

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 application specification covers the requirements for application of Shur-Plug .156 Diameter Terminal and Receptacle Contacts. These terminals and contacts have a wire size range of 22 through 12 AWG with an insulation diameter range of 2.16 to 5.33 mm [.085 to .210 in.]. Shur-Plug Terminal and Receptacle Contacts are terminated with automatic machines.

When corresponding with Tyco Electronics 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.

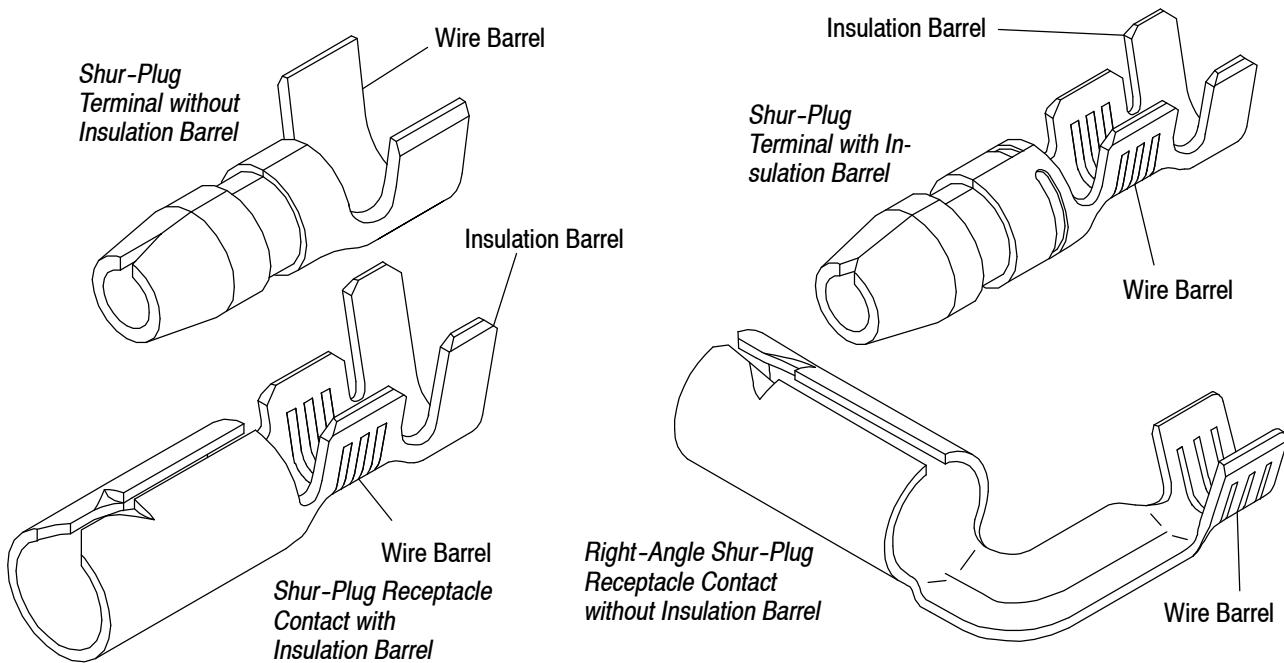


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

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

- Updated document to corporate requirements, new logo and format
- Merged Figures 3 and 4 and renumbered

2.2. Customer Assistance

Reference Part Number 42142 and Product Code 1176 are representative numbers of Shur-Plug .156 Diameter Terminal and Receptacle 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 Tyco Electronics Representative or, after purchase, by calling the Tooling Assistance Center or the Product Information number at the bottom of this page.

2.3. Drawings

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

2.4. Specifications

Product Specification 108-2027 provides test and performance requirements.

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 provides 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 Gaging Die Closure
408-8024	Miniature Quick-Change Applicator (End-Feed Type)
408-8039	HD Miniature Quick-Change Applicators (End-Feed Type)
408-8040	HD Miniature Quick-Change Applicators (Side-Feed Type)
408-8053	Conversion Guide for Miniature Quick-Change Applicators
408-8059	General Preventative Maintenance for Applicators
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-[]
409-5878	AMPOMATOR CLS IV+ Lead-Making Machines 356500-[] and 1213400-[]

3. REQUIREMENTS

3.1. Storage

A. Reeled Contacts

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

B. Shelf Life

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

C. 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	Sulfur	Nitrites	Tartrates

NOTE

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



3.2. Wire Size and Preparation

A. Wire Strip Length

Recommended wire strip lengths for the terminal wire barrels are listed in Figure 2.

WIRE BARREL LENGTH	WIRE STRIP LENGTH	FIXED SPACER BLOCK‡
2.36-2.74 [.093-.108]	3.18 [.125]	3.18 [.125]
2.77-3.58 [.109-.141]	3.96 [.156]	3.96 [.156]
3.61-4.42 [.142-.174]	4.78 [.188]	4.78 [.188]
4.44-5.26 [.175-.207]	5.56 [.219]	5.56 [.219]
5.28-6.10 [.208-.240]	6.35 [.250]	6.35 [.250]
6.12-6.93 [.241-.273]	7.14 [.281]	7.14 [.281]

‡Fixed spacer blocks used to set wire strip lengths in most commercially available wire stripping machines come in 0.79 mm [.031 in.] lengths.

Figure 2

B. Wire Preparation

The contacts will accept a wire size range of 22 to 12 AWG and may be terminated to either stranded or solid wire.

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.

CAUTION

DO NOT nick, scrape, or cut the wire conductor during the stripping operation.

3.3. Crimped Contact Requirements

Crimp contact to wire according to instructions packaged with applicable tooling. Figure 3 shows a typical contact as it should appear after crimping; these requirements apply equally to the socket contact.

CAUTION

When crimping, do not damage wire insulation.



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 contact wire barrel crimp height must be within the area shown in Figure 3.

B. Crimp Length

For optimum crimp effectiveness, the crimp must be within the area shown in Figure 3. 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.

D. Cutoff Tabs

The cutoff tab shall be cut to the dimensions shown.

E. Burrs

The cutoff burr shall not exceed the dimensions shown.

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.

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.

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 impair usage of the contact. See Figure 3.

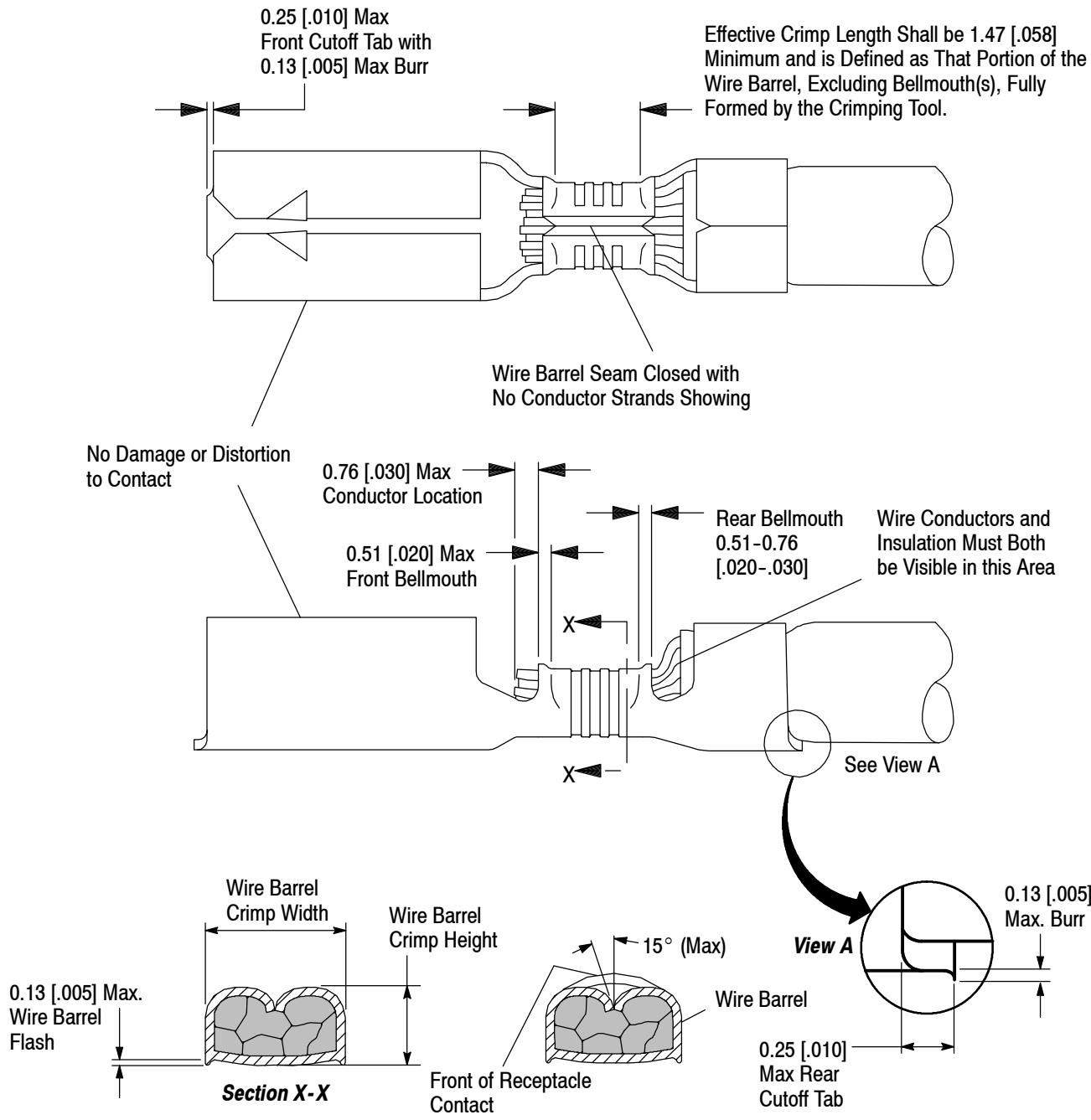


Figure 3

L. Straightness

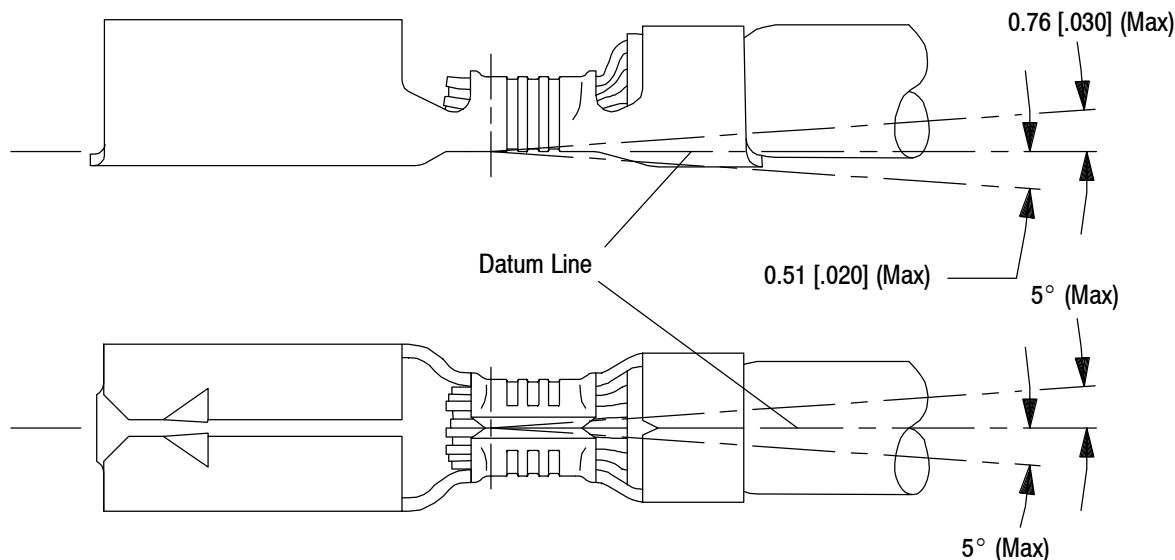
The force applied during crimping may cause some bending between the crimped wire barrel and the mating portion of the contact. Such deformation is acceptable within the limits provided in Figure 5.

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. See Figure 4.

2. Side to Side

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



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

Figure 4

NOTE

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



NOTE

The crimped terminal plug contact shall pass through a 25.4 mm [1.000 in.] long metal tube with an inside diameter of 5.08 mm [.200 in.].



3.4. Contact Repair

Once a terminal or contact has been damaged, it can not be used. It must be cut from the wire and replaced with a new one.

4. QUALIFICATIONS

Shur-Plug .156 Diameter Terminal and Receptacle Contacts are Component Recognized by Underwriters Laboratories, Inc. (UL) in File No. E13288; and Certified by CSA International in Report No. LR7189.

5. TOOLING

This section provides a selection of tools for various application requirements. 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 5.

NOTE

Tyco Electronics Tool Engineers have designed machines for a variety of application requirements. For assistance in setting up prototype and production line equipment, contact Tyco Electronics Tool Engineering through your local Tyco Electronics 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 located at the bottom of page 1 for specific changes.

- **Power Units**

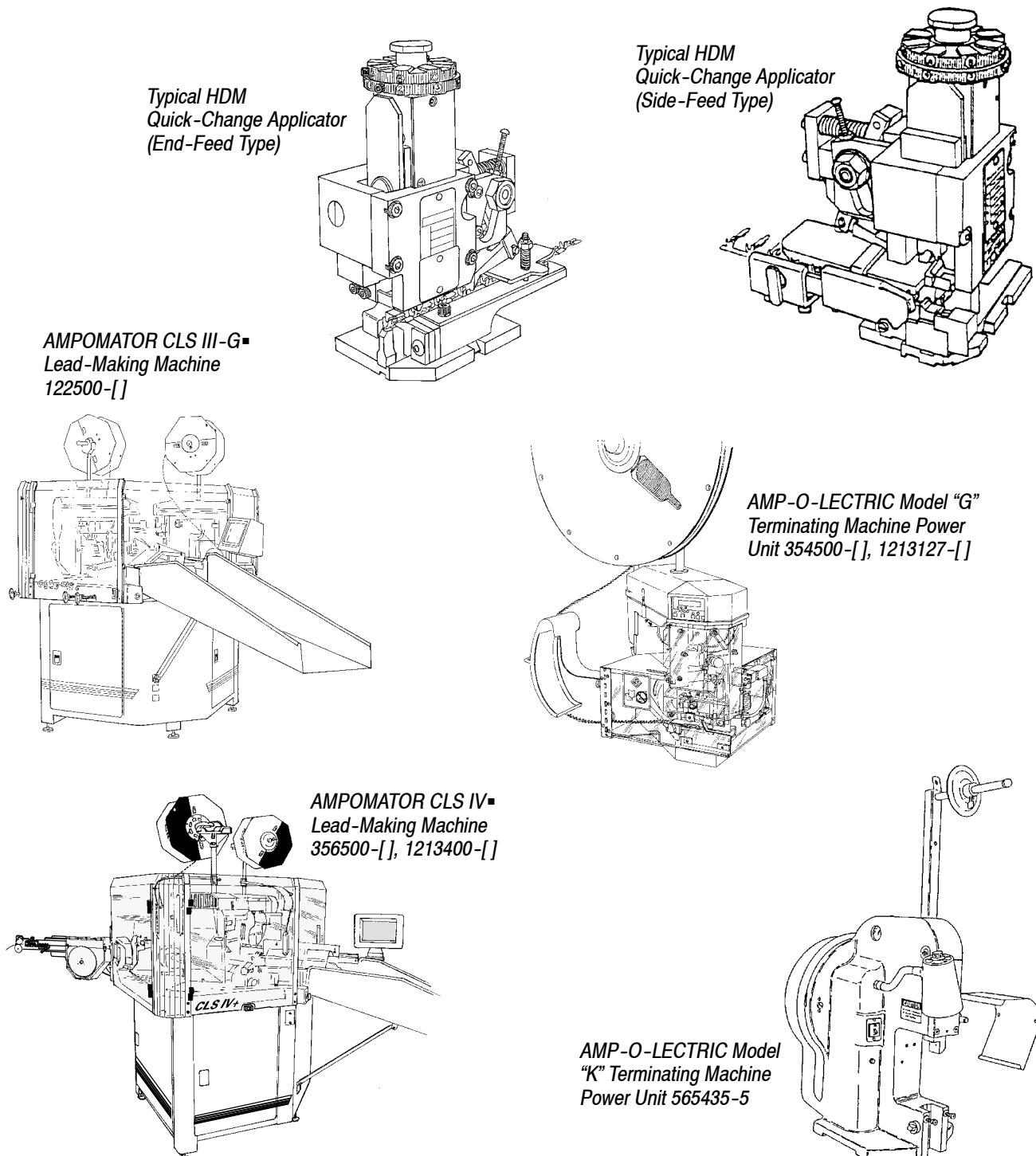
A power unit is an automatic or semi-automatic device used to assist in the application of a product. Power unit includes the power source used to supply the force or power to an applicator.

NOTE

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

WIRE SIZE, AWG	INSULATION DIAMETER	APPLICATOR (DOCUMENT)	POWER UNIT (DOCUMENT)
22-18	2.16-3.18 [.085-.125]	687959-1 (408-8039)	356500-1 (409-5878)
		687959-2 (408-8039)	354500-1 (409-5842) 565435-5 (409-5128)
20-16	2.41-2.92 [.095-.115]	466120-2 (408-8039)	354500-1 (409-5842) 565435-5 (409-5128)
		466436-1 (408-8040)	122500-2, -3 (409-5852) 356500-1, -2 (409-5878) 1213400-1, -2 (409-5878)
		466436-2 (408-8040)	354500-1 (409-5842) 565435-5 (409-5128)
	2.54-3.56 [.100-.140]	466436-3 (408-8040)	354500-[] (409-5842)
		680434-1 (408-8040)	122500-2, -3 (409-5852) 356500-1, -2 (409-5878) 1213400-1, -2 (409-5878)
		680434-2 (408-8040)	354500-1 (409-5842) 565435-5 (409-5128)
		680434-3 (408-8040)	354500-[] (409-5842)
18-14	2.03-3.05 [.080-.120]	466082-2 (408-8039)	354500-1 (409-5842) 565435-5 (409-5128)
		466082-3 (408-8039)	354500-[] (409-5842)
	2.16-5.33 [.085-.210]	466153-2 (408-8039)	354500-1 (409-5842) 565435-5 (409-5128)
	3.18-4.06 [.125-.160]	687423-2 (408-8024)	354500-1 (409-5842) 565435-5 (409-5128)
		687423-3 (408-8024)	354500-[] (409-5842)
	3.3-4.45 [.130-.175]	687914-1 (408-8039)	122500-2, -3 (409-5852) 356500-1, -2 (409-5878) 1213400-1, -2 (409-5878)
		687914-3 (408-8039)	354500-1 (409-5842) 565435-5 (409-5128)
	---	466168-1 (408-8039)	122500-2, -3 (409-5852) 356500-1, -2 (409-5878) 1213400-1, -2 (409-5878)
		466168-2 (408-8039)	354500-1 (409-5842) 565435-5 (409-5128)
(2) 14 or 12	---	680335-1 (408-8039)	122500-2, -3 (409-5852) 356500-1, -2 (409-5878) 1213400-1, -2 (409-5878)
		680335-2 (408-8039)	354500-1 (409-5842) 565435-5 (409-5128)

Figure 5 (cont'd)



NOTE: These applicators and power units are shown for reference only. Contact your Tyco Electronics Representative, or call one of the phone numbers at the bottom of page 1 for availability of all equipment.

Figure 5 (end)

6. VISUAL AID

Figure 6 shows a typical application of Shur-Plug .156 Diameter Terminal and Receptacle 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.

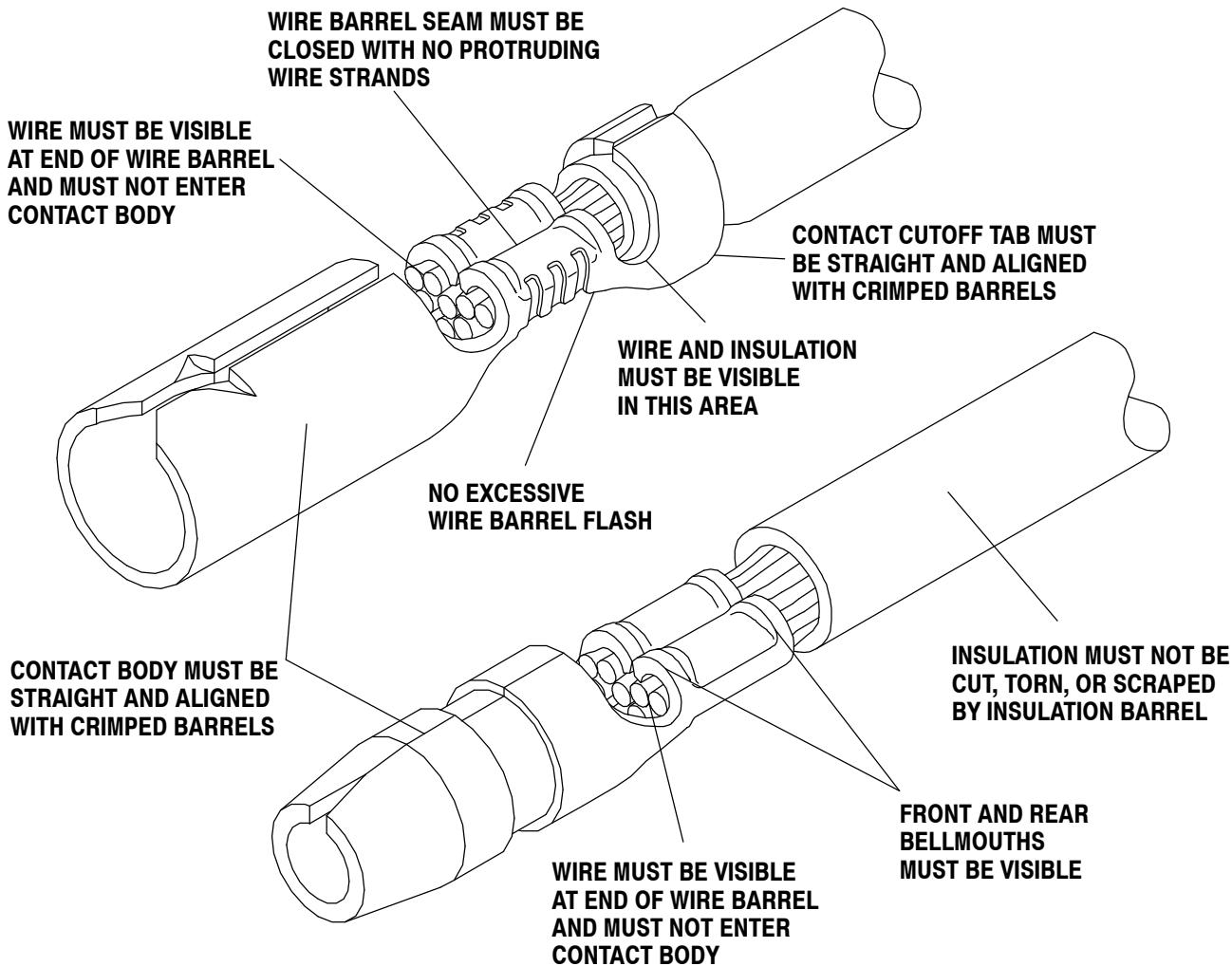


FIGURE 6. VISUAL AID