

NOTE



All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters. Unless otherwise specified, dimensions have a tolerance of ± 0.10 and angles have a tolerance of $\pm 1^\circ$. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of AMP-DUAC UPC Connectors. These connectors consist of receptacle and pin contacts which are installed in various receptacle and plug housings. The housings and contacts will accept a discrete wire size range of 0.30–1.63 mm² [22–15 AWG]. Information provided in this specification contains stripping and crimping information for contacts used in AMP-DUAC and AMP-DUAC/PL Connectors.

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.

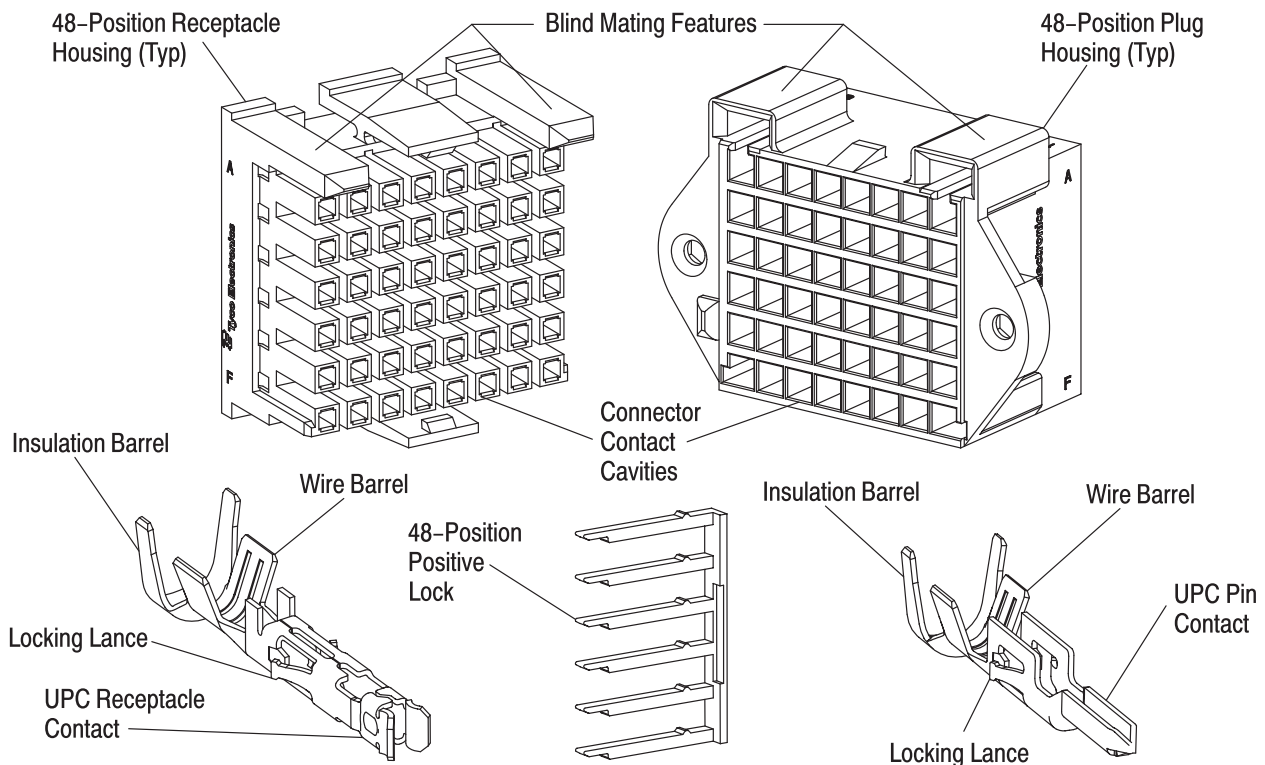


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

- Initial release of document

2.2. Customer Assistance

Reference Part Numbers 1934142, 1934144, 1934182, and Product Codes A202 and A203 are representative numbers of AMP-DUAC UPC Connectors. 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 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 technical documentation supplied by Tyco Electronics.

2.4. Specifications

Design Objective 108-2248 provides expected product performance requirements and test information.

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
408-8040	Heavy Duty Miniature Quick-Change Applicators (Side-Feed Type)
408-8059	General Preventive Maintenance for Applicators
408-9816	Handling of Reeled Products
408-10140	Extraction Tool 1976132-1
409-5842	AMP-O-ELECTRIC* Model "G" Terminating Machines 354500-[]

3. REQUIREMENTS

3.1. Storage

A. Reeled Contacts

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

B. Ultraviolet Light

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

C. Shelf Life

The plug and receptacle housings should remain in the shipping containers until ready for use to prevent damage. These products should be used on a first in, first out basis to avoid storage contamination.

D. Chemical Exposure

Do not store contacts or housings near any chemicals listed, as they may cause stress corrosion cracking in the components.

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. Special Characteristics

AMP-DUAC UPC Connectors are a cable-to-cable configuration designed for power applications. Both housings have contacts on 4.4 x 5.3 mm centerlines and are held to each other by two latches. Housings are keyed to prevent smaller position sizes from being inserted into larger position sizes. Both housings are polarized to prevent inverted mating and also to prevent inverting the plug housing when attaching to a panel.

3.3. Wire Selection and Preparation

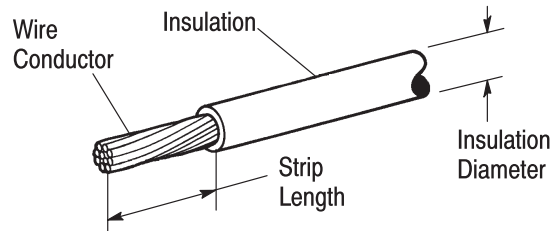
The contacts will accept a wire size range of 0.30–1.63 mm² [22–15 AWG] and are terminated to stranded wire. Figure 2 lists the insulation diameter range, strip length, wire crimp height, wire crimp width, insulation crimp height, and insulation crimp width as determined by wire size.

CAUTION

When stripping the wire, care must be taken to avoid scraping, nicking, or cutting the conductor. Care must also be used when handling the wire during stripping and crimping to prevent cracking or breaking of the conductor and insulation.

NOTE

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 the instruction sheet packaged with manual tools and the applicator log packaged with power tools.



WIRE			CRIMP DIMENSIONS ± 0.05			
WIRE SIZE mm ² [AWG]	INSULATION DIA RANGE	WIRE STRIP LENGTH	WIRE BARREL CRIMP HEIGHT	WIRE BARREL CRIMP WIDTH	INSUL BARREL CRIMP HEIGHT	INSUL BARREL CRIMP WIDTH
1.63 [15 OR (2) 18]	4.40 Max	2.40–3.20	1.26	2.03	3.05	2.80
1.31 [16]	2.40	2.40–3.20	1.18	2.03	2.95	2.80
1.25 [18 + 22]	3.70	2.40–3.20	1.04	1.78	2.96	2.80
0.82 [18]	2.10	2.40–3.20	0.95	1.78	2.56	2.80
0.50 [20]	1.85	2.40–3.20	0.91	1.57	2.70	2.80
0.30 [22]	1.60	2.40–3.20	0.79	1.57	2.50	2.80

Figure 2

3.4. Wire Bend Radius

Tyco Electronics Engineering recommends that individual cables should be dressed to a bend radius of *at least* ten times the cable outside diameter. Likewise, cable bundles should be dressed to a bend radius of *at least* ten times the diameter of the bundle.

3.5. Contact Crimp Features

Figure 3 shows a typical contact as it should appear after crimping.

1. Crimp Location

For optimum crimp effectiveness, the crimp must be within the area shown and must meet the crimp requirements provided in Figure 3.

2. Crimp Height

The crimp applied to the wire barrel portion of the contact is the most compressed area and is most critical in ensuring optimum electrical and mechanical performance of the terminated contact. The contact wire barrel crimp height must be within the dimension provided in Figure 2.

3. Effective Crimp Length

Effective crimp length shall be defined as that portion of the wire barrel, excluding bellmouth(s), fully formed by the crimping tool. See Figure 3.

4. Conductor Extension

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

5. Wire Barrel Seam

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

6. Conductor/Insulation

The conductor and insulation must both be visible in the area between the insulation barrel and the wire barrel.

NOTE: Receptacle contact shown, but pin contact dimensions are the same.

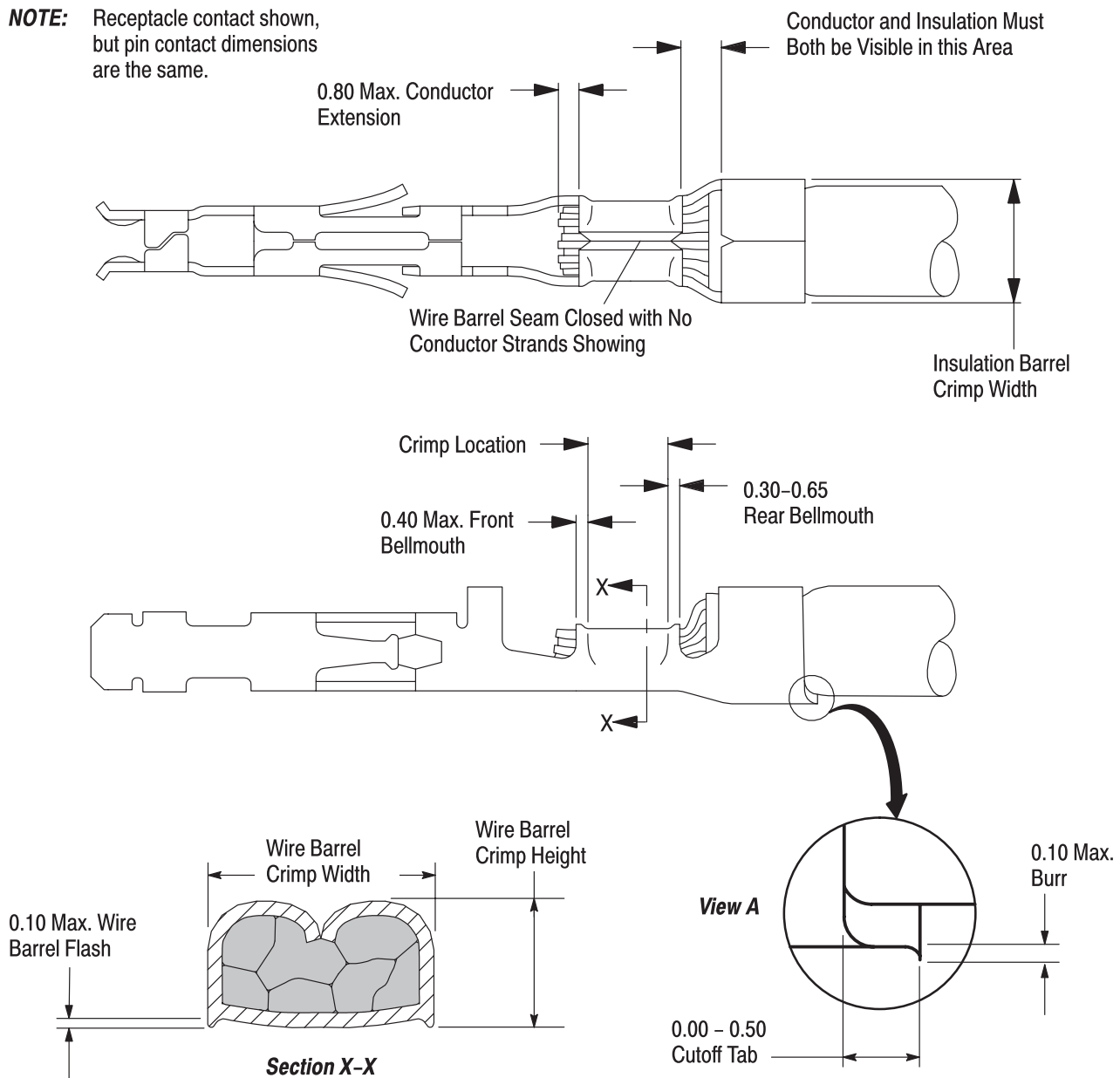


Figure 3

7. Bellmouth

The front and rear bellmouths are caused by the extrusion of metal during crimping and must be within the range specified in Figure 3.

8. Cutoff Tab and Burr

The cutoff tab and burr resulting from the contact being cut from the carrier strip must be within limits to allow the contact to be fully inserted and seated in the housing. See Figure 3.

9. Flash

The wire barrel flash at the bottom of the wire barrel results from applied crimp pressure and must be within the dimension provided in Section X-X of Figure 3.

A. 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. See Figure 4.

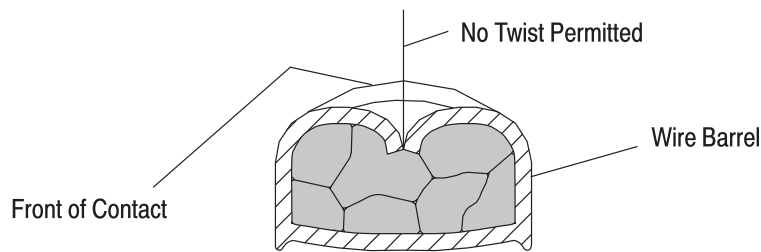


Figure 4

B. 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 following limits.

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 in Figure 5.

2. Side to Side

The side-to-side bending of the contact may not exceed the limits provided in Figure 5.

NOTE

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



NOTE: Receptacle contact shown, but pin contact dimensions are the same.

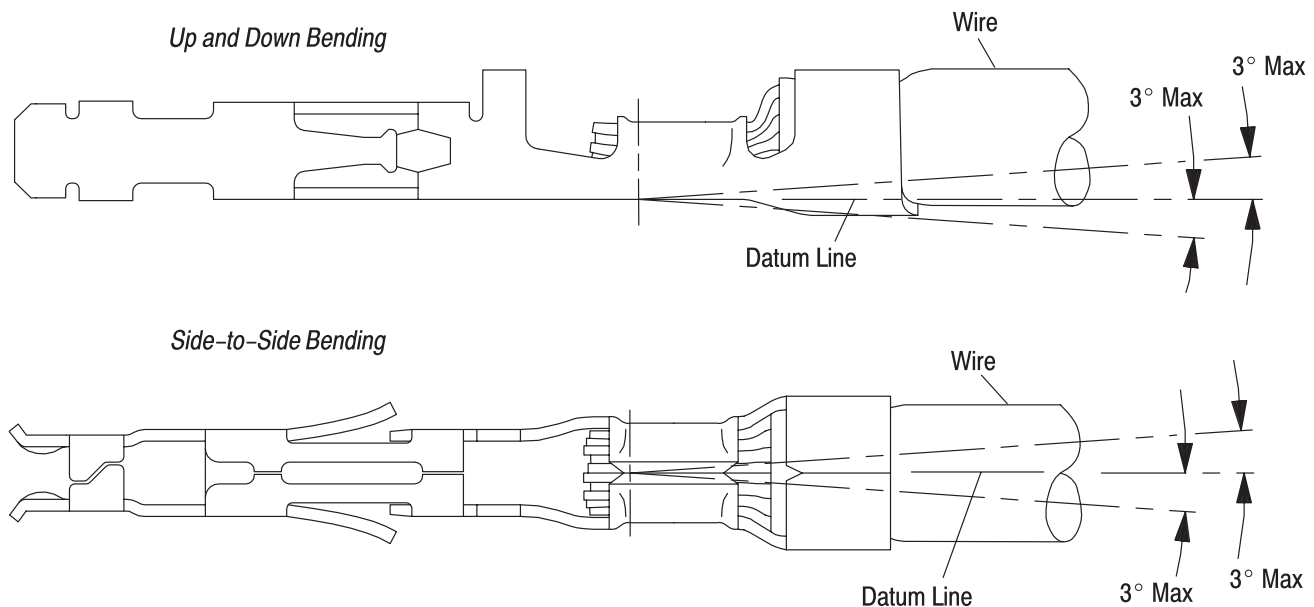


Figure 5

3.6. Placement of Crimped Contact in Housing

The contact must be inserted in the back of the housing and snapped into place. For contact orientation, refer to Figure 6. When fully inserted, the locking lances will engage the housing and prevent backing out during mating of the connector. After inserting contact into housing, pull back on the wire with a maximum force of no more than 15.6 N [3.5 lbs] to ensure the contact is fully seated. See Figure 6.

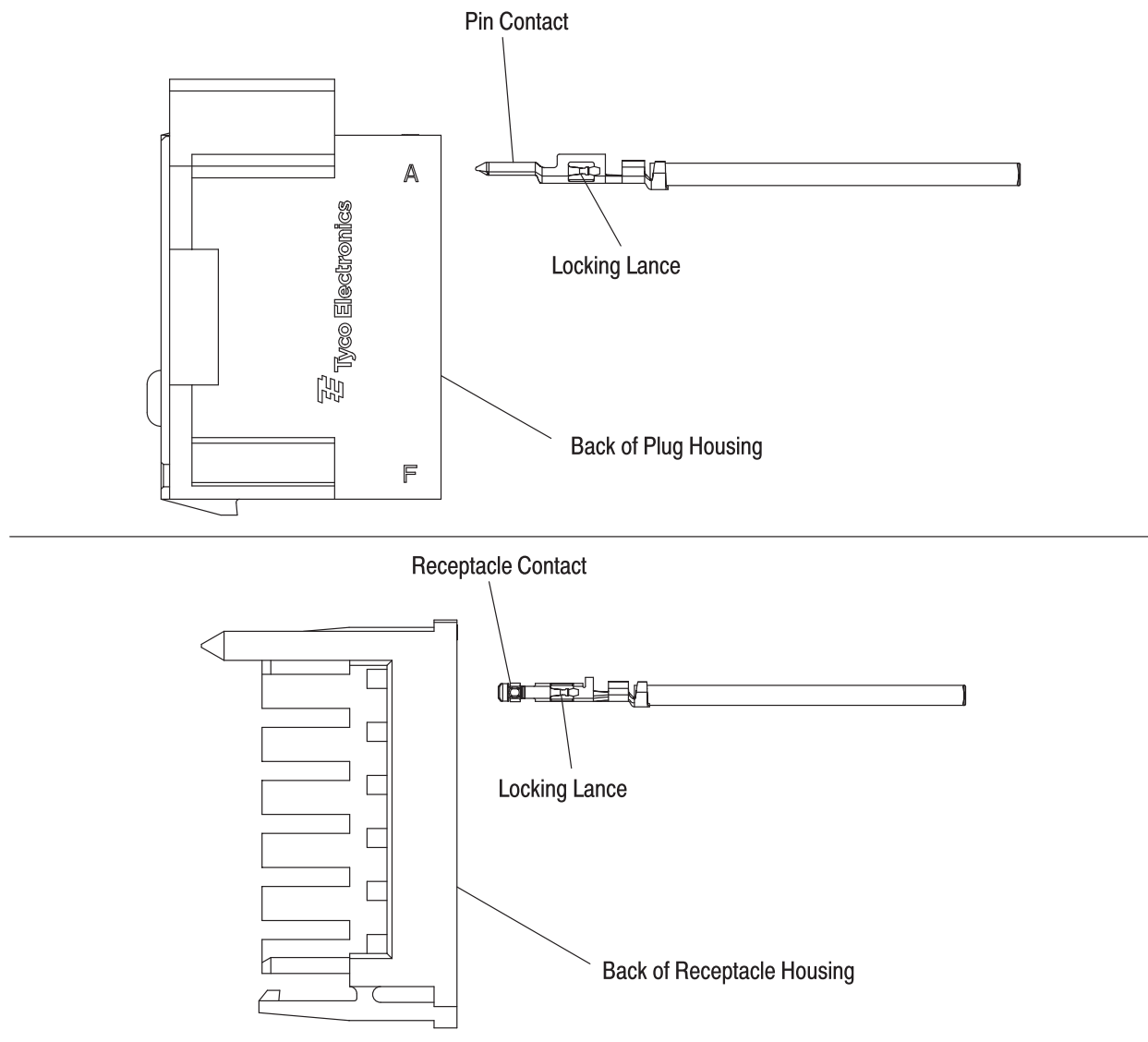


Figure 6

3.7. Contact Seating Inspection

In order to determine if the pin contacts are fully seated in the housing, a dimensional check should be performed on the assembly. All checks should be performed with the information provided in Figure 7. If a contact is determined to not be fully seated, attempt to fully seat the contact. If this cannot be accomplished, attempt to pull the contact out of the housing with a maximum force of no more than 15.6 N [3.5 lbs]. With the contact in hand, visually inspect the contact and housing for damages. If the contact and housing are visually not damaged, reinsert the contact and reinspect according to Figure 7.

CAUTION



Damaged product should not be used. If a damaged contact is evident, replace it with a new contact. Do NOT reterminate the damaged contact. If the housing is damaged, a new housing must be used.

NOTE



For a 48-Position Connector: when measuring an odd column (ie. 1, 3, 5, 7), the distance from the front of the housing to the tip of the pin is 4.6 mm maximum. When measuring an even column (ie. 2, 4, 6, 8), the distance from the front of the housing to the tip of the pin is 3.6 mm maximum. See Figure 7.

For a 66-Position Connector: when measuring an odd column (ie. 1, 3, 5, 7, 9, 11), the distance from the front of the housing to the tip of the pin is 3.6 mm maximum. When measuring an even column (ie. 2, 4, 6, 8, 10), the distance from the front of the housing to the tip of the pin is 4.6 mm maximum. See Figure 7.

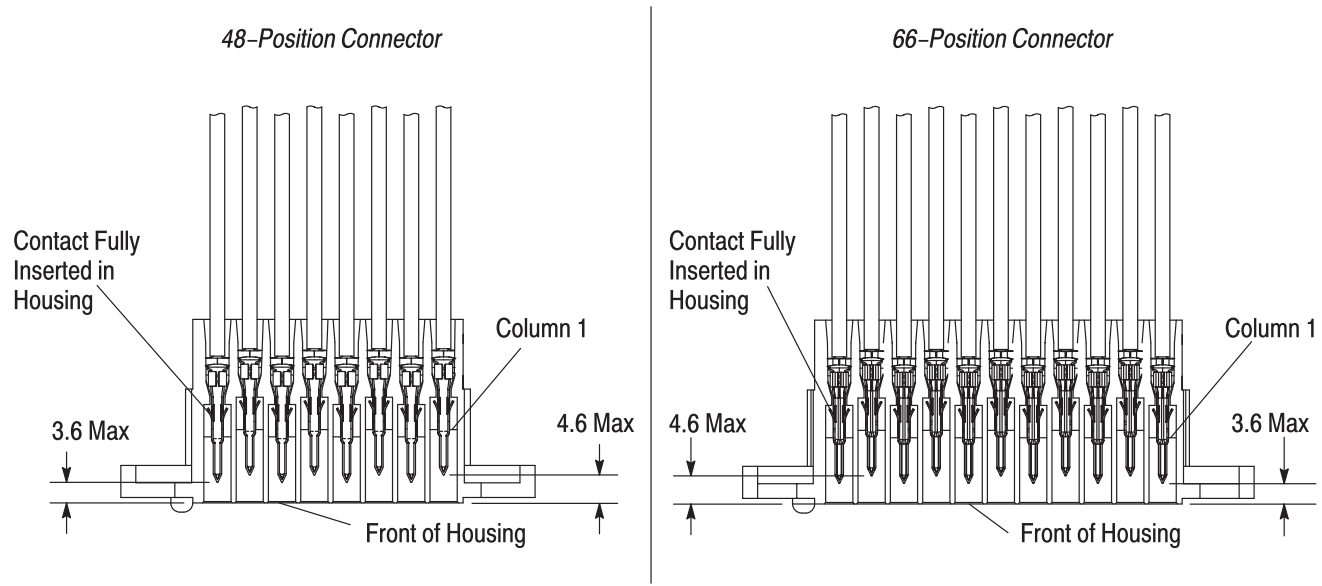


Figure 7

3.8. Position Lock (PL) Assembly (Receptacle Only)

After the contacts have been inserted into the receptacle housing, the positive lock is installed to provide a secondary locking feature as shown in Figure 8. If it is determined that the positive lock cannot be inserted into the housing, inspect the receptacle assembly for any loose contacts. Inspection can be done by pulling back on the wires individually with a maximum force of 15.6 N [3.5 lbs]. Once the loose contact is found, attempt to fully seat the contact. If the contact cannot be fully seated, inspect the contact and housing for any damages. If no damage is visible, attempt to reinsert the contact followed by the positive lock.

CAUTION



Damaged product should not be used. If a damaged contact is evident, replace it with a new contact. Do NOT reterminate the damaged contact. If the housing is damaged, but the contact can still be seated, no damage is visible near the housing interface, and the positive lock can still be inserted, then the housing may be used. If the housing is damaged and the contact cannot be seated, the damage is visual near the interface, or the positive lock cannot be installed because of the damage, then a new housing must be used.

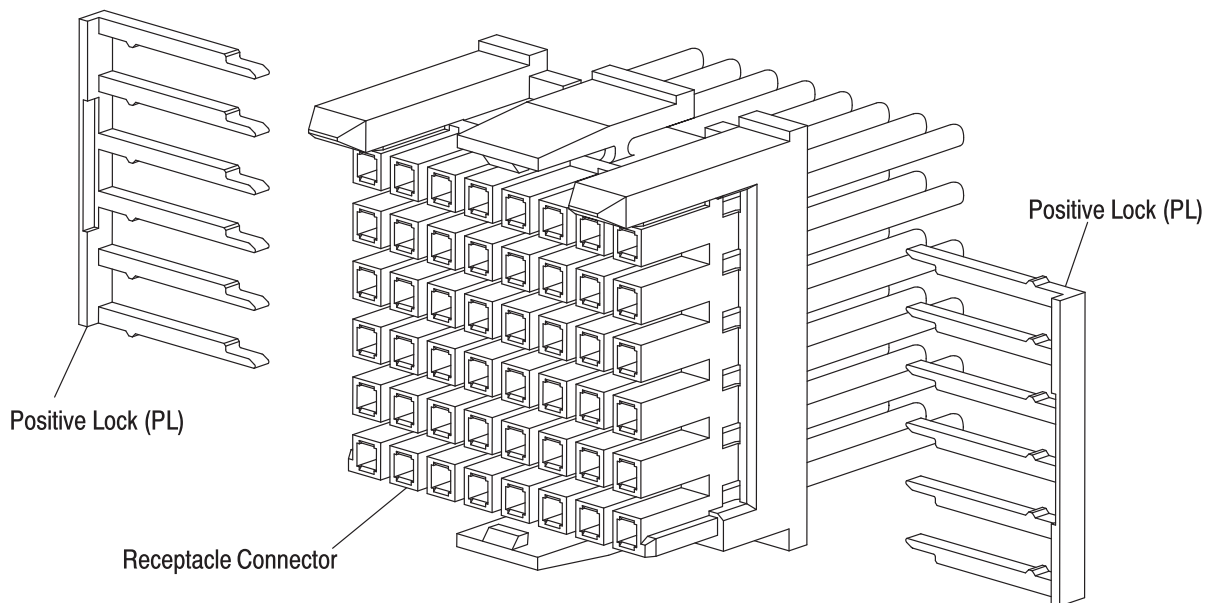


Figure 8

3.9. Panel Cutout

AMP-DUAC UPC Connector panel cutouts and dimensions are provided on their respective customer drawings. Customer supplied mounting hardware is required. The plug housing and panel are designed to accept a style 1-M3 hex nut. The 48-position panel cutout is shown in Figure 9. The correct orientation is provided in Figure 9. The plug housing has a polarization feature on the left side flange which prevents the housing from being mated upside-down in a panel. See Figure 9.

1. Place the plug up to the panel until the housing recess sits in the panel.
2. Place a nut in the captivation feature on the backside of the housing.
3. Insert a M3 screw in the front side of the panel, and screw until tight.
4. Repeat on the opposite side of the housing.

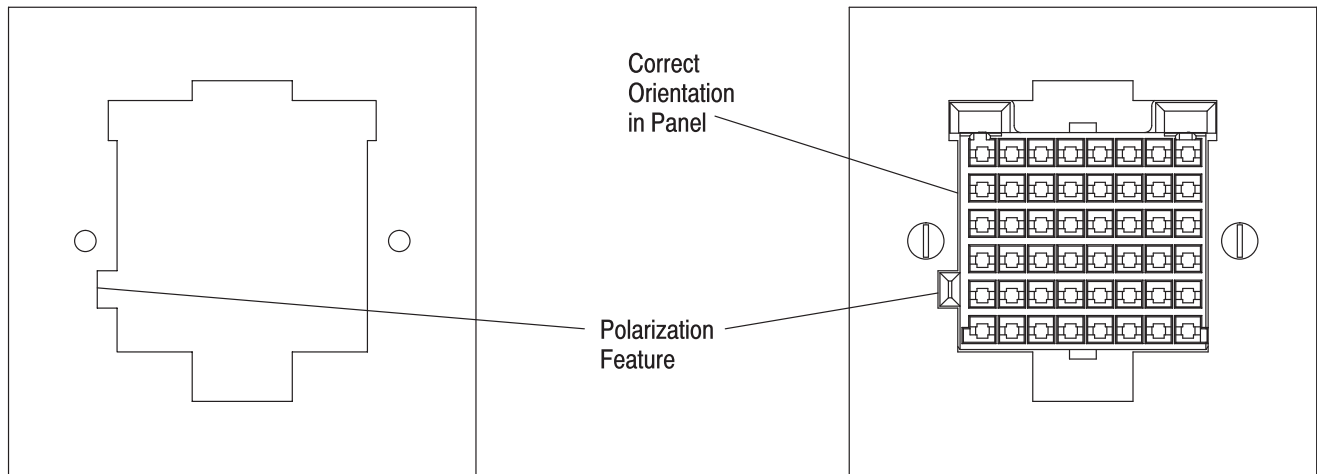


Figure 9

3.10. Keying/Polarization

The configuration of the connector mating face prevents accidental inversion when mating tow like components. These features also prevent improper mating of dissimilar sized housings. The plug housing has a polarization feature on the left side flange which prevents his housing being mated upside-down in a panel. See the panel cutout in Figure 9 and polarization features in Figure 10.

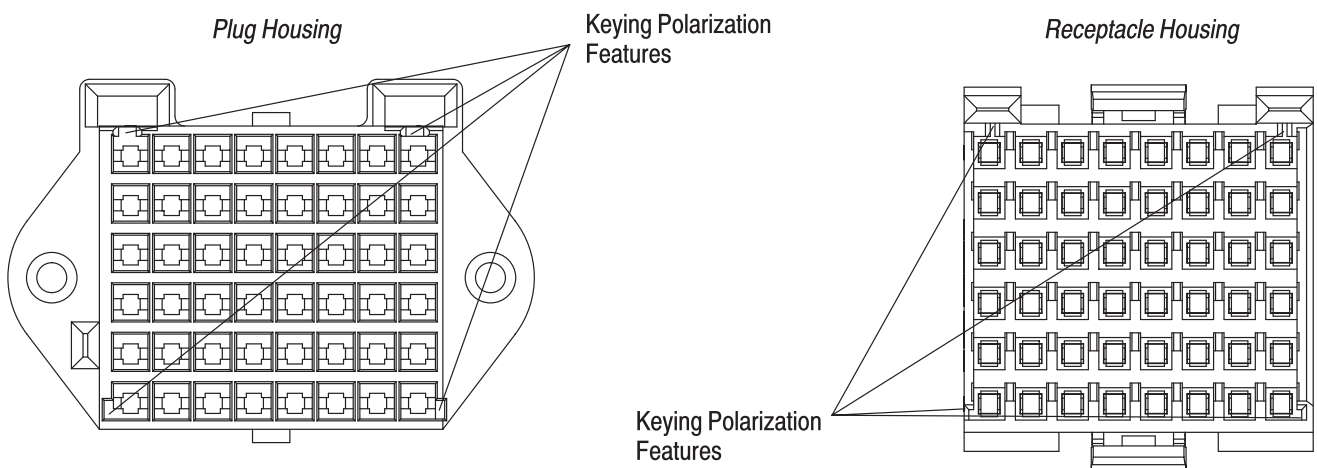


Figure 10

3.11. Connector Assembly

The plug and receptacle connectors will mate according to the polarization designed in the housings. Once the connectors have been mated, the latch will secure them from becoming unmated. See Figure 11.

NOTE

To ensure a proper circuit connection, the receptacle connector latch must fully engage the plug assembly locking ramp.

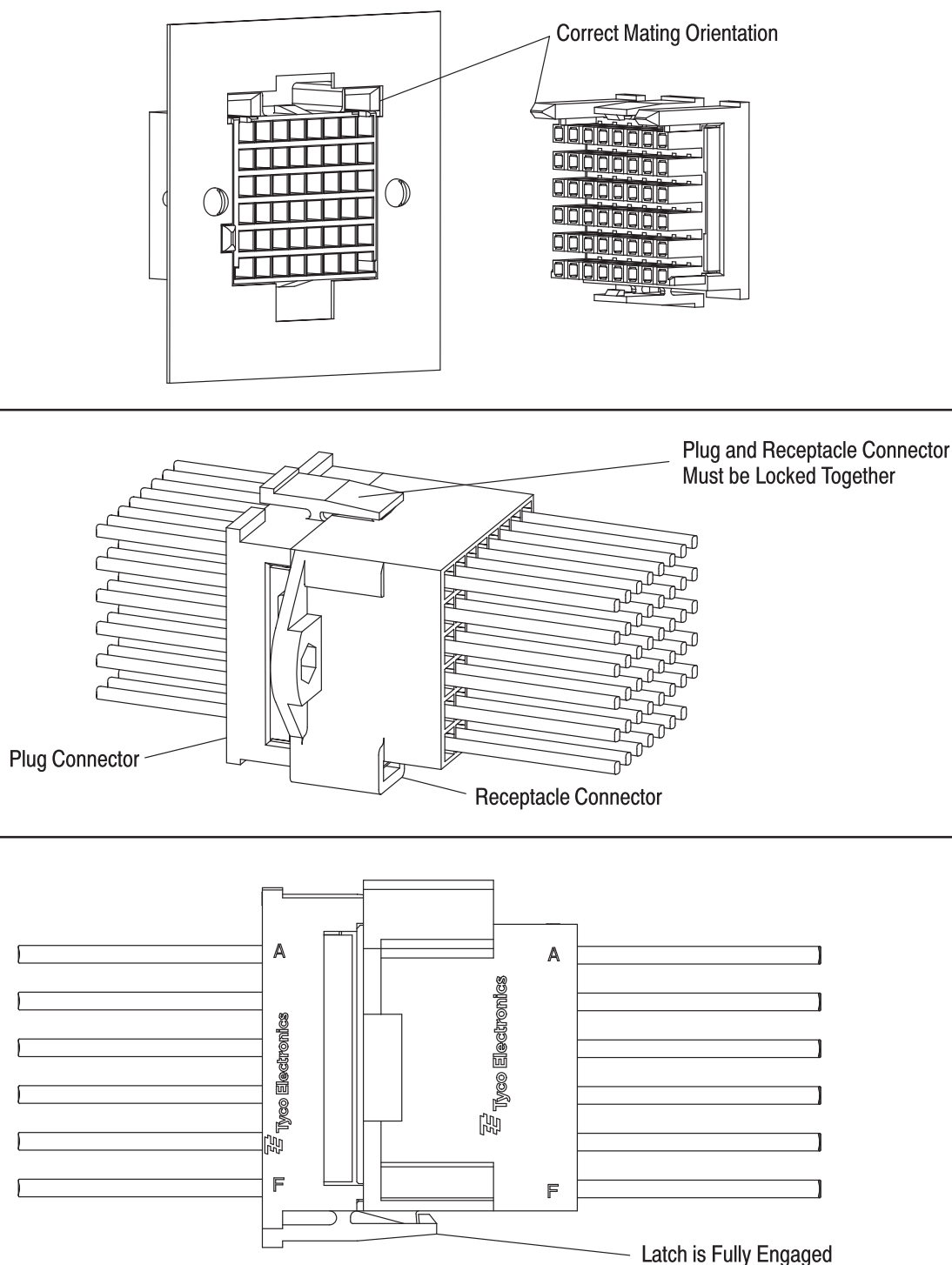


Figure 11

3.12. Repair/Removal (Figure 12)

CAUTION

The position lock must be removed prior to the extraction of receptacle contacts.



Use an extraction tool to remove individual contacts from connectors for replacement or for relocation to another housing cavity. Extraction Tool 1976297-1 is used to extract contacts from receptacle connectors. Extraction Tool 1976132-1 is used to extract contacts from plug connectors. See Figure 12. Reset the locking lances to the original spread before reusing contacts. Damaged or worn contacts may be replaced provided there is sufficient slack, after stripping the wire, to insert the new contact into the connector. Refer to the extraction tool instruction sheets provided in Paragraph 2.5 for information on how to remove the contacts from the housings.

NOTE: Pin Contact Extraction Tool Shown, Receptacle Contact Extraction Tool is Not Available at Time of Publication.

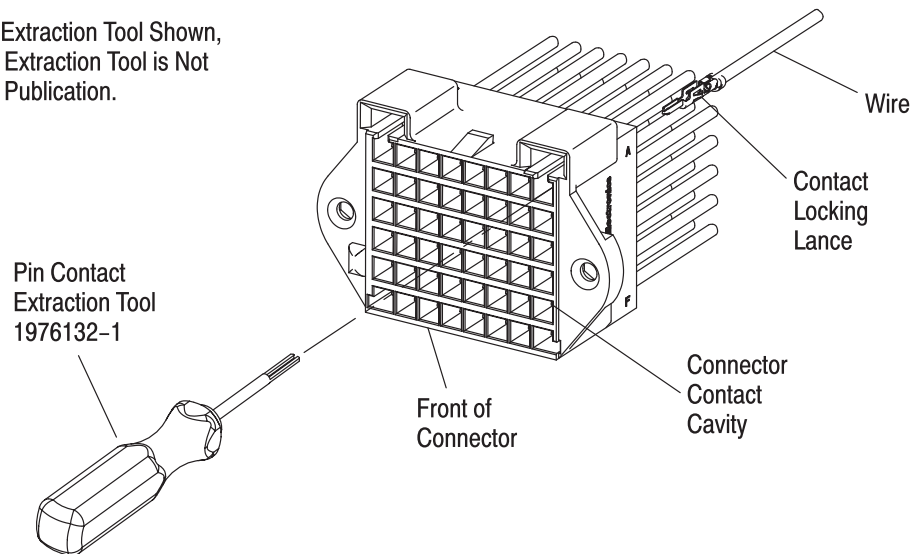


Figure 12

CAUTION

Damaged product should not be used. If a damaged contact is evident, it should be removed from the housing and replaced. If a damaged housing is evident, it should be replaced. Contacts must not be removed and reterminated.



4. QUALIFICATIONS

AMP-DUAC UPC Connectors have been submitted for agency evaluation.

5. TOOLING

A listing of tooling recommendations covering the full wire size range is provided in Figure 13. The listing includes hand tools for manual application of loose piece contacts, and semi-automatic and automatic machines for power assisted application of strip form contacts. 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.

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 Tool Engineering through your local Tyco Electronics Representative or call the Tooling Assistance Center number at the bottom of page 1.

- **Hand Crimping Tools**

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

- **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 at the bottom of page 1 for specific changes.

- **Power Units**

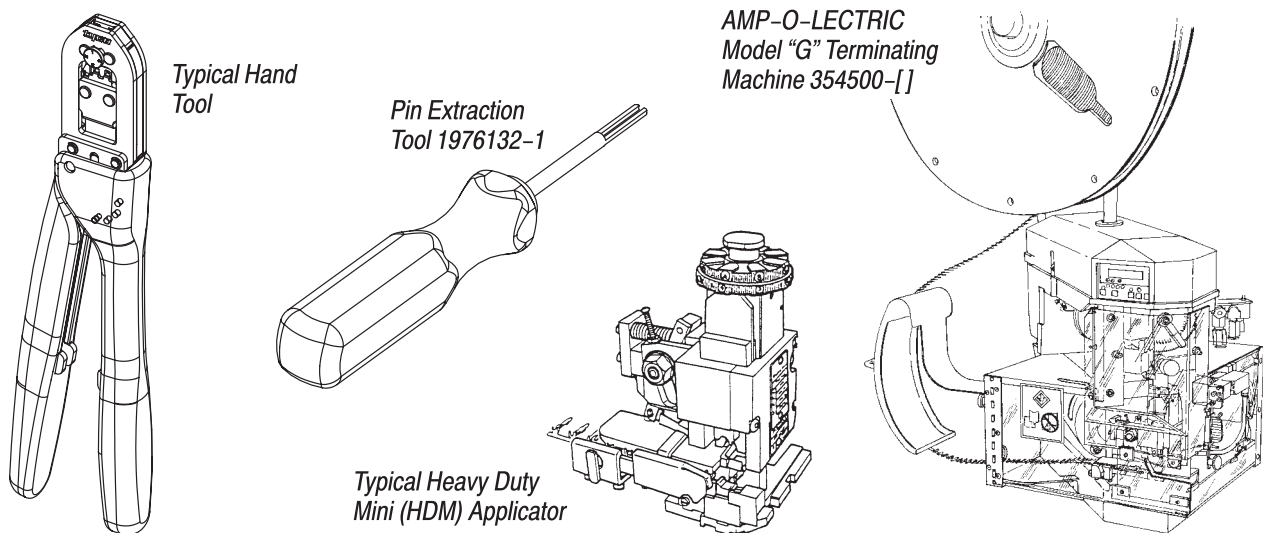
A power unit is an automatic or semi-automatic device used to assist in the application of a product. Power unit includes the power source used to supply the force or power to an applicator.

NOTE

The Model "K" AMP-O-LECTRIC Terminating Machine PN 565435-5 (409-5128) 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.

- **Extraction Tools**

Extraction Tools are designed to release the contacts inside the receptacle connector without damaging the housing or contacts. Refer to Paragraph 3.12.



CONTACT TYPE	WIRE SIZE mm ² [AWG]	INSULATION DIA RANGE	APPLICATION TOOLING (DOCUMENT)			
			APPLICATOR (N/A)	POWER UNIT	HAND TOOL (N/A)	EXTRACTION TOOL
Pin	1.63 [15 or (2) 18]	4.40 Max	1852468-3	354500-1 (409-5842)	1901774-1	1976132-1 (408-10140)
	1.31 [16]	2.50	1852468-3		1901774-1	
	1.25 [18 + 22]	3.90	1852467-3		1901761-1	
	0.82 [18]	2.20	1852467-3		1901761-1	
Socket	1.63 [15 or (2) 18]	4.40 Max	1852468-3		1901774-1	1976297-1 (N/A)
	1.31 [16]	2.50	1852468-3		1901774-1	
	1.25 [18 + 22]	3.90	1852467-3		1901761-1	
	0.82 [18]	2.20	1852467-3		1901761-1	
	0.50 [20]	2.40	1852469-3		734202-2	
	0.30 [22]	1.50	1852469-3		734202-2	

Figure 13

6. VISUAL AID

Figure 14 shows a typical application of AMP-DUAC UPC Connectors. 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.

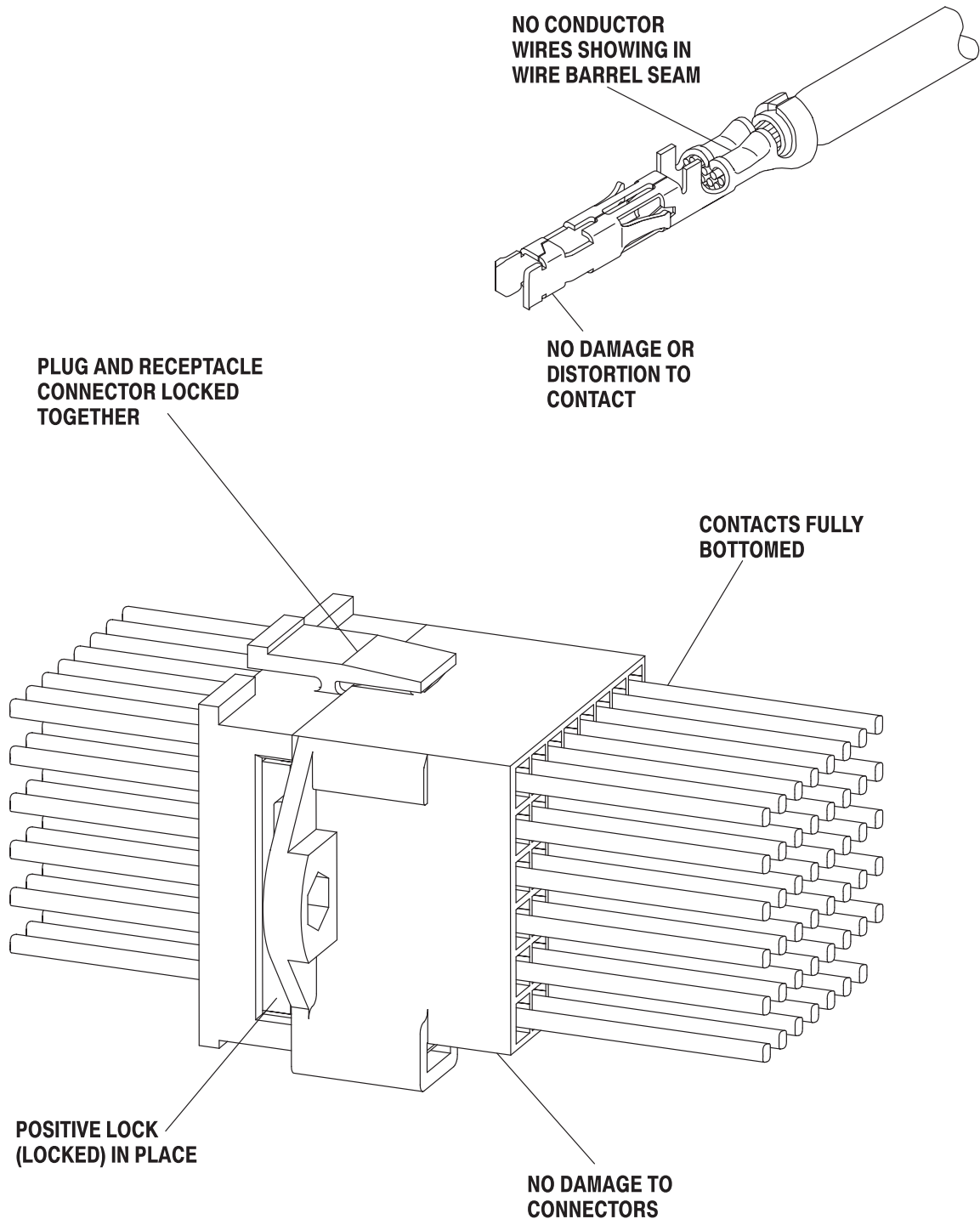


FIGURE 14. VISUAL AID