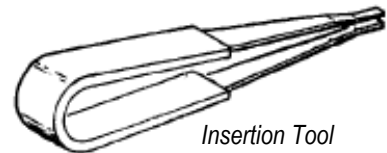
Typical
PRO-CRIMPER
Hand Tool



Extraction Tool
189727-1



Typical Straight
Action Hand Tool



Insertion Tool
455830-1

Figure 12

6. VISUAL AID

Figure 13 shows a typical application of Mini-Universal MATE-N-LOK 2 Connectors. This illustration should be used by production personnel to ensure a correctly applied product. Applications which do not appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.

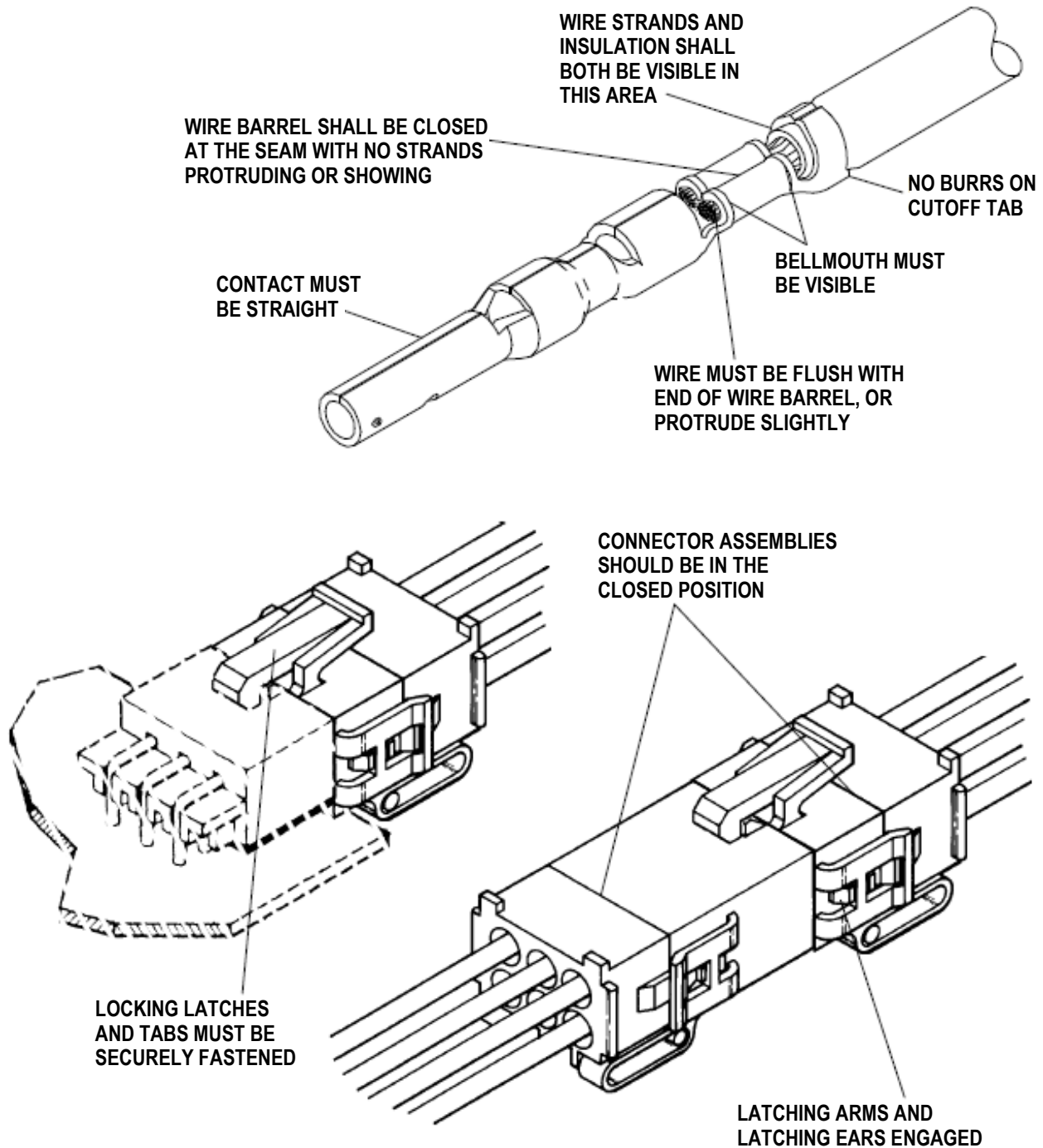


Figure 13