



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 mm [$\pm .005$ in.] 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 Ultra-Pod Positive Lock Fully Insulated Receptacles. The nylon 6/6 insulated housings on these receptacles provide protection from short circuits and shock hazard. The Positive Lock receptacles they house are designed for use in 600-volt applications.

These products use Series 187 MK III and Series 250 MK III Positive Lock Receptacle Connectors. Both series contacts are designed to accept 18-14 AWG. The contacts are designed to be mated with tabs containing holes for greater locking force. Internal serrations in the F-Crimp wire barrel provide a high level of reliability. Automatic or semi-automatic machines terminate these assemblies.

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

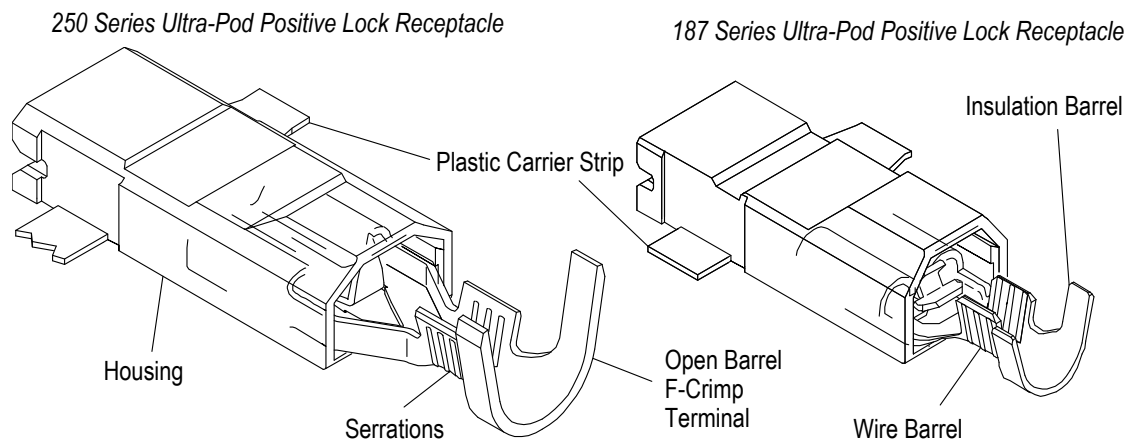


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

- Updated document to corporate requirements
- Changed Tyco Electronics to TE Connectivity or TE in all instances

2.2. Customer Assistance

To ensure consistent and high-quality terminations, TE Connectivity (TE) product engineering has analyzed and tested the design factors of numerous terminal crimp connections with varying wire ranges defined by the terminals. As a result, TE product engineering has defined five criteria necessary to achieve a reliable crimp: be sure to 1) use the TE product only for an application it was designed for, 2) always use the TE recommended application tooling, 3) use an appropriately selected and prepared wire, 4) adhere to the application specification described in the associated TE product print and application documentation (such as the TE 114-Application Specification, and TE Applicator “Log Sheet” print), and 5) have the product handled by trained operators only. TE product performance according to TE product specification can be achieved using the methods described in this application specification with the use of the recommended, properly maintained tooling and applicator.

If tooling or termination equipment is used other than what is recommended by TE, where such tooling or equipment was not used for agency validation and/or the product qualification process, TE does not make any representation or warranty, expressed or implied, and disclaims liability for non-performance per TE product specification. Customer accepts the sole responsibility for the evaluation, application, and use of the terminals in such circumstances.

Reference Product Base Part Number 521213 and Product Code A345 are representative of Ultra-Pod Positive Lock Fully Insulated Receptacles. Use of these numbers will identify the product line and help you to obtain product and tooling information. Such information can be obtained through a local TE Representative, by visiting our website at www.te.com, or by calling PRODUCT INFORMATION or the TOOLING ASSISTANCE CENTER at the numbers at the bottom of page 1.

2.3. Drawings

Customer Drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the Customer Drawings and this specification or with any other technical documentation supplied by TE, the information contained in the Customer Drawings takes priority.

2.4. Specifications

Underwriters Laboratories, Inc. (UL) Specification UL-310 covers test data and performance requirements.

2.5. Instructional Material

The following is a list of Instructional Documents (408 Series) that provide assembly procedures for product, operation, maintenance and repair of tooling, as well as setup and operation procedures of applicators; and Machine 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 or Gaging Die Closure
408-8053	Conversion Guide For Miniature Quick-Change Applicators
408-8095	Miniature Quick-Change Applicators 680878 and 680879
408-9725	250 Series Straight Manual Insertion Tool
408-9728	Insertion Tool 314920-1 for Ultra-Pod Fully Insulated FASTON* Receptacles
408-9816	Handling of Reeled Products
409-5128	AMP-O-LECTRIC* Model "K" Machine
409-5842	AMP-O-LECTRIC Model "G" Terminating Machine 354500-[]
409-5852	AMPOMATOR* CLS III-G Lead-Making Machines 122500-[]
409-5878	AMPOMATOR CLS IV+ Lead-Making Machines 356500-[] and 1213400-[]

3. REQUIREMENTS

3.1. Storage

A. Ultraviolet Light

Prolonged exposure to ultraviolet light will attack and break down the nylon used in the receptacle housing.

B. Reel Storage

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

C. 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.

D. Chemical Exposure

Do not store contacts near any chemical listed below as stress corrosion cracking may occur.

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.

3.2. Wire and Receptacle Selection

A. Special Characteristics

Positive Lock Receptacles are designed with reduced mating forces and a flexible locking dimple. This unique locking feature acknowledges proper mating with an audible mechanical • snap" of the dimple into the hole in the mating tab. The locking feature enhances safety and reliability of the connection for isolated and hard-to-reach areas. The mating tab must have a hole in order for the receptacle to effectively mate to the tab.

B. Receptacle Selection

The basic criteria for choosing a receptacle are the width (Series) and the thickness of the tab it is to mate with. Contact your local TE Representative for information regarding currently available receptacle choices.

C. Wire Selection



NOTE

For a specific listing of Ultra-Pod Positive Lock Fully Insulated Receptacles which will accept wire insulation ranges categorized by terminal type, size and wire applied, refer to the table in Figure 2.

3.3. Wire Preparation

Strip the wire insulation according to the dimension provided in Figure 2.



CAUTION

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

TERMINAL WIRE SIZE RANGE, AWG	INSULATION DIAMETER	STRIP LENGTH ±0.38 [±.015]	WIRE APPLIED			WIRE BARREL CRIMP		MINIMUM TENSILE STRENGTH (NEWTONS [LBS])
			QTY	CMA	REFERENCE SIZE (AWG)	WIDTH (REF)	HEIGHT ±0.05 [±.002]	
250 SERIES STRIGHT RECEPTACLES								
18-14	2.79-4.57 [.110-.180]	4.7 [.185]	1	1600	18	2.29 [.090]	1.68 [.066]	89 [20]
			1	2600	16		1.88 [.074]	133.4 [30]
			1	4100	14		2.13 [.084]	222.4 [50]
			1 ea	700, 1600	22, 18		1.80 [.071]	35.6 [8]
			1 ea	1000, 1600	20, 18		1.88 [.074]	57.8 [13]
			2	1600	18		1.98 [.078]	89 [20]
			2	1000	20		1.78 [.070]	57.8 [13]
			1 ea	1000, 2600	20, 16		2.06 [.081]	57.8 [13]
1 ea	700, 2600	22, 16	1.98 [.078]	35.6 [8]				
187 SERIES STRAIGHT RECEPTACLES								
18-14		4.06 [.160]	1	1600	18	2.29 [.090]	1.52 [.060]	89 [20]

2.79-4.57 [.110-.180]		1	2600	16	2.29 [.090]	1.70 [.067]	133.4 [30]
		1	4100	14		1.98 [.078]	222.4 [50]
		1 ea	1000, 1600	20, 18	2.29 [.090]	1.70 [.067]	57.8 [13]
		2	1000	20		1.60 [.063]	57.8 [13]
		1 ea	700, 1600	22, 18		1.65 [.065]	35.6 [8]
		2	1600	18		1.83 [.072]	89 [20]
		1 ea	1000, 2600	20, 16		1.91 [.075]	57.8 [13]
		1 ea	700, 2600	22, 16		1.83 [.072]	35.6 [8]

Figure 2

3.4. Crimped Terminal Requirements

Locate the terminal to be crimped in the appropriate tooling according to the instructions packaged with that tooling. See Section 5, TOOLING. Perform the crimping operation. Figure 3 shows typical terminals, as they should appear after crimping. The table in Figure 2 lists proper crimp dimensions and tensile strengths, arranged by terminal type and wire criteria.



CAUTION

Terminal insulation shall NOT be cut or broken during the crimping operation. Exercise of reasonable care by tooling operators should be sufficient to provide undamaged terminations.

A. Crimp Height

The crimp applied to the wire portion of the terminal is the most compressed area and is most critical in ensuring optimum electrical and mechanical performance of the crimped terminal. 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 in Figure 3. 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.



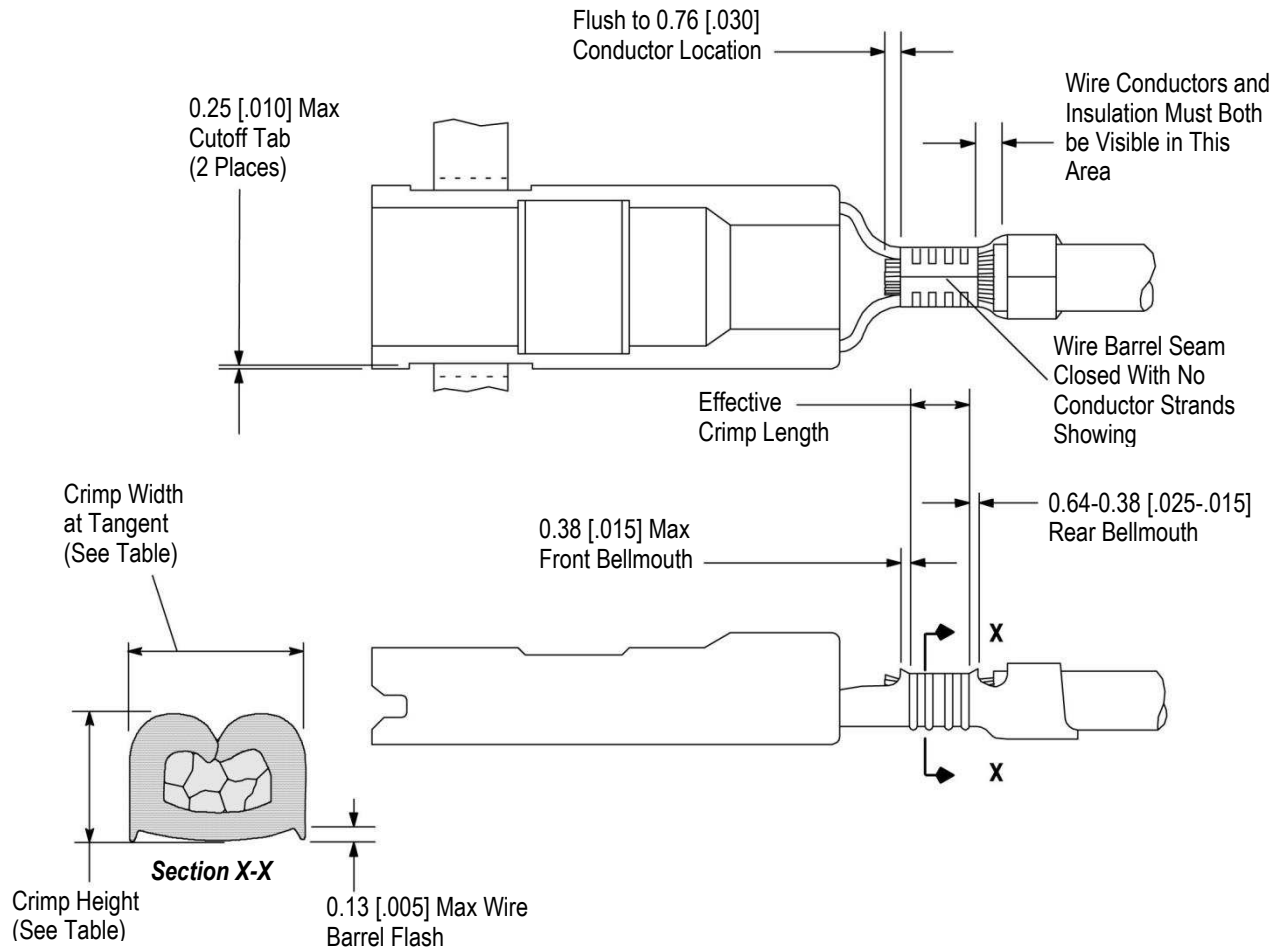
NOTE

The effective crimp length is given for tooling design only, and should not be used for inspection criteria.

C. Bellmouths

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

Figure 3



D. Cutoff Tab

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 in Section X-X.

G. Wire Location

After crimping, the wire conductor and insulation must be visible in the transition area between the wire and insulation barrels as shown in Figure 3.

H. Conductor Location

The conductor may extend beyond the wire barrel to the maximum shown in Figure 3.

I. Wire Barrel Seam

The wire barrel seam must be closed with no evidence of loose wire strands visible in the seam as shown in Figure 3.

J. Twist and Roll

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

3.5. Terminal Alignment and Housing Retention

A. Terminal Alignment

The crimped terminal shall not be deformed or damaged in a manner preventing full insertion into its housing. There shall be no twist or roll in the contact portion of the terminal that will prevent it from mating properly.

B. Housing Retention

Terminals must be straight within the limits shown in Figure 4. When seated in housing, the back edge of the receptacle rolls must be fully seated past the integral retention feature. See Figure 6C. Test for proper seating by pulling lightly in a direction opposite insertion.

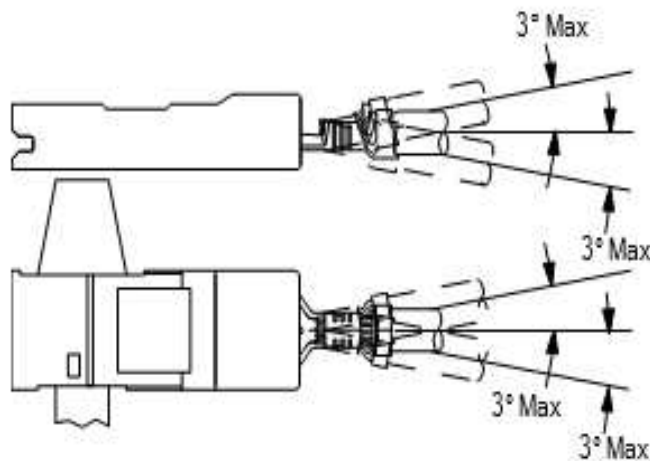
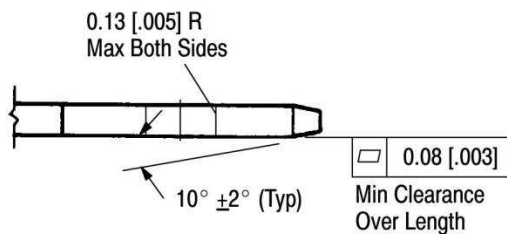
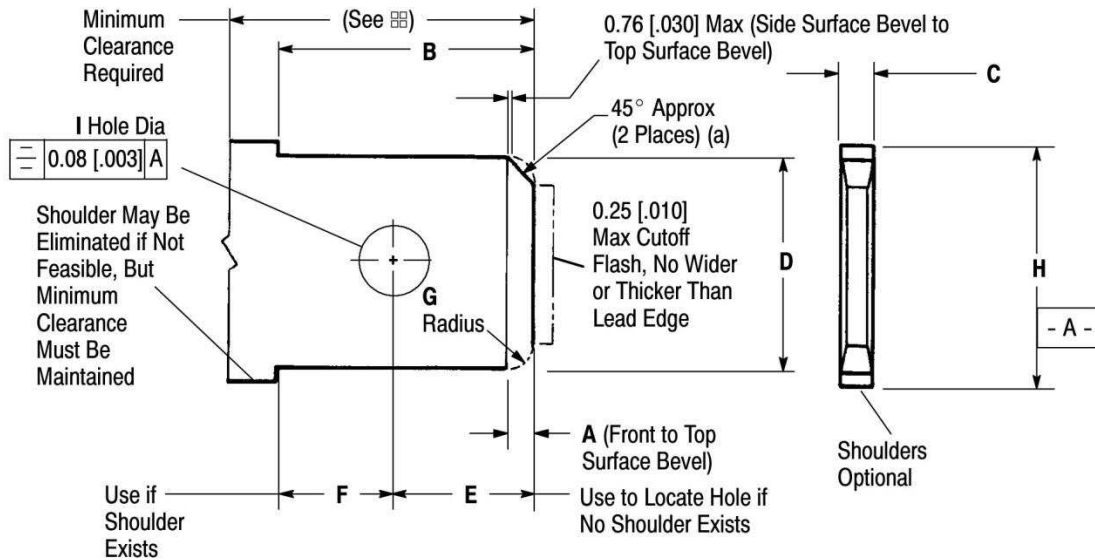


Figure 4

3.6. Mating Tab Dimensions

Figure 5 shows features and dimensional requirements for tab terminals intended for mating with Series 187 and 250 Ultra-Pod Positive Lock Receptacle Contacts. The mating portion of the tab and clearance for applicable housings shall be manufactured to the dimensions shown in Figure 5.



☒ Min Clearance:
 Series 187: 7.62 [.300] W/Housing
 Series 250: 9.91 [.390] W/Housing

TAB SIZE	A ± 0.13 [.005]	B ± 0.13 [.005]	C ± 0.03 [.001]	D ± 0.08 [.003]	E ± 0.20 [.008]	F ± 0.08 [.003]	G ± 0.51 [.020]	H (MIN)	I DIA
6.35 x 0.81 [.250 x .032]	1.02 [.040]	7.92 [.312]	0.81 [.032]	6.35 [.250]	4.52 [.178]	3.40 [.134]	1.27 [.050]	8.26 [.325]	1.65-2.03 [.065-.080]
4.75 x 0.51 [.187 x .020]	1.02 [.040]	6.35 [.250]	0.51 [.020]	4.75 [.187]	3.18 [.125]	3.18 [.125]	1.14 [.045]	5.41 [.213]	1.27-1.52 [.050-.060]
4.75 x 0.81 [.187 x .032]	1.02 [.040]	6.35 [.250]	0.81 [.032]	4.75 [.187]	3.18 [.125]	3.18 [.125]	1.14 [.045]	5.41 [.213]	1.27-1.52 [.050-.060]

NOTE: (a) Bevel need not be a straight line if within confines as shown, or a radius of G ±0.51 [.020] may be substituted.

NOTE: Dimensional measurements shall not include plating, burrs, or flatness tolerance.

Figure 5

3.7. Mating Overcycle and Testing

A. Mating/Unmating Cycles

The rolled shape of the Ultra-Pod Positive Lock Fully Insulated Receptacles determines the contact mating force. This design is NOT intended for a high number of mating cycles over the life of the product. Therefore, the maximum number of mating cycles (matings/unmatings) recommended is ten (10).



NOTE

Testing may be done using a gage as described in UL-310. Test tabs shall be dimensioned as shown in Figure 5 except that the “C” dimension shall have a tolerance of ± 0.008 mm [± 0.0003 in.] for brass tabs (± 0.013 mm [± 0.0005 in.] for steel) and raised plateaus around detents shall be limited to a total of 0.03 mm [.001 in.] for both sides.

3.8. Assembly/Disassembly Procedures

A. Assembling Connector

The receptacle contact is inserted into the back of the connector until it bottoms. The contact is held in place by an integral contact retention latch designed inside the housing to prevent the contact from backing out. See Figure 6C. The contact is designed with a flexible locking dimple, which acknowledges proper mating with an audible mechanical “snap” of the dimple into the hole in the mating tab. See Figure 6A.

B. Disassembling Connector

To release the lock, the release latch must be depressed. This is accomplished either with a thumb (Figure 6B), or a cam surface (Figure 6C and D), inside the housing. Unless the release latch is depressed either manually or with the optional designated area of the housing, the receptacle cannot be removed from the housing without damage force being applied.

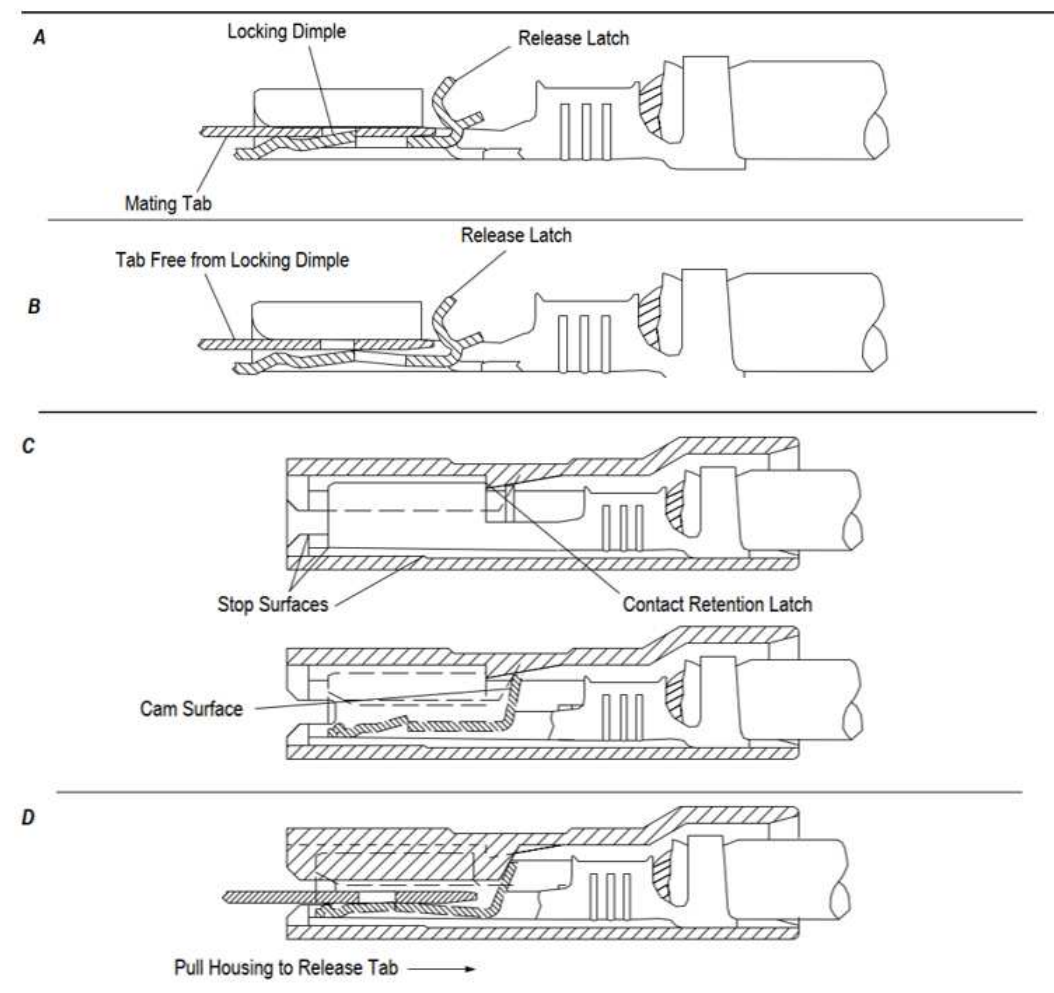


Figure 6

3.9. Repair/Replacement

Damaged crimped contacts or housings must be removed, discarded, and replaced with new components.

4. QUALIFICATIONS

Series 187 and 250 Ultra-Pod Positive Lock Fully Insulated Receptacle Connectors are Recognized by Underwriters Laboratories Inc. (UL) in File No. E66717; and Certified by the CSA International in Report LR7189-233. They are also being evaluated by VDE for possible Certification to Registration 5193.

5. TOOLING

Figures 7 and 8 provide tool part numbers and instructional material related to product and wire size. Product is applied using automatic tooling only. Contact the Tooling Assistance Center or the Product Information number listed at the bottom of page 1 for applicator information about product offerings not currently covered in the table.



NOTE

TE Tool 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 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.

Application tooling crimps the receptacle, and then inserts it into its housing. In order to check crimp measurements the toggle valve switch on the applicator must be properly positioned so that insertion will not automatically take place. Refer to the applicator instruction sheet packaged with the applicator for instructions. After checking measurements, use the appropriate insertion tool, listed in Figure 8, to manually insert the receptacle into its housing.



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.



NOTE

During manual insertion, lift up on the rear of the crimped receptacle when inserting it into its housing. This enables it to slide fully past the internal retention feature of the housing (maximum 12-lb insertion force).



CAUTION

Extreme care must be taken to apply the insertion force along the bottom plane of the receptacle. Applying the force at an angle will cause the terminal to bend.

TERMINAL TYPE	INSERTION TOOL
250 Series Straight Receptacle	314916 (408-9725)
187 Series Straight Receptacle	314920 (408-9728)

Figure 7

• **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.

• **Insertion Tools**

Insertion Tools are designed for contact insertion into a housing after being crimped to the wire. They are designed to stabilize the contact during insertion.

SERIES SIZE	WIRE SIZE, AWG	INSULATION DIA	APPLICATOR (408-8095)	POWER UNIT (DOCUMENT)
187	18-14	2.79-3.56 [.110-.140]	680878-1	122500-2 (409-5852)
				122500-3 (409-5852)
				356500-1 (409-5878)
				356500-2 (409-5878)
			680878-2	354500-1 (409-5842)
				565435-5 (409-5128)
		680878-3	354500-[] (409-5842)	
		3.56-4.57 [.140-.180]	680878-4	122500-2 (409-5852)
				122500-3 (409-5852)
				356500-1 (409-5878)
				356500-2 (409-5878)
			680878-5	354500-1 (409-5842)
565435-5 (409-5128)				
187	18-14	3.56-4.57 [.140-.180]	680878-6	354500-[] (409-5842)
250	18-14	2.79-3.56 [.110-.140]	680879-1	122500-2 (409-5852)
250	18-14	2.79-3.56 [.110-.140] 3.56-4.57 [.140-.180]	680879-1 680879-2	122500-3 (409-5852)
				356500-1 (409-5878)
				356500-2 (409-5878)
				354500-1 (409-5842)
			680879-2	565435-5 (409-5128)
				680879-3
			680879-4	122500-2 (409-5852)
			3.56-4.57 [.140-.180]	680879-4 680879-5
		356500-1 (409-5878)		
		356500-2 (409-5878)		
		354500-1 (409-5842)		
		680879-5 680879-6		565435-5 (409-5128)
				354500-[] (409-5842)

Figure 8 continued

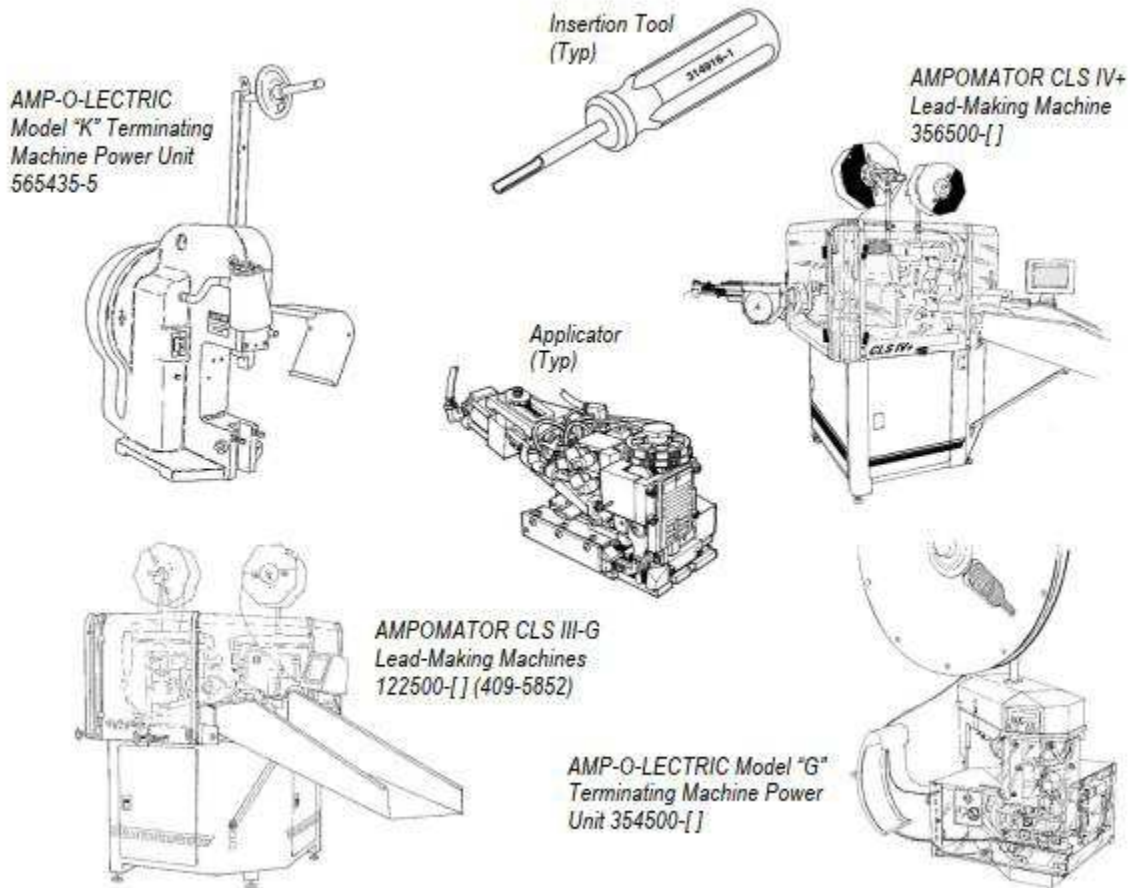


Figure 8 end

6. VISUAL AID

The illustration below shows a typical application of .an Ultra-Pod Positive Lock Fully Insulated Receptacle. 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.

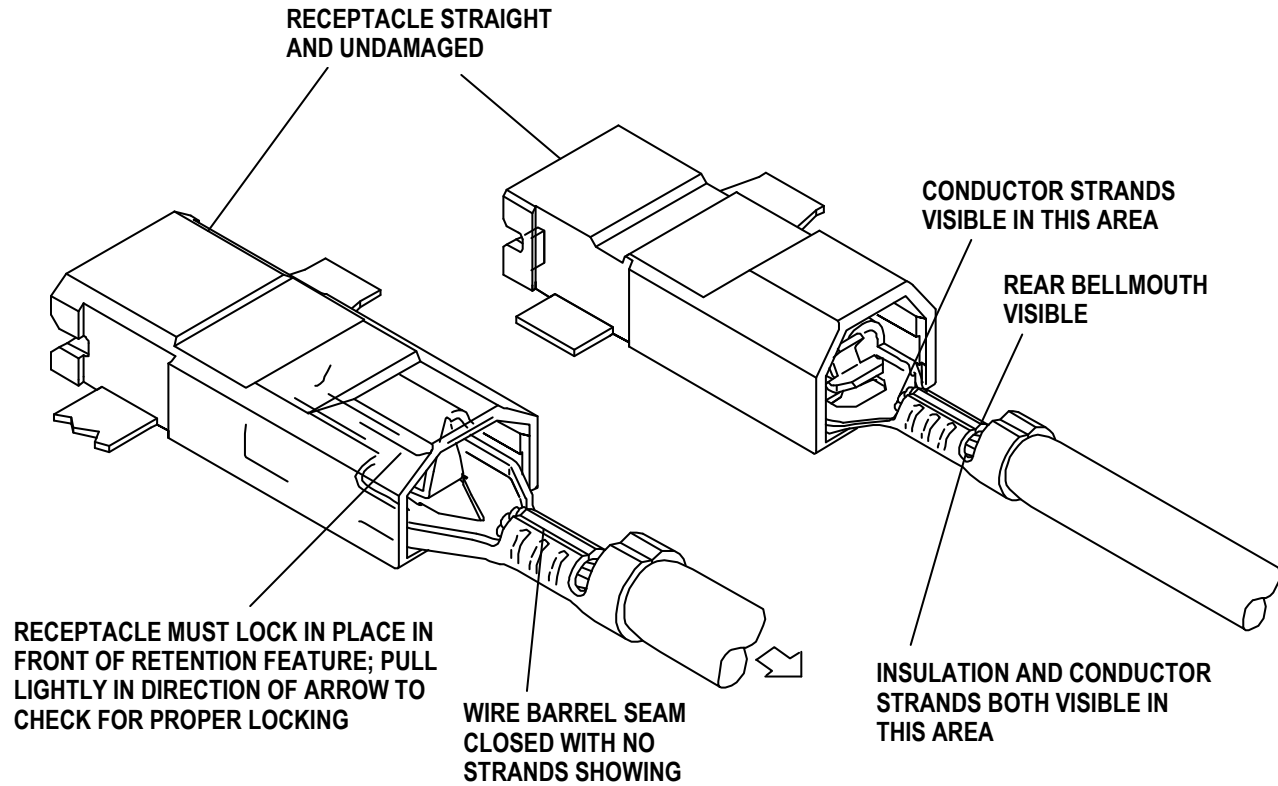


FIGURE 9. VISUAL AID