

**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  $\pm 0.13$  [ $\pm 0.005$ ] 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 Ultra-Pod FASTON Fully Insulated Receptacles and Tabs. The nylon insulated housings on these receptacles provide protection from short circuits and shock hazard. The FASTON receptacles they house are designed for use in 600 volt applications and have an operating temperature of  $-40^\circ\text{C}$  to  $105^\circ\text{C}$  [ $-40^\circ\text{F}$  to  $221^\circ\text{F}$ ]. Internal serrations in the F-Crimp wire barrel provide a high level of reliability.

When corresponding with TE Connectivity 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.

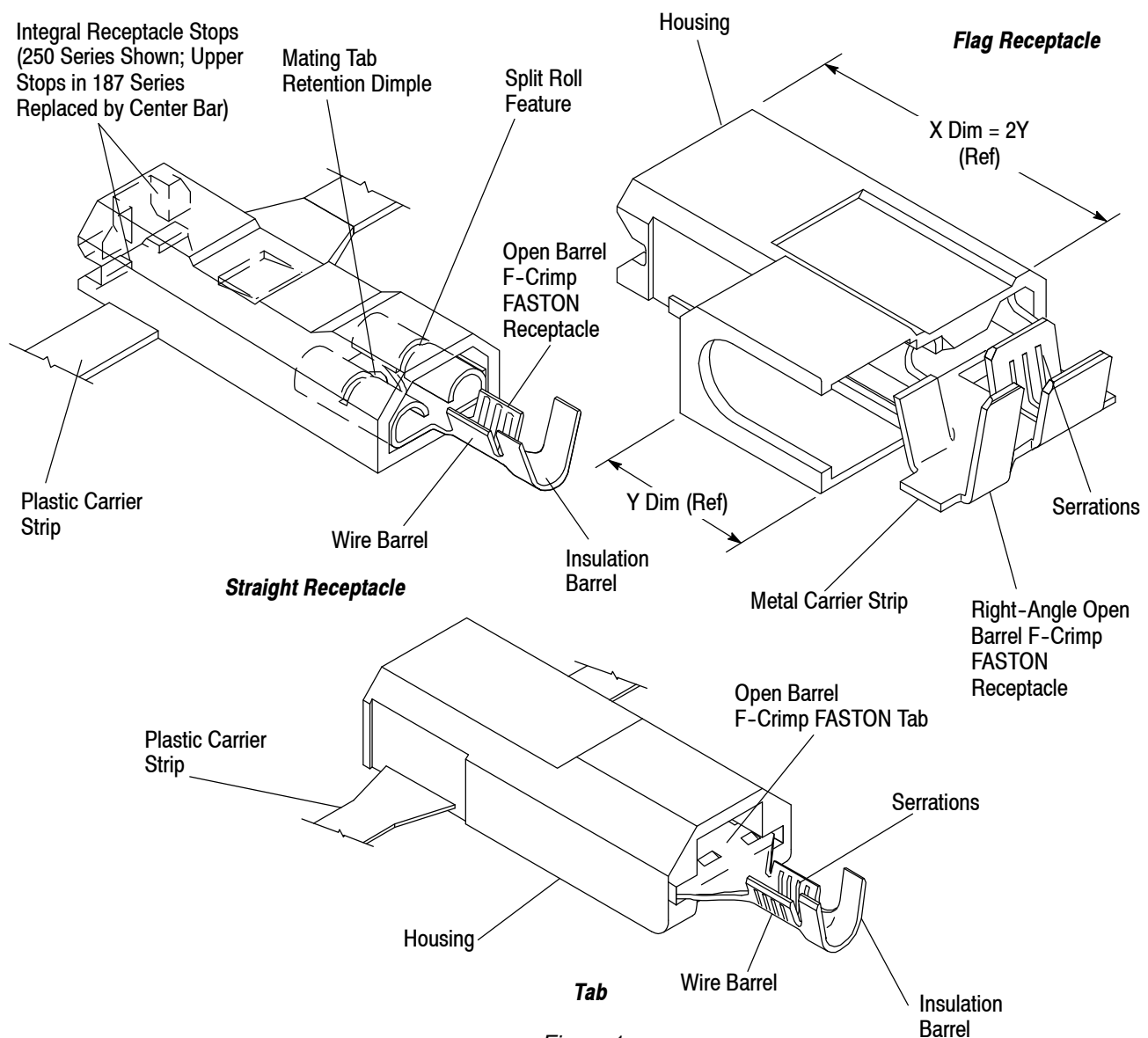


Figure 1

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## 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
- Added new text to Section 1

### 2.2. Customer Assistance

Reference Part Number 520963 and Product Code 7112 are representative numbers of Ultra-Pod FASTON Fully Insulated Receptacles and Tabs. 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 TE Representative or, after purchase, by calling the Tooling Assistance Center or the TE Product Information number at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for specific products are available from the responsible Engineering department via the service network (see Paragraph 2.2). The information contained in Customer Drawings takes priority if there is a conflict with this document or with any other technical documentation supplied by TE.

### 2.4. Specifications

Product Specification 108-1285 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. Refer to Figure 9 for a complete listing of application equipment and related documents.

<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 852293-[ ] and 853358-[ ]
408-8098	Installation Sheet for Ultra-Pod Miniature Quick Change Applicators
408-8099	Heavy Duty Miniature Quick-Change Applicator 852500-[ ]
408-8102	Installation Sheet for Quick-Change Applicator 852500-[ ]
408-9640	Crimp Quality Monitor Applicator for Side-Feed and End-Feed Applications
408-9725	250 Series Straight Manual Insertion Tool
408-9726	250 Series Straight and Flag Manual Extraction Tool
408-9727	250 Series Flag Manual Insertion Tool
408-9816	Handling of Reeled Products
409-5842	AMP-O-LECTRIC* Model "G" Terminating Machine 354500-[ ]

## 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.

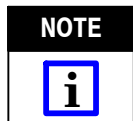
#### C. Shelf Life

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 chemicals listed below, as stress corrosion cracking may occur.

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



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

### 3.2. Wire and Receptacle Selection

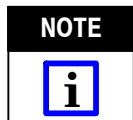
#### A. Receptacle Selection

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.

#### B. Wire Selection

Ultra-Pod FASTON Fully Insulated Receptacles and Tabs will accept wires with insulation ranges as listed below.

250 Series Straight Receptacle	2.29–4.57 mm [.090–.180 in.]
250 Series Flag Receptacle	1.27–4.06 mm [.050–.160 in.]
250 Series Tab	3.30–5.08 mm [.130–.200 in.]
187 Series Straight Receptacle	2.29–3.30 mm [.090–.130 in.]
187 Series Flag Receptacle	1.52–3.30 mm [.060–.130 in.]
110 Series Straight Receptacle	2.03–3.05 mm [.080–.120 in.]



For a more specific listing of wire insulation ranges categorized by terminal type, size and wire applied, refer to the table in Figure 3.

### 3.3. Wire Preparation

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



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

TERMINAL SERIES NUMBER	WIRE SIZE RANGE (AWG)	STRIP LENGTH $\pm 0.38$ [ $\pm 0.15$ ]
250 Straight Receptacle	22-18	5.72 [.225]
	18-14	
	(2) 18	6.10 [.240]
	14-10	6.35 [.250]
250 Flag Receptacle	22-18	7.14 [.281]
	18-14	
	(2) 18	7.50 [.295]
250 Tab	18-14	5.72 [.225]
	12-10	
187 Straight Receptacle	20-16	4.7 [.185]
	(2) 18	5.10 [.200]
187 Flag Receptacle	22-18	5.60 [.220]
	(2) 18	6.00 [.235]
110 Straight Receptacle	22-18	4.32 [.170]

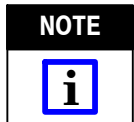
Figure 2

### 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 included in Figure 3 lists proper crimp dimensions and tensile strengths, arranged by terminal type and wire criteria.



*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. Damaged terminals should not be used. If a damaged product is evident, it should be cut from the wire and replaced with a new one.*



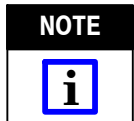
*Periodic inspections must be made to ensure crimped contact formation is consistent as shown in Figure 3.*

#### 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 3.

#### B. Crimp Length

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



*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.

#### 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 and Y-Y.

#### G. Wire Location

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

#### 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.

#### J. 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.

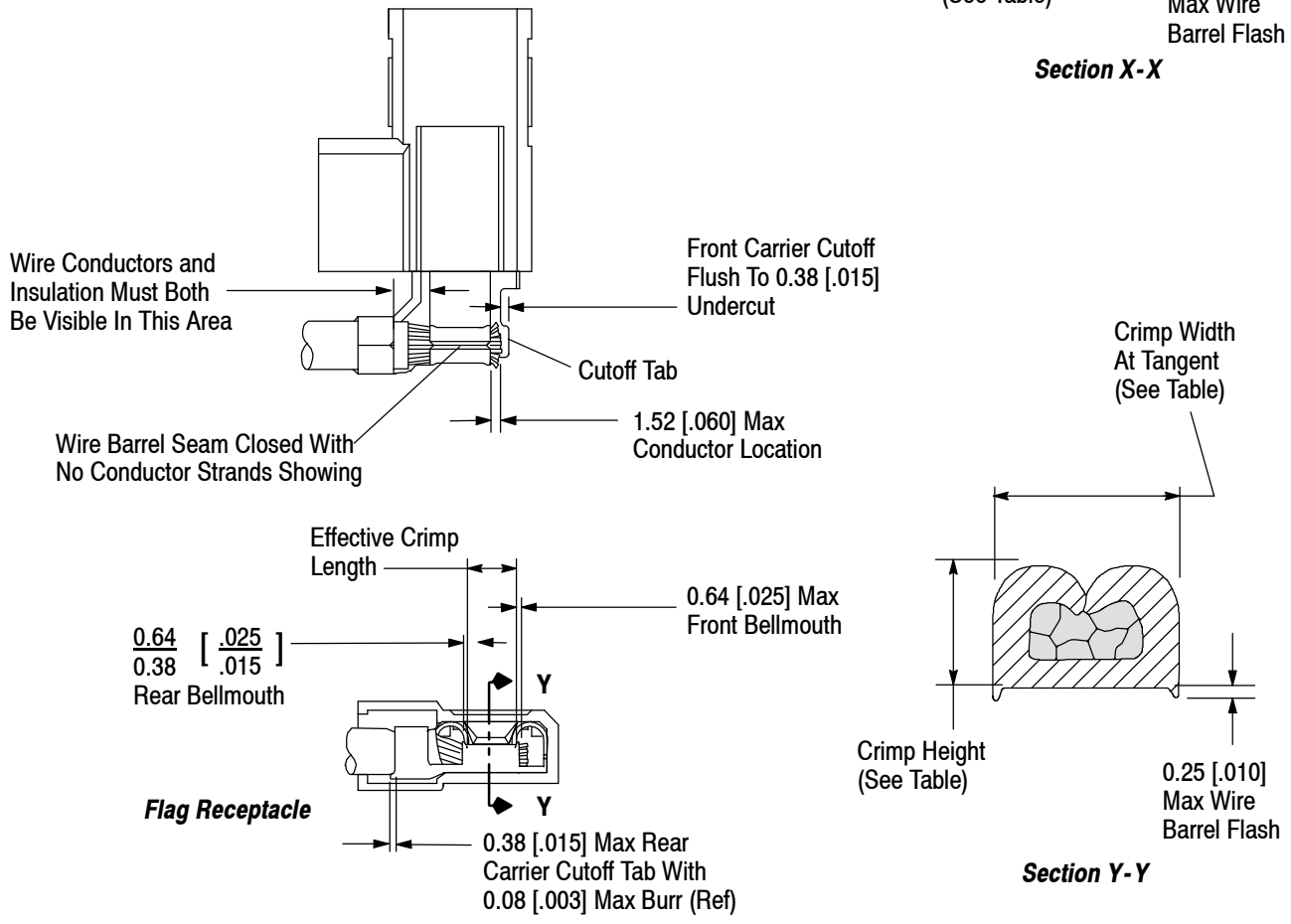
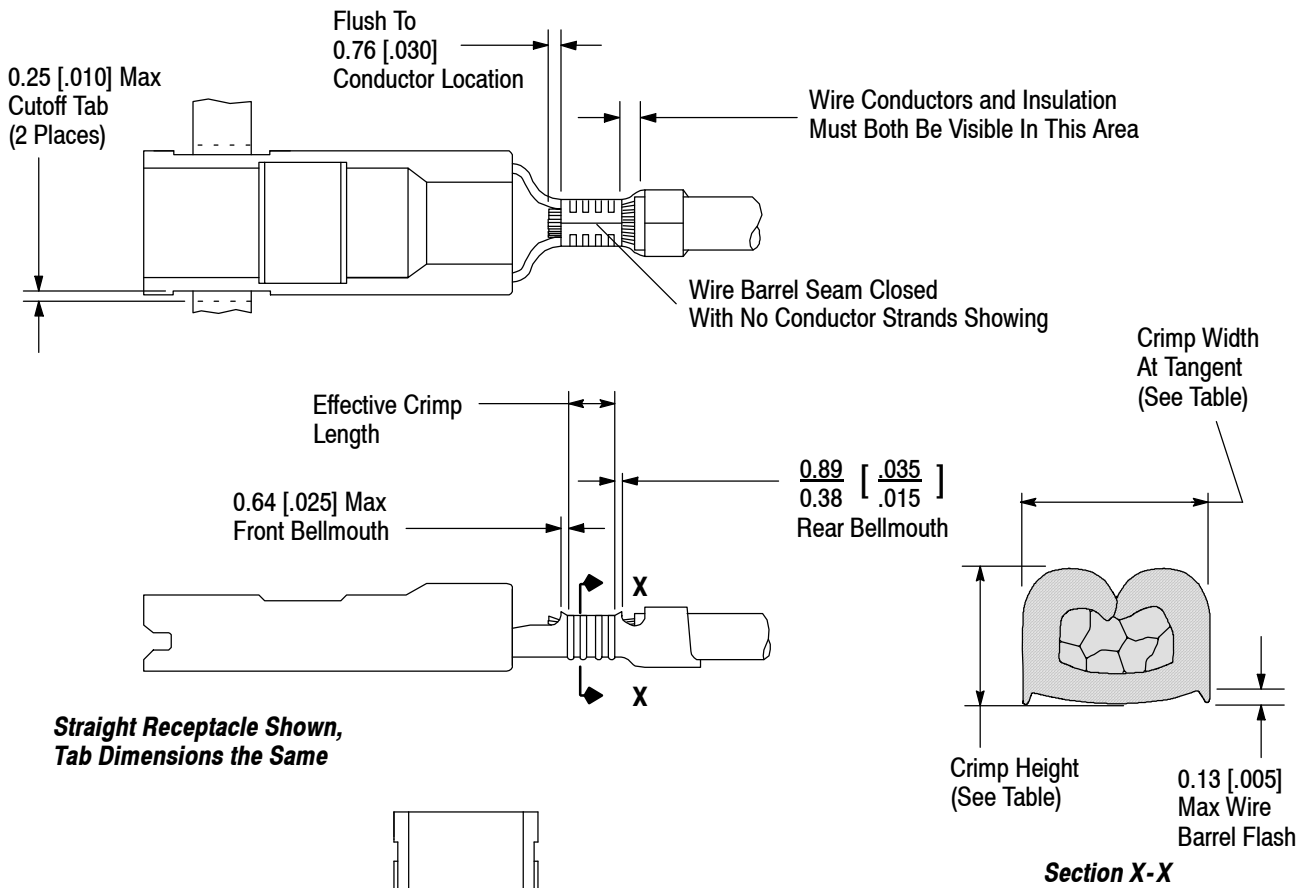


Figure 3 (cont'd)

TERMINAL WIRE SIZE RANGE, AWG	INSULATION DIAMETER	WIRE APPLIED		WIRE BARREL CRIMP		MINIMUM TENSILE STRENGTH (NEWTONS [LBS])
		QTY	WIRE SIZE (AWG)	WIDTH (REF)	HEIGHT $\pm 0.05$ [ $\pm .002$ ]	
<b>250 SERIES STRAIGHT RECEPTACLES</b>						
22-18	2.29-3.3 [.090-.130]	1	22	2.29 [.090]	1.24 [.049]	35.6 [8]
		1	20		1.3 [.051]	57.8 [13]
		1	18		1.42 [.056]	89 [20]
		1 ea	22, 20		1.45 [.057]	35.6 [8]
		2	22		1.37 [.054]	35.6 [8]
18-14	3.05-4.32 [.120-.170]	1	18	2.79 [.110]	1.47 [.058]	89 [20]
		1	16		1.63 [.064]	133.4 [30]
		1	14		1.85 [.073]	222.4 [50]
		1 ea	22, 18		1.57 [.062]	35.6 [8]
		1 ea	20, 18		1.63 [.064]	57.8 [13]
		2	18		1.73 [.068]	89 [20]
		2	20		1.55 [.061]	57.8 [13]
		1 ea	20, 16		1.78 [.070]	57.8 [13]
		1 ea	22, 16		1.75 [.069]	35.6 [8]
14-10	3.30-4.57 [.130-.180]	1	14	3.3 [.130]	2.06 [.081]	222.4 [50]
		1	12		2.36 [.093]	311.4 [70]
		1 ea	16, 14		2.39 [.094]	133.4 [30]
		1	10		2.92 [.115]	355.8 [80]
<b>250 SERIES FLAG RECEPTACLES</b>						
22-18	1.27-2.54 [.050-.100]	1	22	2.03 [.080]	1.19 [.047]	35.6 [8]
		1	20		1.27 [.050]	57.8 [13]
		2	22		1.32 [.052]	35.6 [8]
		1	18		1.40 [.055]	89 [20]
18-14	2.79-4.06 [.110-.160]	1	18	2.79 [.110]	1.4 [.055]	89 [20]
		1	16		1.55 [.061]	133.4 [30]
		1	14		1.78 [.070]	222.4 [50]
(2) 18	(2) 2.67 [.105] Max	2	18		1.65 [.065]	89 [20]
(2) 20	(2) 2.67 [.105] Max	2	20		1.47 [.058]	57.8 [13]
<b>250 SERIES TABS</b>						
18-14	3.30-4.57 [.130-.180]	1	18	2.79 [.110]	1.47 [.058]	89 [20]
		1	16		1.63 [.064]	133.4 [30]
		1	14		1.85 [.073]	222.4 [50]
		2	18		1.73 [.068]	89 [20]
<b>187 SERIES STRAIGHT RECEPTACLES</b>						
20-16	2.29-3.3 [.090-.130]	1	20	2.29 [.090]	1.24 [.049]	57.8 [13]
		1	18		1.35 [.053]	89 [20]
		1	16		1.52 [.060]	133.4 [30]
		1 ea	20, 18		1.52 [.060]	57.8 [13]
		2	20		1.42 [.056]	57.8 [13]
		1 ea	22, 18		1.47 [.058]	35.6 [8]
		2	22		1.3 [.051]	35.6 [8]
		1 ea	22, 20		1.37 [.054]	35.6 [8]

Figure 3 (cont'd)

TERMINAL WIRE SIZE RANGE, AWG	INSULATION DIAMETER	WIRE APPLIED		WIRE BARREL CRIMP		MINIMUM TENSILE STRENGTH (NEWTONS [LBS])
		QTY	WIRE SIZE (AWG)	WIDTH (REF)	HEIGHT $\pm 0.05$ [ $\pm .002$ ]	
<b>187 SERIES STRAIGHT RECEPTACLES</b>						
18-16	2.67-5.33 [.105-.210]	1	18	2.79 [.110]	1.35 [.053]	89 [20]
		1	16		1.50 [.059]	133.4 [30]
(2) 18	(2) 2.67 [.105] Max	2	18		1.60 [.063]	89 [20]
(2) 20	(2) 2.67 [.105] Max	2	20		1.42 [.056]	57.8 [13]
<b>187 SERIES FLAG RECEPTACLES</b>						
22-18	1.50-2.80 [.060-.110]	1	22	1.78 [.070]	1.09 [.043]	35.6 [8]
		1	20		1.19 [.047]	57.8 [13]
		1	18		1.32 [.052]	89 [20]
18-14	2.67-3.56 [.105-.140]	1	18	2.79 [.110]	1.27 [.050]	89 [20]
		1	16		1.42 [.056]	133.4 [30]
		1	14		1.65 [.065]	222.4 [50]
(2) 18	(2) 2.67 [.105] Max	2	18		1.52 [.060]	89 [20]
<b>110 SERIES STRAIGHT RECEPTACLES</b>						
22-18	2.03-3.05 [.080-.120]	1	22	1.57 [.062]	1.02 [.040]	35.6 [8]
		1	20		1.09 [.043]	57.8 [13]
		1	18		1.24 [.049]	89 [20]

Figure 3 (end)

### 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 terminal must bottom against insertion stops. Test for proper seating by pulling lightly in a direction opposite insertion.

#### Straightness of Terminals Prior to Pod Insertion

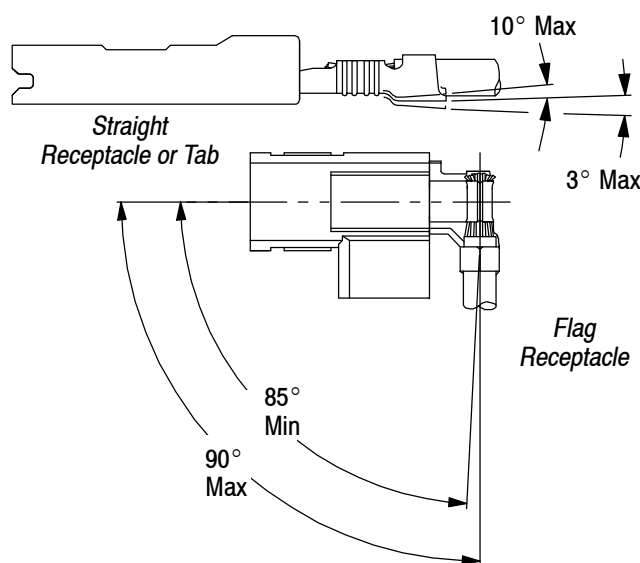
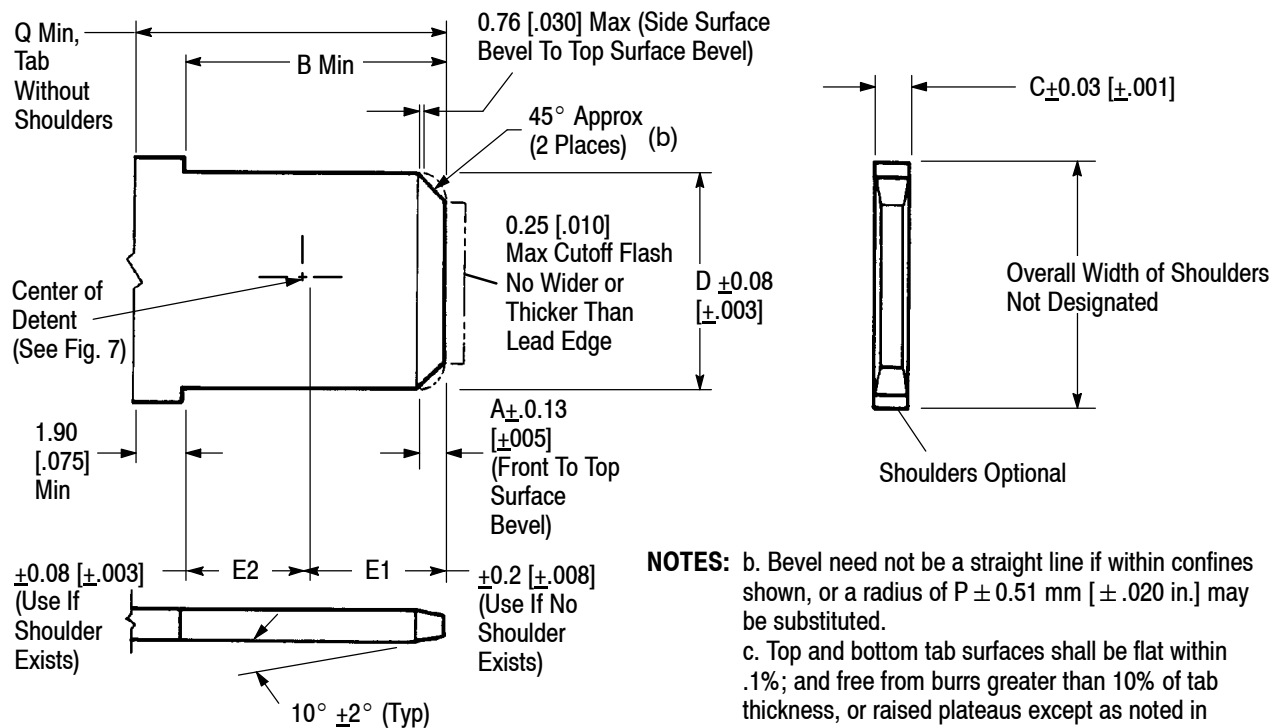


Figure 4

### 3.6. Mating Tab Dimensions

Figure 5 shows features and dimensional requirements for tab terminals intended for mating with Ultra-Pod FASTON Fully Insulated Receptacles.



**NOTES:** b. Bevel need not be a straight line if within confines shown, or a radius of  $P \pm 0.51 \text{ mm} [\pm .020 \text{ in.}]$  may be substituted.  
 c. Top and bottom tab surfaces shall be flat within .1%; and free from burrs greater than 10% of tab thickness, or raised plateaus except as noted in paragraph 3.8.B.  
 d. Dimensional measurements shall not include plating, burrs or flatness tolerance.

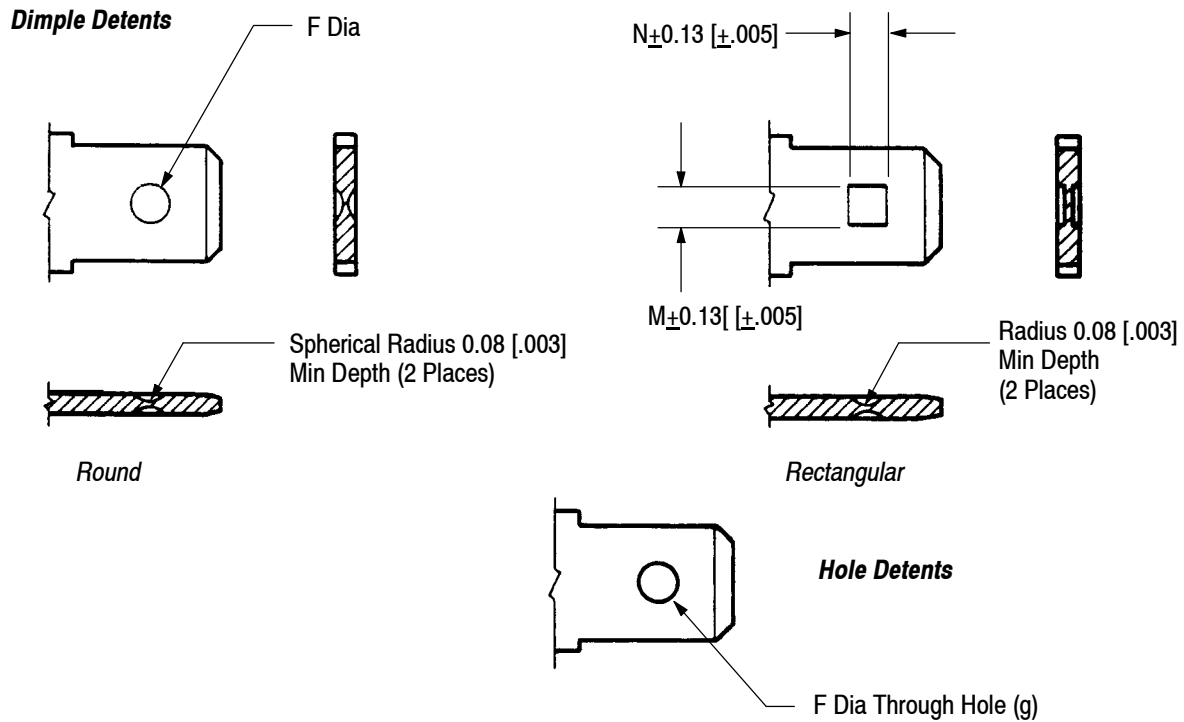
TAB SIZE (NOMINAL)	A	B	C	D	E1	E2	P	Q
6.35x0.81 [.250x.032] With Dimple	0.89 [.035]	7.8 [.307]	0.81 [.032]	6.35 [.250]	3.86 [.152]	4.06 [.160]	1.27 [.050]	10.00 [.394]
6.35x0.81 [.250x.032] With Hole	0.89 [.035]	7.8 [.307]	0.81 [.032]	6.35 [.250]	4.52 [.178]	3.4 [.134]	1.27 [.050]	10.00 [.394]
4.75x0.81 [.187x.032] With Dimple	0.89 [.035]	6.22 [.245]	0.81 [.032]	4.75 [.187]	2.54 [.100]	3.81 [.150]	1.27 [.050]	8.90 [.350]
4.75x0.81 [.187x.032] With Hole	0.89 [.035]	6.22 [.245]	0.81 [.032]	4.75 [.187]	3.18 [.125]	3.18 [.125]	1.27 [.050]	8.90 [.350]
4.75x0.51 [.187x.020] With Dimple	0.76 [.030]	6.22 [.245]	0.51 [.020]	4.75 [.187]	2.54 [.100]	3.81 [.150]	1.14 [.045]	8.90 [.350]
4.75x0.51 [.187x.020] With Hole	0.76 [.030]	6.22 [.245]	0.51 [.020]	4.75 [.187]	3.18 [.125]	3.18 [.125]	1.14 [.045]	8.90 [.350]
2.79x0.51 [.110x.020] With Dimple or Hole	0.51 [.020]	6.98 [.275]	0.51 [.020]	2.79 [.110]	1.57 [.062]	5.54 [.218]	0.89 [.035]	8.13 [.320]

Figure 5

### 3.7. Tab Retention and Detent Configurations

A tab configuration having no locking feature may be used for applications where low mating retention forces are desirable. Where higher forces are sought, a tab with a detent meeting the requirements of Figure 6 should be used. Hole detents provide the greatest retention forces, while dimples provide acceptable medium-range forces.





TAB WIDTH (NOMINAL)	M(e)	N(e)	F
6.35 [.250]	2.36 [.093]	1.9 [.075]	1.78 <sup>+0.25</sup> <sub>-0.13</sub> [.070 <sup>+0.010</sup> <sub>-.005</sub> ]
4.75 [.187]	1.57 [.062]	1.37 [.054]	1.4±0.13 [.055±.005]
2.79 [.110]	1.57 [.062]	1.22 [.048]	1.22±0.08 [.048±.003]

- NOTES:**
- e. Dimension applies to dimple detents only.
  - f. Hole or dimple detents may be at the same location on the longitudinal centerline if no shoulder or obstruction is present at the base of the tab.
  - g. Maintain sharp hole edges on top and bottom tab surfaces. (Minimal rounds and burrs).

Figure 6

### 3.8. Mating Overcycle and Testing

#### A. Mating/Unmating Cycles

The rolled shape of the Ultra-Pod FASTON Fully Insulated Receptacles and Tabs 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).

#### B. Mating Force

The forces required to mate and unmate a test mating tab and receptacle shall be as specified in Figure 7. Measure the force using a testing device capable of holding the reading. It must also provide accurate alignment with slow and steady mating and unmating of the test tab and receptacle.

**NOTE**



Testing may be done using a gage as described in Residential Controls-Quick-Connect Terminals, ANSI/NEMA No. DC2-1982. Test tabs shall be dimensioned as shown in Figure 5 and Figure 6 except that the "C" dimension shall have a tolerance of  $\pm 0.008$  mm [ $\pm .0003$  in.] for brass tabs ( $\pm 0.013$  mm [ $\pm .0005$  in.] for steel) and raised plateaus around detents shall be limited to a total of 0.03 [.001] for both sides.

TAB SERIES	FORCE (NEWTONS [LBS])					
	FIRST MATING (MAXIMUM) INDIVIDUAL	FIRST UNMATING			SIXTH UNMATING	
		(MAX)	(MINIMUM)		(MINIMUM)	
			AVERAGE	INDIVIDUAL	AVERAGE	INDIVIDUAL
<b>TEST TAB AND UNPLATED RECEPTACLE</b>						
250	80.1 [18]	80.1 [18]	26.7 [6]	17.8 [4]	22.2 [5]	17.8 [4]
187	66.7 [15]	89 [20]	22.2 [5]	13.3 [3]	13.3 [3]	8.9 [2]
110	53 [12]	62 [14]	13 [3]	9 [2]	9 [2]	4 [1]
<b>TEST TAB AND TIN-PLATED RECEPTACLE</b>						
250	75.6 [17]	75.6 [17]	22.2 [5]	13.3 [3]	17.8 [4]	13.3 [3]
187	66.7 [15]	89 [20]	22.2 [5]	13.3 [3]	13.3 [3]	8.9 [2]
110	53 [12]	62 [14]	13 [3]	9 [2]	9 [2]	4 [1]

Figure 7

#### 4. QUALIFICATIONS

Ultra-Pod FASTON Fully Insulated Receptacles and Tabs are supported by the following commercial, military and government qualification and specification organizations.

##### 4.1. Underwriters Laboratories Inc. (UL)

Products meet UL-310 specification for quick-connect terminals and are Listed in UL Component Listing Program — Electrical File No. E-66717.

**NOTE**

*UL does not qualify this type of terminal when designed for application to 24 AWG or smaller wire.*



##### 4.2. CSA International

CSA Certified in File No. LR7189.

#### 5. TOOLING

Application tooling crimps receptacle, 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. Manual extraction tools are also listed.

**NOTE**

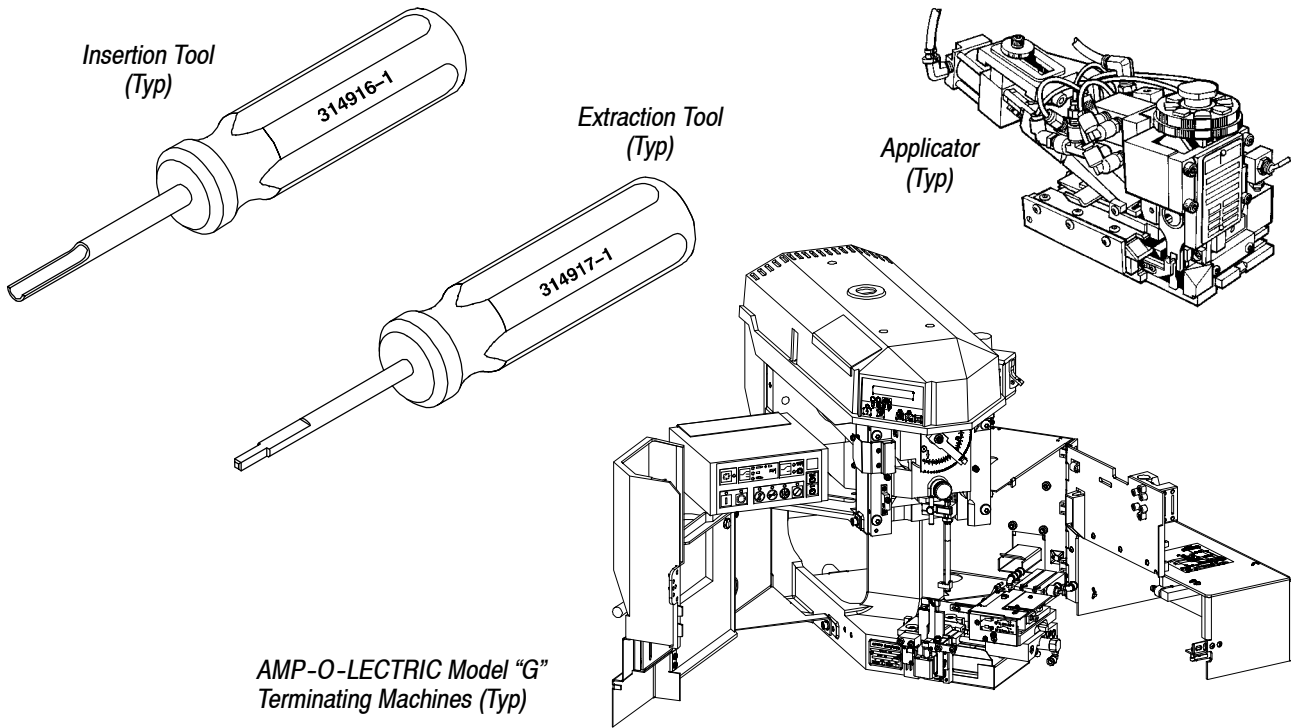
*Lift up on the rear of the crimped receptacle when inserting it into its housing. This enables it to slide fully past the internal retention feature of the housing (maximum 12-lb insertion force).*



TERMINAL TYPE	INSERTION TOOL	EXTRACTION TOOL
250 Series Straight	314916-1 (408-9725)	314917-1 (408-9726)
250 Series Flag	314919-1 (408-9727)	314917-1 (408-9726)

Figure 8

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. See Figure 9.



AMP-O-LECTRIC Model "G"  
Terminating Machines (Typ)

RECEPTACLE TYPE	WIRE SIZE RANGE (AWG)	HDM APPLICATOR (DOCUMENT)	POWER UNIT PART NUMBER (DOCUMENT)	POWER UNIT TYPE
250 Series Straight Receptacle	22-18	853741-3 (408-8095)	354500-[ ] (408-5842)	Model "G"
	18-14	852293-3 (408-8095)		
		680879-3 (408-8095) (Positive Lock)		
	(2) 18 (2) 20	1385719-3 (408-8095)		
14-10	680017-3 (408-8095)			
250 Series Flag Receptacle	22-18	680020-1 (408-8099)		
	18-14	852500-3 (408-8099)		
	(2) 18 (2) 20	1385813-3 (408-8099)		
250 Series Tab	18-14	680834-3 (408-8095)		
	12-10	1385303-1 (408-8095)		
187 Series Straight Receptacle	20-16	853358-3 (408-8095)		
	18-14	680878-3 (408-8095) (Positive Lock)		
		(2) 18 (2) 20	1385788-1 (408-8095)	
187 Series Flag Receptacle	22-18	1385725-3 (408-8099)		
	(2) 18 (2) 20	1385724-3 (408-8099)		
110 Series Straight Receptacle	22-18	680835-1 (408-8095)		

**NOTE:** Tooling information listed above applies to Bench Machine Model "G" only. For additional applicator and machine options, contact the Tooling Assistance Center number at the bottom of page 1.

Figure 9

### 6. VISUAL AID

Figure 10 is to be used by production personnel to ensure a properly applied product. Sample receptacles are shown as they should appear for best quality termination. Applications which are NOT visually correct should be inspected using the information in the main body of this specification and in the instructional material shipped with the product or tooling.

**NOTE:** RECEPTACLES SHOWN, TAB TERMINATION SHOULD BE THE SAME.

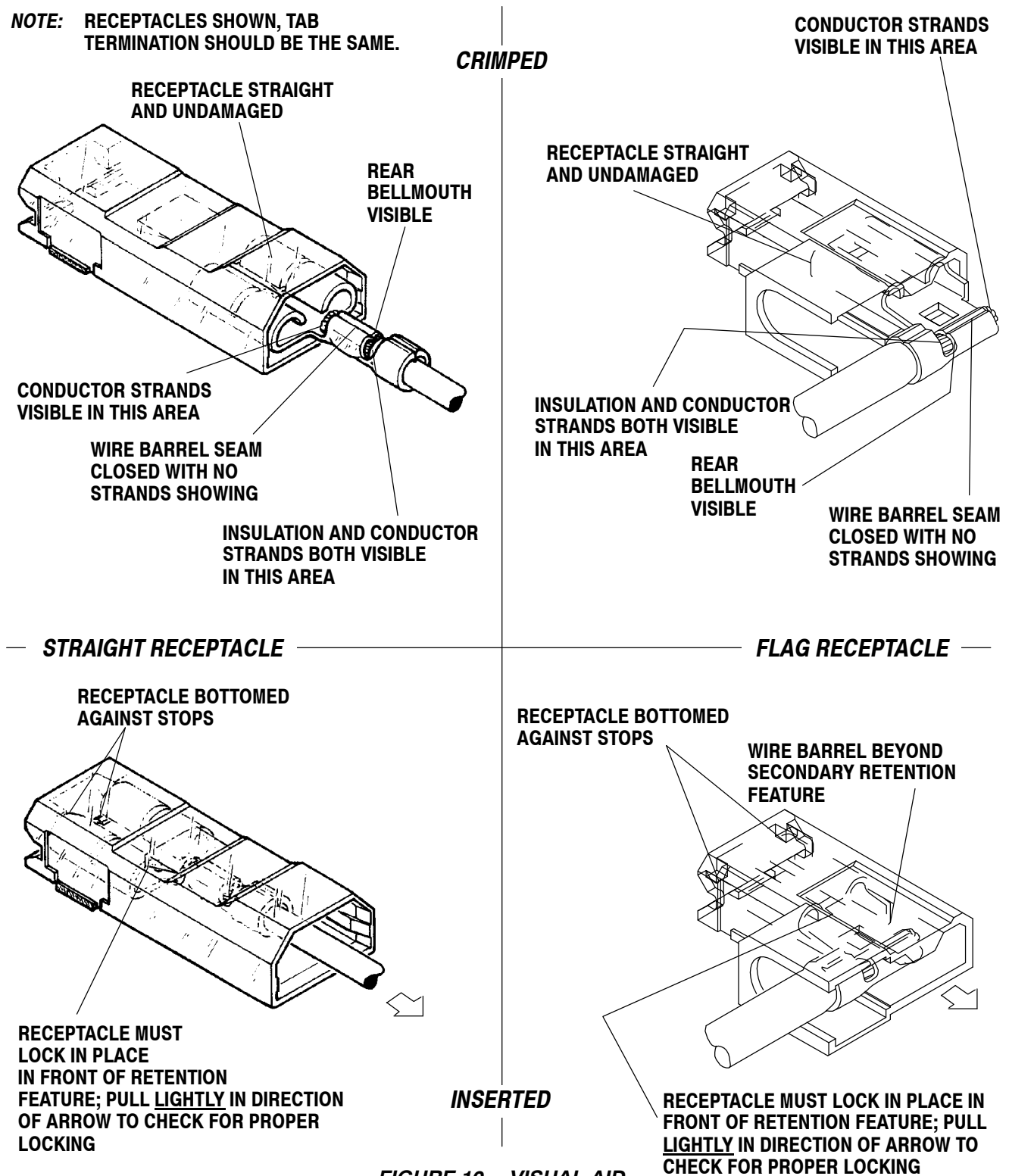


FIGURE 10. VISUAL AID