



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  $\pm 0.13$  [ $\pm 0.005$ ] 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 Type XII Male and Female Contacts. These contacts have a wire size range of 10 through 16 AWG with an insulation diameter range of 3.43 to 5.59 mm [.135 to .220 in.]. Type XII Contacts are terminated with hand held tooling or automatic machines, and are used in various types of connector housings designed with power circuit cavities.

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

*Female*

*Male*

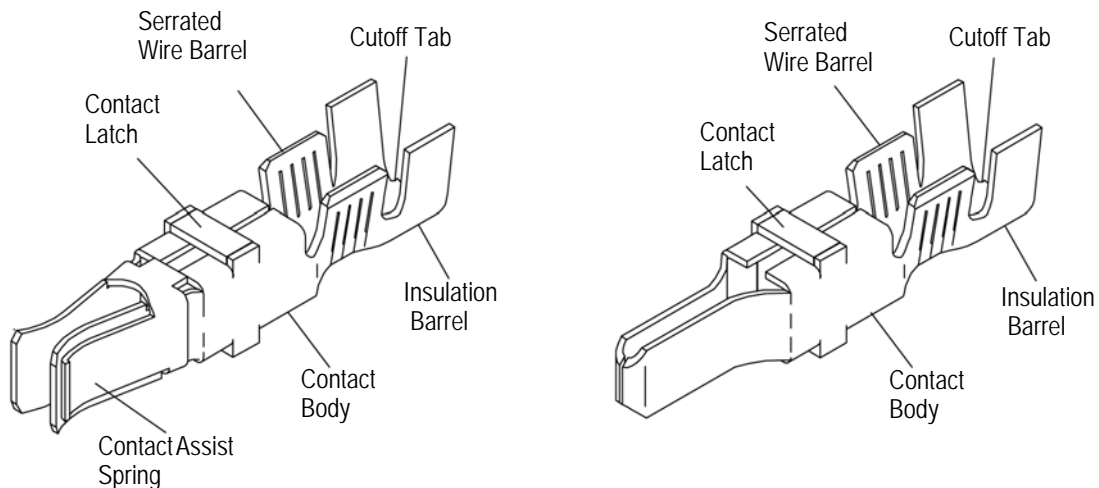


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

Since the previous release of this document, the new company logo was applied.

2.2. Customer Assistance

Reference Part Number 66741 and Product Code 5016 are representative numbers of Type XII 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 company representative or, after purchase, by calling the TOOLING ASSISTANCE CENTER or PRODUCT INFORMATION number at the bottom of this page.

2.3. Drawings

Customer Drawings for specific products are available from this 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 by the company.

## 2.4. Product Specifications

Product Specification 108-10037 provides product performance requirements and test information.

## 2.5. Instructional Specifications

The following list includes available instruction sheets (408-series specifications) that provide assembly procedures for operation, maintenance and repair of tooling; and customer manuals (409-series specifications) that provide setup, operation, and maintenance of machines. A variety of documents for Type XII Contacts are available. Call the PRODUCT INFORMATION number or TOOLING ASSISTANCE CENTER number at the bottom of page 1.

- 408-2095 Hand Crimping Tool 69710-1
- 408-3295 Preparing Reel of Contacts for Applicator Tooling
- 408-4190 C-Head Pneumatic Adapter 318161-[ ]
- 408-4321 Pneumatic CERTI-CRIMP\* Tool Holder 356304-1
- 408-7175 Crimping Die Assemblies 90140-1, 90140-2, 90145-1, and 90145-2
- 408-7276 Extraction Tool 91019-3 for Type XII Contacts
- 408-7424 Checking Contact Crimp Height
- 408-8040 Heavy Duty Miniature Quick-Change Applicators (Side-Feed Type)
- 408-8053 Miniature (Mini) and Quick-Change Applicators
- 408-8059 General Preventative Maintenance for Applicators
- 408-9816 Handling of Reeled Products
- 409-5128 AMP-O-ELECTRIC\* Model "K" Terminating Machine 1-471273-3
- 409-5862 626 Pneumatic Tooling Assemblies 189721-[ ] and 189722-[ ]

## 3. REQUIREMENTS

### 3.1. Storage

The contacts should remain in the shipping containers until ready for use to prevent deformation of the contact. The contacts should be used on a first in, first out basis to avoid storage contamination that could adversely affect current transmission. These contacts have a shelf life of two years from date of manufacture.



*Extra protection should be given to silver plated contacts to minimize tarnishing when exposed to the environment. When loose piece or reeled silver plated contacts are not in use, they should be stored in a plastic bag or other sealed container.*

### 3.2. Wire Selection and Preparation

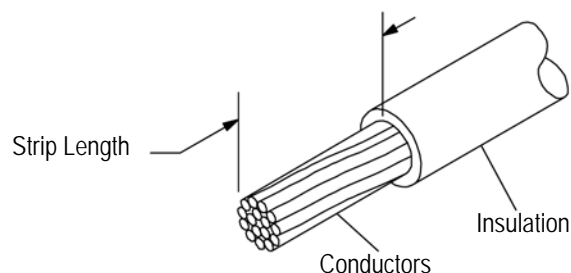
#### A. Wire Type

The contacts will accept copper fused-stranded or stranded conductor wire within the range of 10 through 16 AWG.

#### B. Preparation

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

WIRE SIZE (AWG)	STRIP LENGTH $\pm 0.79$ [ $\pm .031$ ]
10	8.33 [.328]
16-12	7.14 [.28]



Note: Not to Scale

Figure 2



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

### 3.3. 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

### 3.4. Cutoff Tab

Cutoff tabs are the remaining portion of the carrier strip after the contact is cut from the strip. The following dimensional requirements will ensure proper application for these contacts.

1. The cutoff tab must not exceed the dimension shown in Figure 3.
2. The burr resulting from the cutoff tab shearing must not exceed the dimension shown in Figure 3.

### 3.5. Terminating

Select the contact to be crimped for the wire size being used. Crimp the contact according to the instructions packaged with that tooling (refer to Section 5, TOOLING).

### 3.6. Crimped Contact Requirements

#### A. Effective Crimp Length

For optimum crimp effectiveness, the crimp must be within the area shown in Figure 3 and must meet the crimp dimensions provided in the table in Figure 2. Effective crimp length is 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.



*Each crimp dimension represents the functional range of a wire/contact combination. 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.*

#### B. Wire Conductor Location

After crimping, the end of the wire conductor must be flush with or extend 1.27 mm [.050 in.] from the front end of the contact wire barrel. Both the insulation and the conductor must be visible between the insulation barrel and wire barrel. Care must be taken not to allow the wire insulation to be crimped in the wire barrel. Refer to Figure 3.

#### C. Contact Assist Spring

The contact assist spring on female contacts must be straight and not deformed.

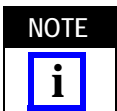
#### D. Wire Barrel Seam

The seam between the two sides of the wire barrel must be completely closed and there must be no evidence of loose wire strands or wire strands visible in the seam.

#### E. Wire Barrel Flash

Wire barrel flash is the formation that may appear on both sides of the wire barrel as the result of the crimping process. It must not exceed the dimension provided in Figure 3.

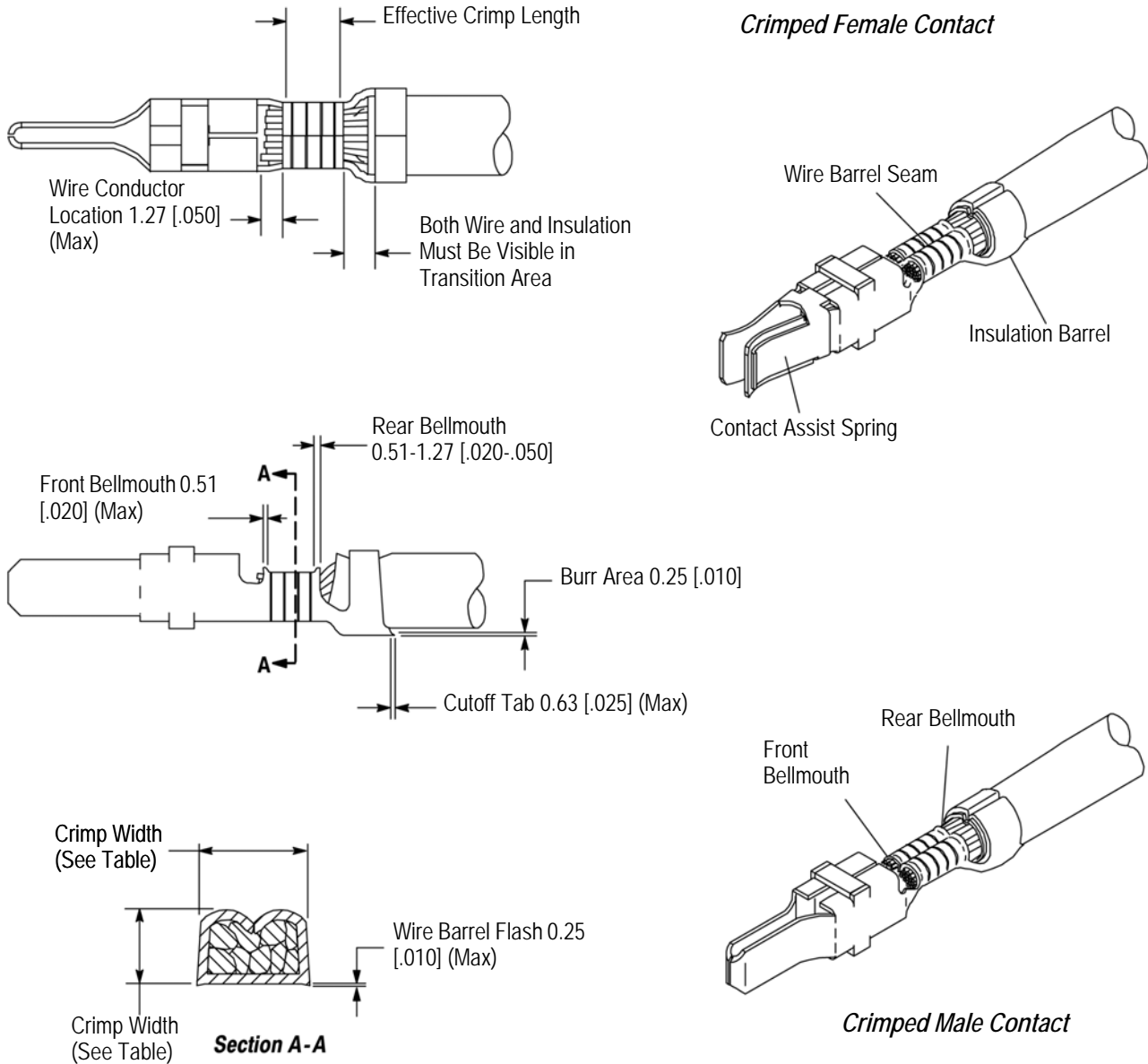
#### F. Wire Barrel and Insulation Barrel Crimp



*The crimp applied to the wire barrel and insulation barrel 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 and insulation barrel height and width must be within the dimensions provided in Figure 3.*

### G. Bellmouths

The rear bellmouth length must be within 0.51 to 1.27 mm [.020 to .050 in.] and the front bellmouth must not exceed 0.51 mm [.020 in.]. Refer to Figure 3.



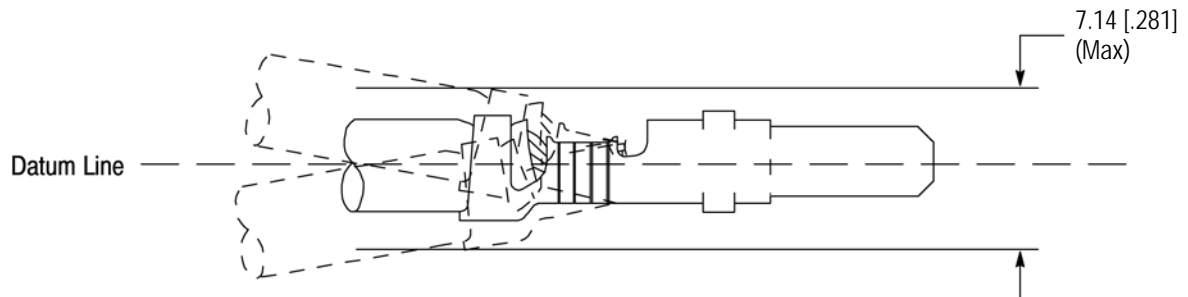
WIRE		CONTACT		
SIZE (AWG)	INSULATION DIAMETER	WIRE BARREL CRIM		INSULATION BARREL CRIMP (Ref)
		HEIGHT	WIDTH	WIDTH
16	3.43-4.06 [.135-.160]	2.08-2.24 [.082-.088]	3.48-3.63 [.137-.143]	5.26-5.41 [.207-.213]
14		2.29-2.44 [.090-.096]		
12		2.18-2.59 [.086-.102]		
10	4.83-5.59 [.190-.220]	2.72-2.92 [.107-.115]	5.26-5.41 [.207-.213]	5.08-5.84 [.200-.230]

Figure 3

**H. Alignment**

- 1) Up and Down -- The crimped portion, including cutoff tab and burr, must not be bent beyond the limits shown in Figure 4.
- 2) Side-to-Side -- The crimped portion must not be bent from one side to the other beyond the limits shown in Figure 4.

*Up and Down Alignment*



*Side-to-Side Alignment*

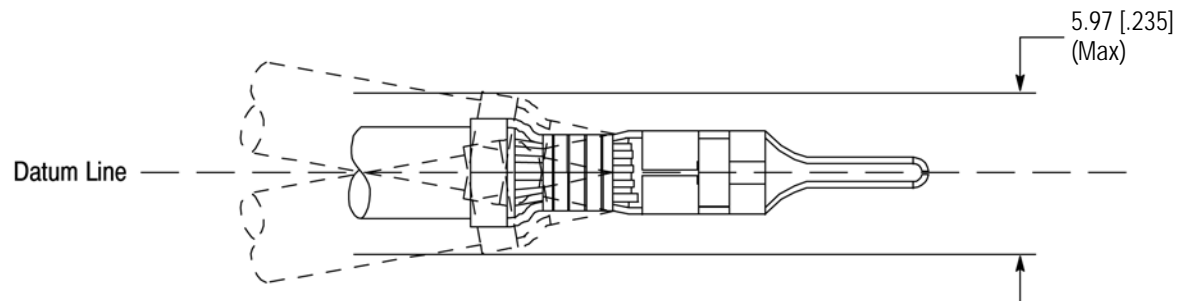


Figure 4

**I. Twist and Roll**

There should be no twist or roll of the wire barrel or mating portion of the crimped contact that would cause overstress or impair usage. See Figure 5.

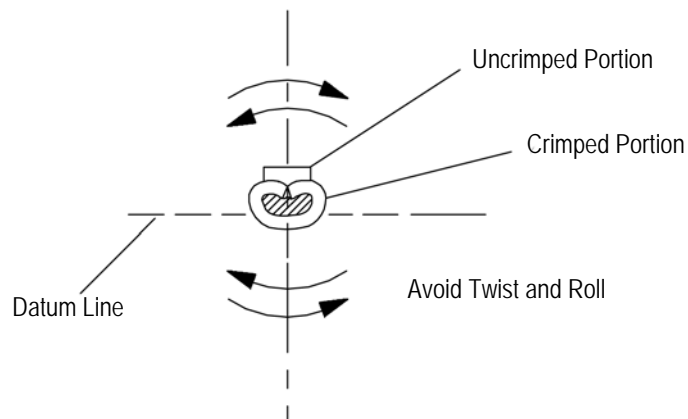


Figure 5

### 3.7. Repair



*Contacts are not repairable once a termination has been made. Any defective contact should be removed and replaced with a new one. Do not reterminate a contact.*

## 4. QUALIFICATION

Type XII Contacts do not require any agency certification.

## 5. TOOLING

Type XII Contacts can be terminated to wire using manual or pneumatic hand held crimping tools or semi-automatic terminating bench mounted machines. The wire size range of the contact will dictate the tooling to use. Once a contact is crimped, it can be inserted into the housing without the use of a tool. An extraction tool has been designed to remove contacts that have been inserted into a housing.

A description, an illustration, a part number, and the instruction material for each tool is provided in the following text and illustration.

### 5.1. Extraction Tool

This tool is designed to release the locking latch of Type XII Contacts from the housing without overstressing the latch.

### 5.2. Die Assemblies

Various die assemblies have been developed to cover the full wire size range for the Type XII Contacts. They are designed to be used in manually and pneumatically operated tools. The wire size range and applicable die assemblies are provided in Figure 6.

### 5.3. Hand Crimping Tool Frame

The hand crimping tool frame features a tool handle frame assembly with a C-head configuration that provides interchangeability of die assemblies. These tools have been designed for prototype and low volume application of loose piece form contacts. A handle frame assembly and a typical crimping die assembly are shown in Figure 6.

### 5.4. 626 Pneumatic Tool System

The pneumatic tool system features a pneumatic power unit, a tool holder assembly, and an adapter. This tool system has been developed to reduce operator fatigue and provides interchangeability of die assemblies. The system has been designed for prototype and medium-volume application of loose piece form contacts. Components for the tool system which includes the C-head adapter for Type XII Contacts are provided in Figure 6.

### 5.5. Semi-Automatic Machine

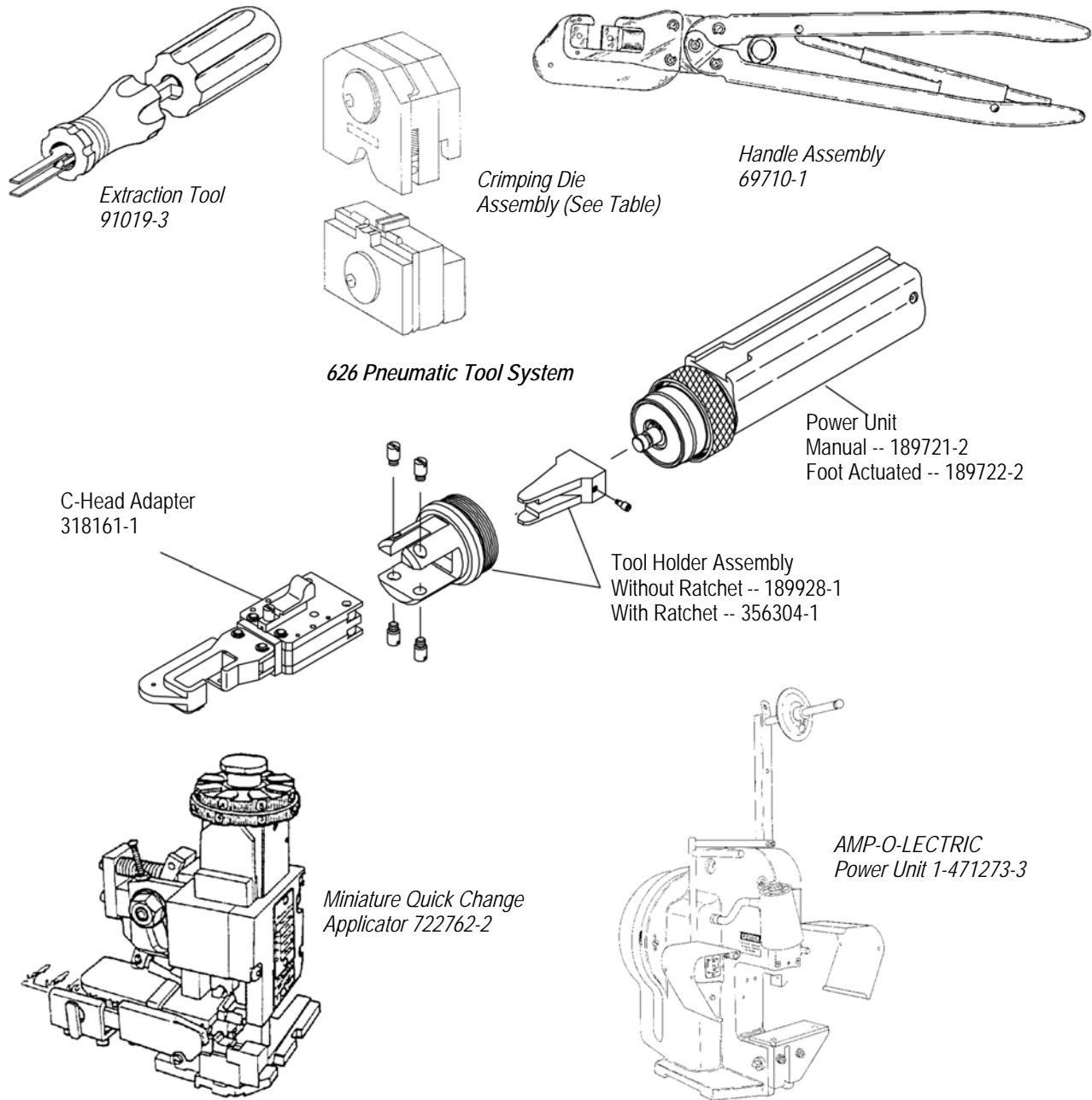
#### A. Applicator

Heavy Duty Quick Change Miniature Applicators have been designed for high-volume production. The applicator is adjustable for the full wire size range of the Type XII Contacts.

#### B. Bench Mount Power Unit

The AMP-O-ELECTRIC power unit is designed for terminating pre-stripped wires to reel-fed contacts. It is designed to be bench mounted and used for high volume applications.

Type XII Contacts are designed to be crimped with application tools according to the instructional material packaged with the tools. The recommended tools and instructional materials are provided in Figure 6.



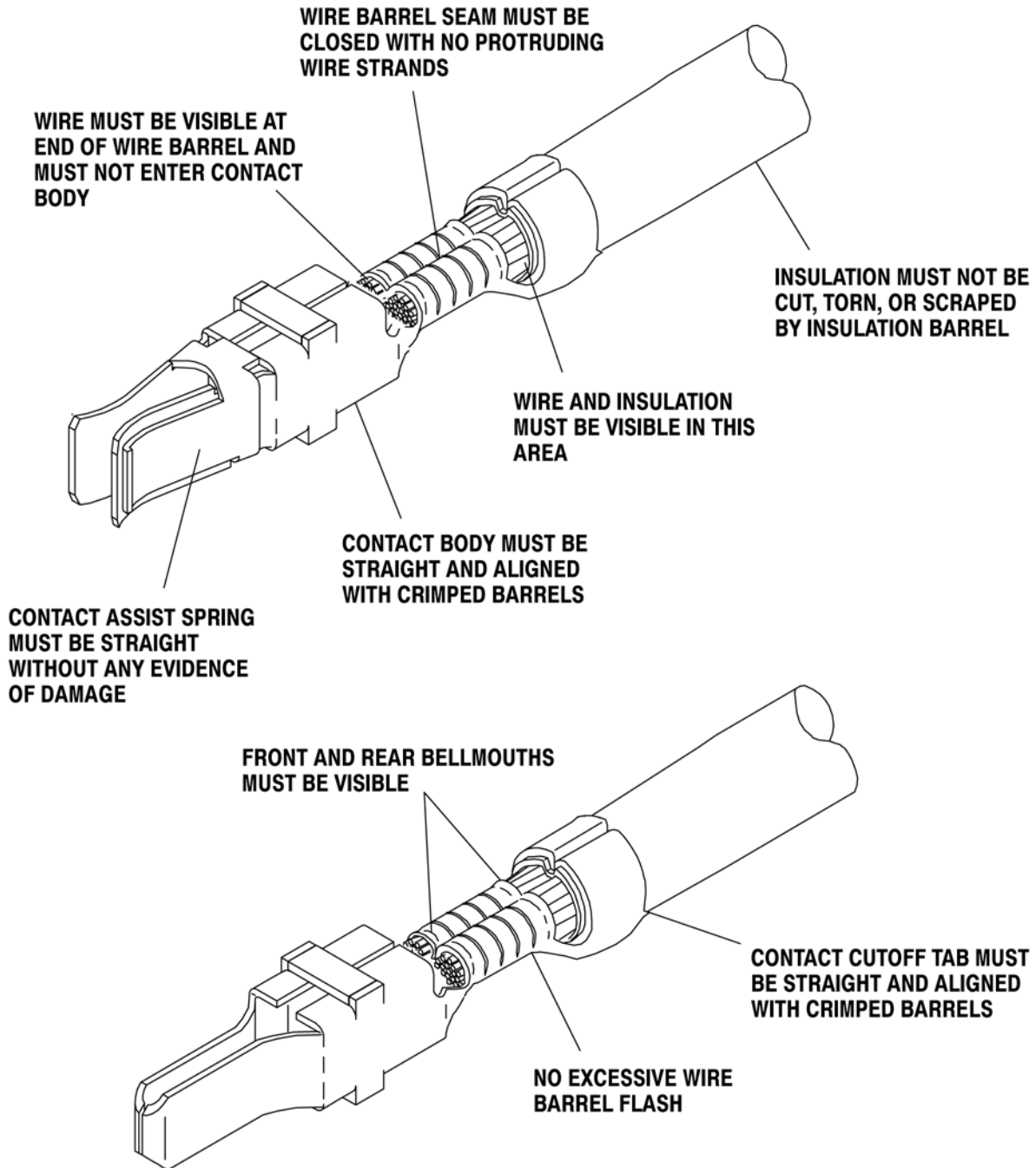
WIRE SIZE (AWG)	TOOLING (DOCUMENT)					
	CRIMPING DIE ASSEMBLY (408-7175)	HAND TOOL FRAME (408-2095)	APPLICATOR (408-8040)	POWER UNIT (409-5128)	626 PNEUMATIC TOOLING SYSTEM	EXTRACTION TOOL (408-7276)
10	90140-1 90140-2	69710-1	722762-2	1-471273-3	See Above	91019-3
16-14	90145-2					
14-12	90145-1					

Figure 6



## 6. VISUAL AID

Figure 7 shows typical application of Type XII 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 7. VISUAL AID**