

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 Twin Leaf contacts. These contacts have a wire size range of 28 through 16 AWG and will accept a wire insulation diameter range of 2.67 through 0.89 mm [.105 through .035 in.]. These contacts are terminated with hand held tooling or automatic machines and used in Crimp Snap Twin Leaf connectors with 2.54 mm [.100 in.], 3.18 mm [.125 in.], or 3.96 mm [.156 in.] centerlines.

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

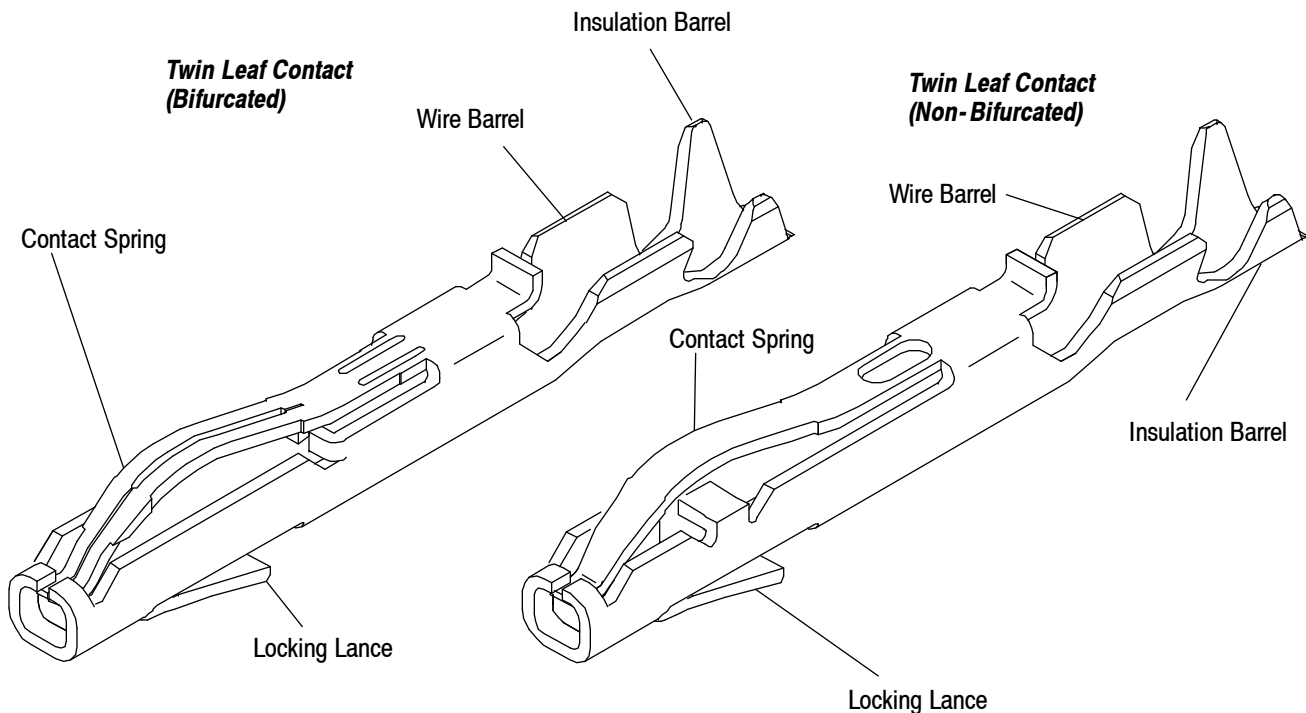


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

Revisions to this application specification include:

- Changed company name and logo

2.2. Customer Assistance

Reference Part Number 530224 and Product Code 5196 are representative numbers of Twin Leaf contacts. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product and tooling information. Such information can be obtained through a local Representative or, after purchase, by calling TOOLING ASSISTANCE CENTER or PRODUCT INFORMATION at the number at the bottom of page 1.

2.3. Drawings

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

2.4. Specifications

Product Specifications 108-9031 and 108-9051 provide test and performance information for the connectors assemblies.

2.5. Instructional Material

The following list includes available instruction sheets (408-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.

<u>Document Number</u>	<u>Document Title</u>
408-3295	Preparing Reel Of Contacts for Application Tooling
408-7424	Checking Terminal Crimp Height or Gaging Die Closure
408-7556	Hand Crimping Tool 90272-1
408-7583	Hand Crimping Tool 90285-1
408-8040	Heavy Duty Quick-Change Applicator (Side-Feed Type)
408-8053	Miniature (Mini) Quick-Change Applicators
408-8059	General Preventative Maintenance for Applicators
408-9640	Crimp Quality Monitor Applicators for Side-Feed and End-Feed Applications
408-9816	Handling of Reeled Products
409-5128	Basic AMP-O-LECTRIC* Model "K" Terminating Machine 565435-5
409-5842	AMP-O-LECTRIC Model "G" Terminating Machines 354500-[] and 1213127-[]
409-5852	AMPOMATOR* CLS III-G Lead-Making Machine 122500-[]
409-5855	AMP-O-MATIC* Side-Feed Stripper-Crimper Model II Machine 854040-3 and -4
409-5862	626 Pneumatic Tooling Assemblies 189721-[] and 189722-[]
409-5866	AMPOMATOR CLS IV Lead-Making Machine 217500-[]
409-5878	AMPOMATOR CLS IV+ Lead-Making Machine 356500-[] and 1213400-[]
409-10012	AMP-O-MATIC Side-Feed Stripper-Crimper III Machine 1320895-[]
409-10016	Entry Level Terminator (ELT) Machine 1338600-[]

3. REQUIREMENTS

3.1. Material

The contact body is made of phosphor bronze and is selectively plated with gold in the mating area, with gold in the mating area with gold flash over the entire contact, or bright tin-lead over the entire contact upon request.

3.2. Storage

A. Ultraviolet Light

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

B. Shelf Life

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

C. Reel Storage

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

D. Chemical Exposure

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

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

3.3. Wire Selection and Preparation

A. Type

The wire size range for these contacts is 0.09 through 1.30 mm² [28 through 16 AWG].

B. Preparation

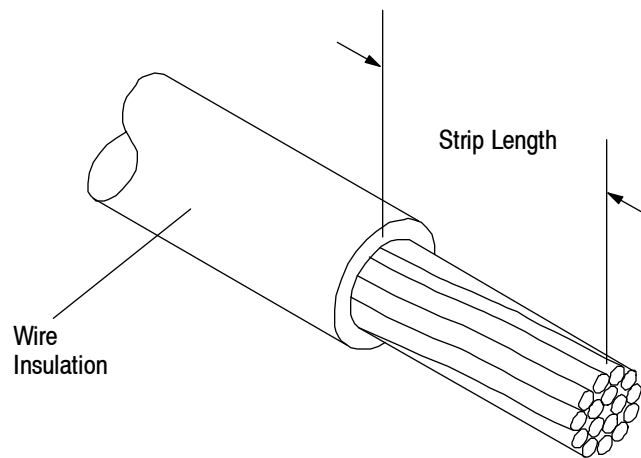
The wire must be stripped to the dimension provided in Figure 2.



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



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.



HAND CRIMPING TOOL WIRE CRIMP DIMENSIONS

WIRE			WIRE BARREL CRIMP HEIGHT RANGE
WIRE SIZE, AWG	INSULATION DIAMETER RANGE	STRIP LENGTH (NOMINAL)	
28-24	0.89-1.40 [.035-.055]	3.56 [.140]	0.91-0.81 [.036-.032]
24-22	1.22-1.52 [.048-.060]	3.56 [.140]	0.89-0.79 [.035-.031]
20	1.22-1.52 [.048-.060]	3.56 [.140]	1.04-0.94 [.041-.037]
22-20	1.24-2.16 [.049-.085]	3.56 [.140]	0.97-0.86 [.038-.034]
18	1.24-2.16 [.049-.085]	3.56 [.140]	1.19-1.09 [.047-.043]
20-18	1.85-2.29 [.073-.090]	3.56 [.140]	1.14-1.04 [.045-.041]
16	1.85-2.29 [.073-.090]	3.56 [.140]	1.40-1.30 [.055-.051]
20-18	2.16-2.67 [.085-.105]	3.56 [.140]	1.14-1.04 [.045-.041]
16	2.16-2.67 [.085-.105]	3.56 [.140]	1.40-1.30 [.055-.051]

Figure 2 (Cont'd)

AUTOMATIC MACHINE WIRE CRIMP DIMENSIONS

SIZE		WIRE		WIRE BARREL		INSULATION BARREL CRIMP WIDTH (REF)
mm ²	AWG	INSUL DIA RANGE	STRIP LENGTH	CRIMP HEIGHT RANGE	CRIMP WIDTH (REF)	
---	28	0.89-1.40 [.035-.055]	3.96-3.18 [.156-.125]	0.86-0.76 [.034-.030]	1.07 [.042]	1.57 [.062]
---	26	0.89-1.40 [.035-.055]	3.96-3.18 [.156-.125]	0.91-0.81 [.036-.032]		
0.20	---	0.89-1.40 [.035-.055]	3.96-3.18 [.156-.125]	0.97-0.86 [.038-.034]		
---	24	0.89-1.40 [.035-.055]	3.96-3.18 [.156-.125]	0.97-0.86 [.038-.034]		
0.20	---	1.22-1.52 [.048-.060]	3.96-3.18 [.156-.125]	0.89-0.79 [.035-.031]	1.40 [.055]	
---	24	1.22-1.52 [.048-.060]	3.96-3.18 [.156-.125]	0.89-0.79 [.035-.031]		
0.25	---	1.22-1.52 [.048-.060]	3.96-3.18 [.156-.125]	0.91-0.81 [.036-.032]		
0.30	---	1.22-1.52 [.048-.060]	3.96-3.18 [.156-.125]	0.97-0.86 [.038-.034]		
---	22	1.22-1.52 [.048-.060]	3.96-3.18 [.156-.125]	0.97-0.86 [.038-.034]		
0.35	---	1.22-1.52 [.048-.060]	3.96-3.18 [.156-.125]	0.97-0.86 [.038-.034]		
0.50	---	1.22-1.52 [.048-.060]	3.96-3.18 [.156-.125]	1.07-0.97 [.042-.038]		
---	20	1.22-1.52 [.048-.060]	3.96-3.18 [.156-.125]	1.07-0.97 [.042-.038]		
---	22	1.24-2.16 [.049-.085]	3.96-3.18 [.156-.125]	0.99-0.89 [.039-.035]	1.57 [.062]	2.29 [.090]
0.50	---	1.24-2.16 [.049-.085]	3.96-3.18 [.156-.125]	1.07-0.97 [.042-.038]		
---	20	1.24-2.16 [.049-.085]	3.96-3.18 [.156-.125]	1.07-0.97 [.042-.038]		
---	18	1.24-2.16 [.049-.085]	3.96-3.18 [.156-.125]	1.22-1.12 [.048-.044]	2.03 [.080]	
---	20	1.85-2.29 [.073-.090]	3.96-3.18 [.156-.125]	1.07-0.97 [.042-.038]		
---	18	1.85-2.29 [.073-.090]	3.96-3.18 [.156-.125]	1.19-1.09 [.047-.043]		
---	16	1.85-2.29 [.073-.090]	3.96-3.18 [.156-.125]	1.40-1.30 [.055-.051]		
---	20	2.16-2.67 [.085-.105]	3.96-3.18 [.156-.125]	1.07-0.97 [.042-.038]	2.03 [.080]	2.54 [.100]
---	18	2.16-2.67 [.085-.105]	3.96-3.18 [.156-.125]	1.19-1.09 [.047-.043]		
---	16	2.16-2.67 [.085-.105]	3.96-3.18 [.156-.125]	1.40-1.30 [.055-.051]		

Figure 2 (End)

3.4. Crimped Contact 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 is shown as it should appear after crimping in Figure 3.

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 in Figure 2.

B. Crimp Length

For optimum crimp effectiveness, the crimp must be within the area shown and must meet the crimp dimensions provided in Figure 3. Effective crimp length shall be defined as that portion of the wire barrel, excluding the bellmouth, fully formed by the crimping tool. Instructions for adjusting, repairing, and inspecting tools are packaged with the tools. See Section 5, TOOLING.

C. Bellmouth

The rear bellmouth shall be evident and conform to the dimensions given in Figure 3.

D. Cutoff Tab

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

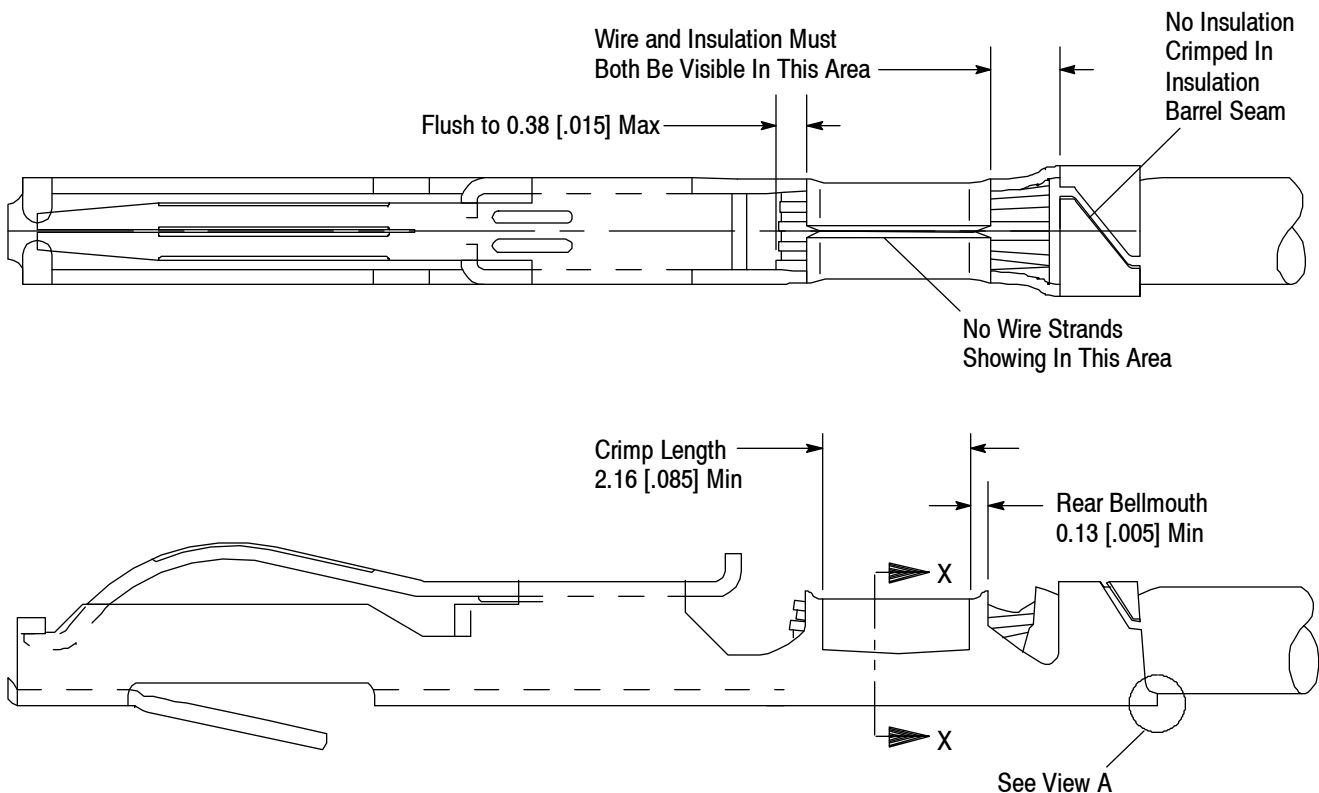


Figure 3 (Cont'd)

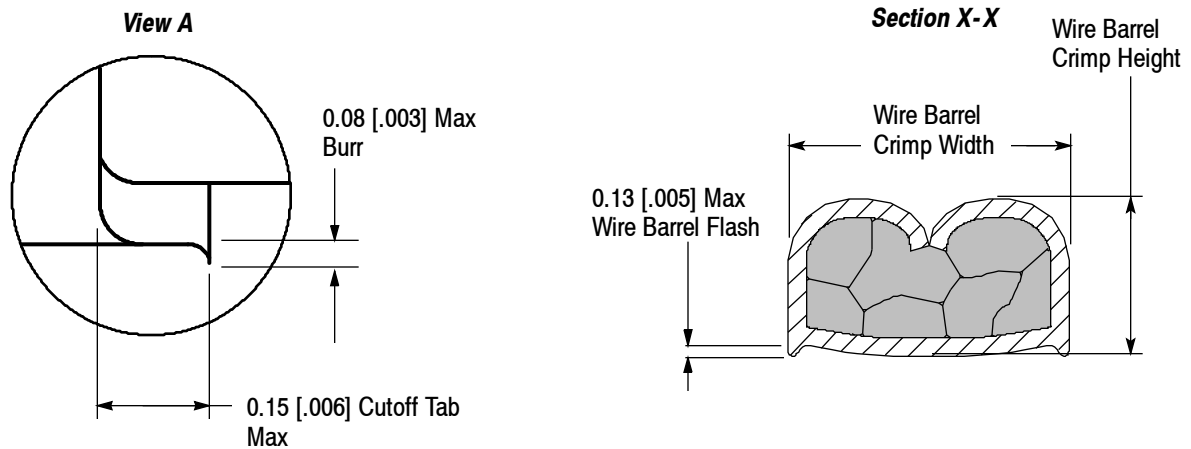


Figure 3 (End)

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 Section X-X.

G. Insulation Barrel Crimp

The insulation barrel shall grip the insulation firmly without cutting into it. Care must be taken to prevent cutting, nicking, or scraping of the insulation. The insulation barrel crimp width must be within the dimensions provided in Figure 2.

H. Wire Location

After crimping, 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 in Figure 3.

J. Wire Barrel Seam

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

K. 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.

L. Locking Lance

The locking lance shall not be deformed in any way.

M. Straightness

The force applied during crimping may cause some bending between the crimped wire barrel and the mating portion of the contact. The contact, excluding the cutoff tab and burr shall be bent below the datum line within the following limits as shown in Figure 4.

3.5. Repair

Contacts are not repairable once a termination has been made. Any defective contact should be removed and replaced with a new one. Refer to Instruction Sheet 408-7529 for contact removal from connectors.

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

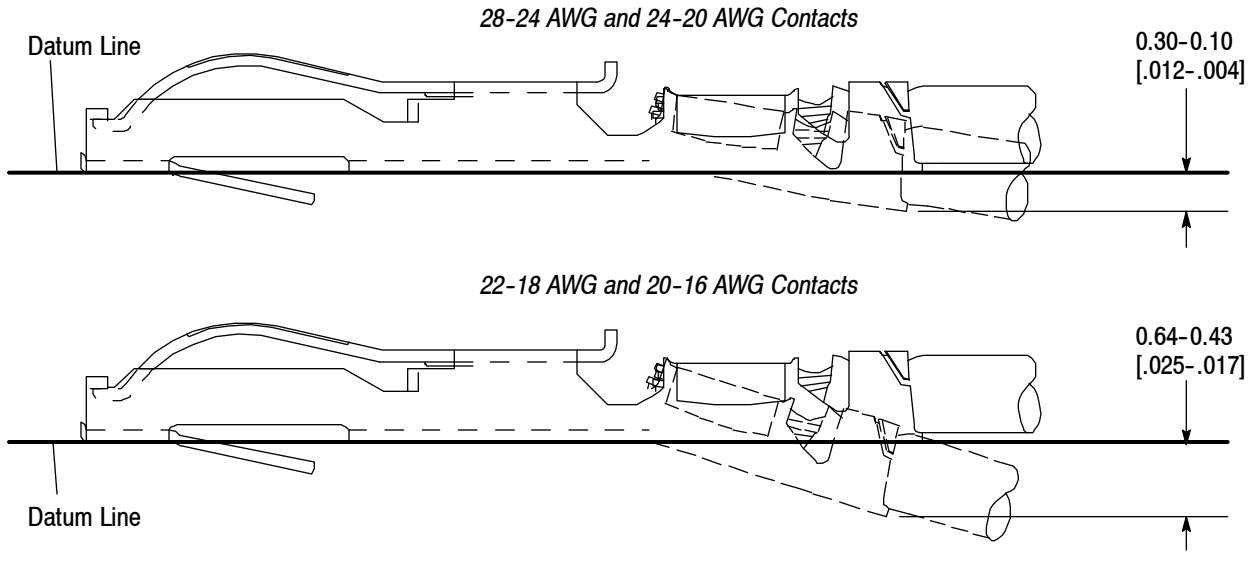



Figure 4

4. QUALIFICATIONS

Twin Leaf contacts do not require any agency approval or certification.

5. TOOLING

Figure 5 provides tool part numbers and instructional material related to wire size.


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

5.1. Hand Crimping Tool

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


5.2. Applicator

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

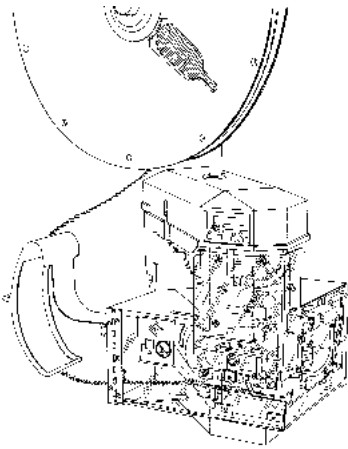
NOTE  Each applicator is shipped with a metal identification tag attached. DO NOT remove this tag or disregard the information on it. Also, a packet of associated paperwork is included in each applicator shipment. This information should be read before using the applicator; then it should be stored in a clean, dry area near the applicator for future reference. Some changes may have to be made to the applicators to run in all related power units. Contact the Tooling Assistance Center number located at the bottom of page 1 for specific changes.

5.3. Power Units

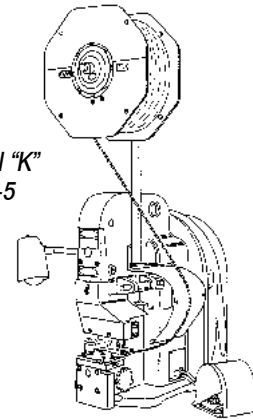
A power unit is an automatic or semi-automatic device used to assist in the application of a product. Power unit includes the power source used to supply the force or power to an applicator.

NOTE  The Model "K" AMP-O-ELECTRIC Terminating Machine PN 565435-5 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.

Automatic Machine Tooling

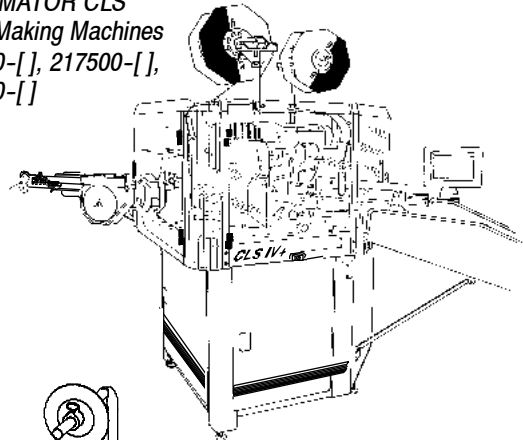


**AMP-O-LECTRIC
Model "G" Terminating
Machine 354500-[]**

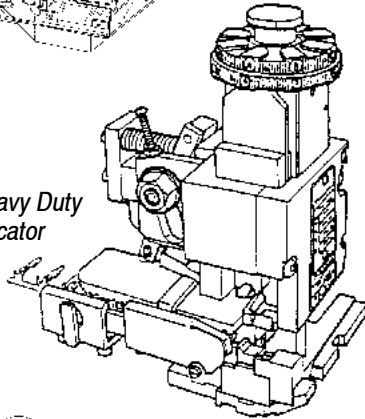


**AMP-O-LECTRIC Model "K"
Terminating Unit 565435-5**

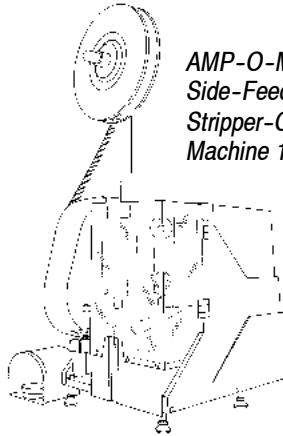
**AMPOMATOR CLS
Lead-Making Machines
122500-[], 217500-[],
356500-[]**



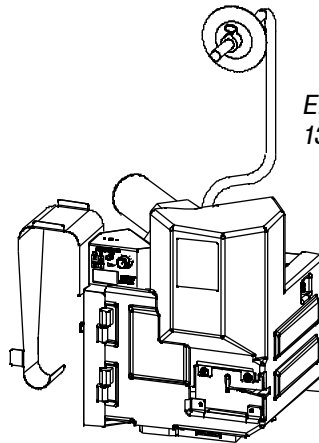
**Typical Heavy Duty
Mini-Applicator**



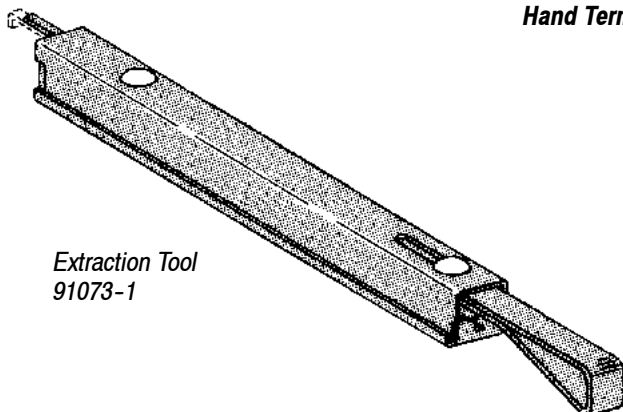
**AMP-O-MATIC
Side-Feed
Stripper-Crimper III
Machine 1320895-[]**



**ELT Machine
1338600-[]**



Hand Termination Tooling



**Extraction Tool
91073-1**

**Typical Hand
Crimping Tool
90268-1,
90264-1,
90272-1,
90285-1**

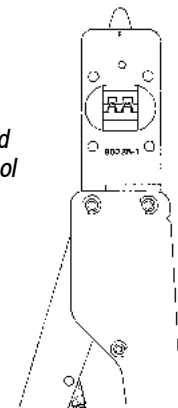


Figure 5 (Cont'd)

WIRE			TOOLING			
SIZE RANGE		INSULATION DIAMETER RANGE	APPLICATOR (DOCUMENT)	POWER UNIT (DOCUMENT)	HAND TOOL (DOCUMENT)	EXT TOOL (DOCUMENT)
mm ²	AWG					
0.20	28-24	0.89-1.40 [.035-.055]	466577-3 (408-8040)	122500-2, -3 (409-5852)	90268-1 (408-7531)	
				217500-[] (409-5866)		
				356500-1, -2 (409-5878)		
			466577-4 (408-8040)	354500-1 (409-5842)		
			466912-1	1320895-1, -3 (409-10012)		
567821-1	1320895-2, -4 (409-10012)					
0.20 0.25 0.30 0.35 0.50	24-20	1.22-1.52 [.048-.060]	466622-1 (408-8040)	122500-2, -3 (409-5852)	90272-1 (408-7556)	
				217500-[] (409-5866)		
				356500-1, -2 (409-5878)		
			466622-2 (408-8040)	354500-1 (409-5842)		
			466622-3 (408-8040)	354500-[] (409-5842)		
			466919-1	1338600-[] (409-10016)		
			567704-1 (408-8040)	1320895-1, -3 (409-10012)		
0.50	22-18	1.24-2.16 [.049-.085]	466713-1 (408-8040)	122500-2, -3 (409-5852)	90264-1 (408-7551)	
				217500-[] (409-5866)		
				356500-1, -2 (409-5878)		
			466713-2 (408-8040)	354500-1 (409-5842)		
			466928-1	1320895-1, -3 (409-10012)		
---	20-16	1.85-2.29 [.073-.090]	567747-1 (408-8040)	122500-2, -3 (409-5852)	90285-1 (408-7583)	
				217500-[] (409-5866)		
				356500-1, -2 (409-5878)		
			567747-2 (408-8040)	354500-1 (409-5842)		
			567747-3 (408-8040)	354500-[] (409-5842)		
			687775-2 (408-8025)	1338600-[] (409-10016)		
---	20-16	2.16-2.67 [.085-.105]	---	---	90285-1 (408-7583)	

Figure 5 (End)

6. VISUAL AID

Figure 6 shows a typical application of a Twin Leaf contacts. 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.

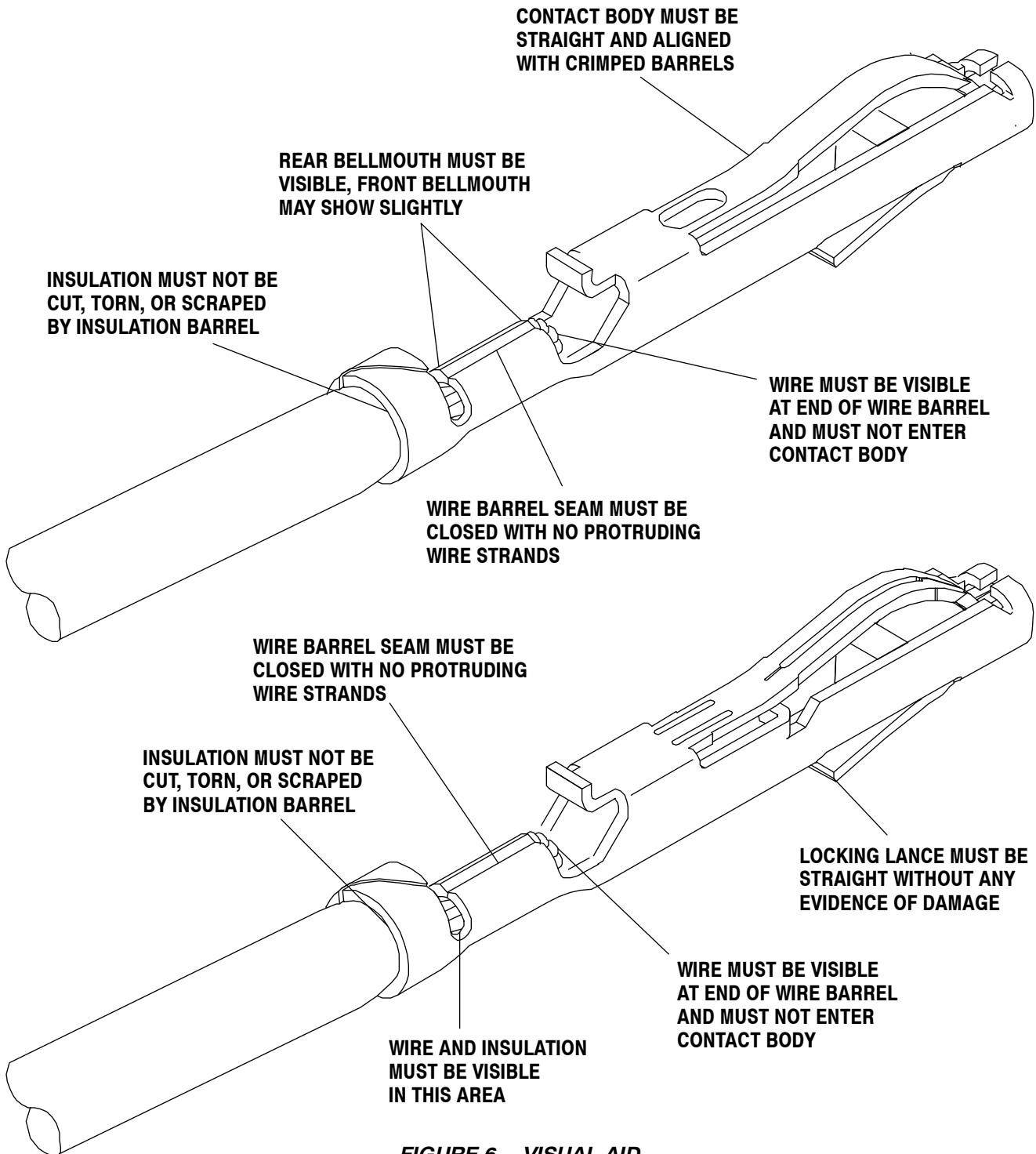


FIGURE 6. VISUAL AID