

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 ± 0.13 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 AMP-DUAC/PL Connectors. These connectors consist of receptacle contacts which are installed in a 4-, 6-, or 12-position receptacle housing. The receptacle housings will accept a discrete wire size range of 0.12 to 0.90 mm² [26-18 AWG]. The customer may provide a shell to support the cable. The range of cable diameters accepted will be determined by this shell. The vertical or right-angle header assembly, which comes with pre-installed contacts, may be installed on the pc board manually, or automatically using robotic equipment.

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.

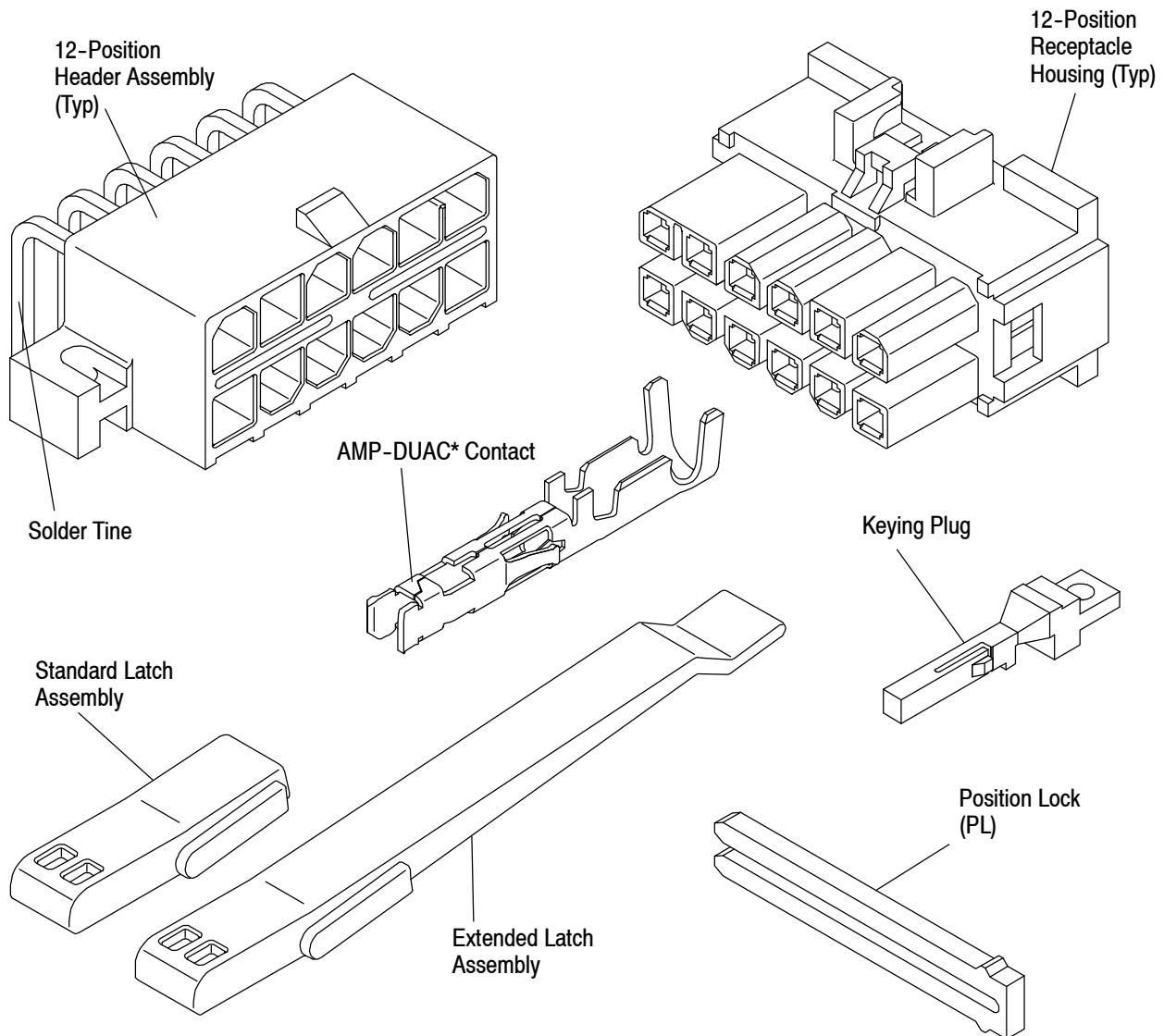


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

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

- Update document to corporate requirements
- New logo

2.2. Customer Assistance

Reference Part Number 794176 and Product Code A207 are representative numbers of AMP-DUAC/PL 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 Center number at the bottom of page 1.

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. Manuals

Manual 402-40 is available upon request and can be used as a guide in soldering. This manual provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is attached to the manual as a guide for information on soldering problems.

2.5. Specifications

Application Specification 114-19048 contains stripping and crimping information for contacts used in AMP-DUAC and AMP-DUAC/PL Connectors. Product Specification 108-1646 provides product performance requirements and test information.

3. REQUIREMENTS

3.1. Storage

A. Ultraviolet Light

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

B. Shelf Life

The header assemblies or 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.

C. Chemical Exposure

Do not store housings or header assemblies 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/PL Connectors are a cable-to-board configuration designed for power applications. The receptacle housing has contacts on 4.2 x 5.5 mm centerlines and is held to the header assembly by a latch assembly. The receptacle housing is polarized to prevent smaller position sizes from being inserted into larger position sizes. The header assemblies contain 1.07 mm square contacts with make-first, break-last (ground pin) option. See Figure 1.

3.3. Cable Selection and Preparation

AMP-DUAC/PL Receptacle Housings accept braided cable while the discrete wire within the cable is used in the individual receptacle contacts in the receptacle connector.

A. Cable Selection

Select the cable diameter and discrete wire size according to your production requirements.

B. Cable Preparation

Strip the cable and discrete wire as shown in Figure 2.

NOTE



Remove any plastic filler or foil underneath the cable jacket and discard. Also DO NOT nick, cut, or scrape the conductors or the braided cable shield during the stripping operation.

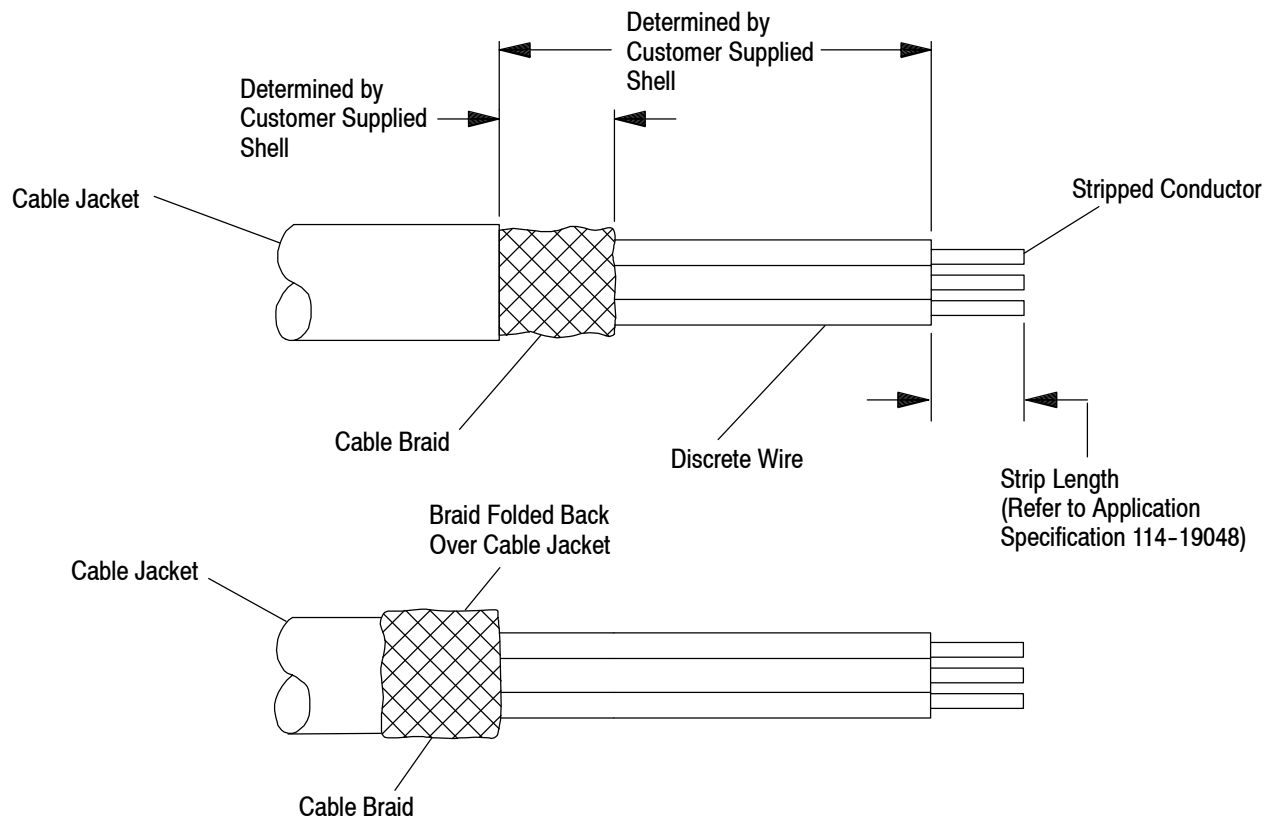


Figure 2

3.4. Terminated Strip Length

Terminated strip length for the outer cable jacket shall be as indicated in Figure 3.

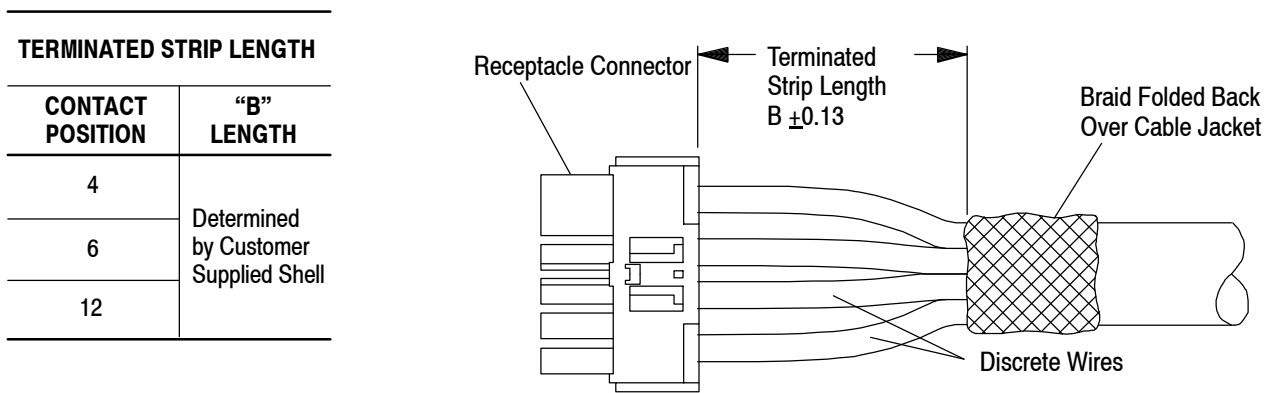


Figure 3

3.5. Discrete Wire

Refer to Application Specification 114-19048 for stripping and crimping dimensions for all contacts used in AMP-DUAC and AMP-DUAC/PL Connectors.

3.6. Placement of Crimped Contact in Housing

After the contact has been terminated, it must be inserted in the back of the receptacle housing and snapped into place. Install the contact so the wire barrel is facing toward the opposing row of circuits. 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 lightly on the wire to ensure contact is fully seated. See Figure 4.

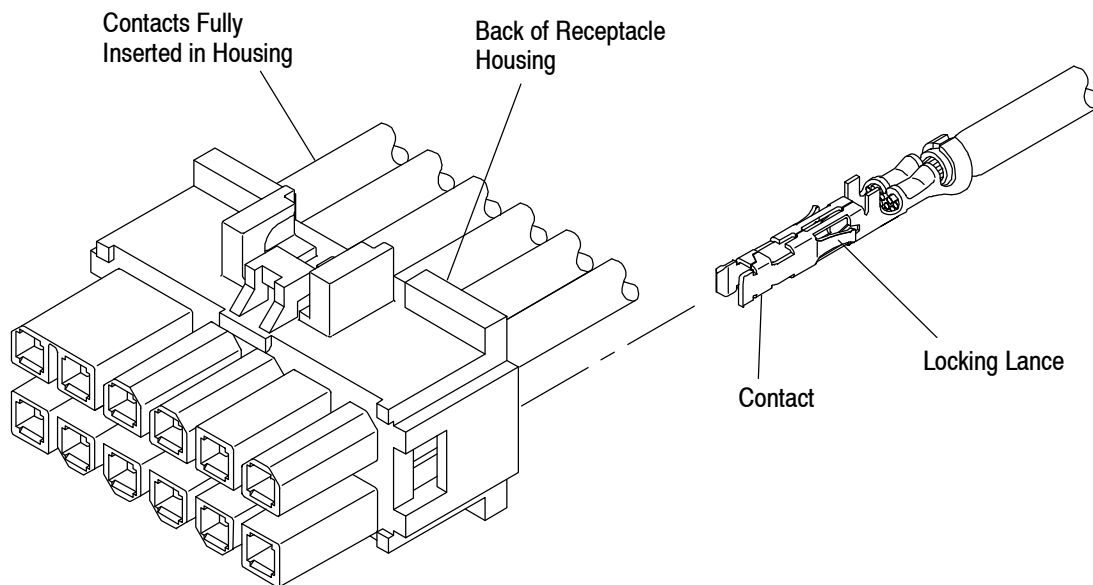


Figure 4

3.7. Keying Plugs

Keying plugs are used to exclude an open receptacle contact from mating. See Figure 5.

NOTE



When a keying plug is used in the receptacle connector, the pin cavity in the mating header assembly must be empty. Install the keying plug so the clearance slot for the position lock is facing toward the opposing row of circuits.

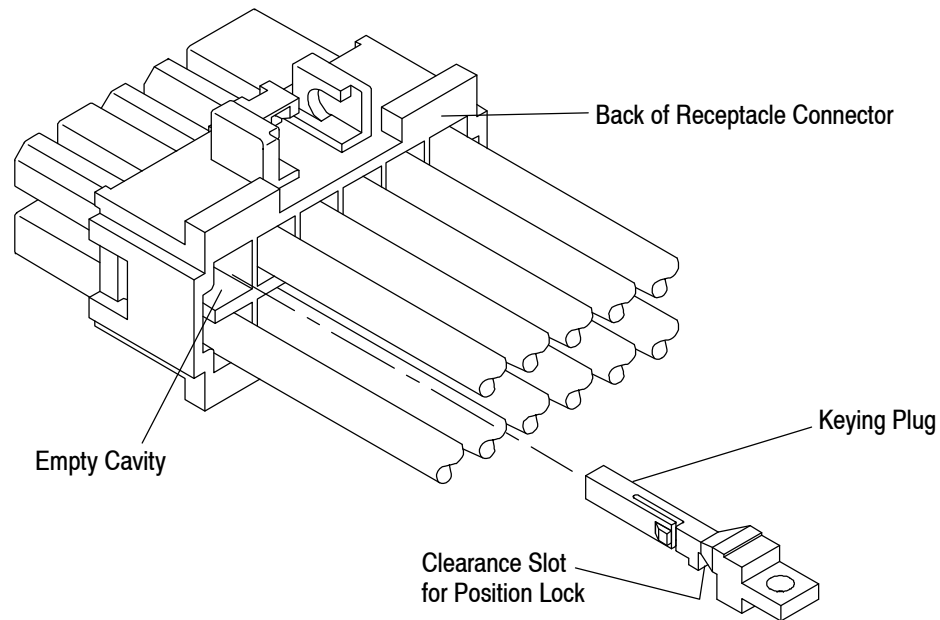


Figure 5

3.8. Position Lock (PL) Assembly

After the contacts and any keying plugs have been inserted, assemble the PL to the receptacle connector to provide a secondary locking feature. The PL locks the contacts and keying plugs in place. See Figure 6.

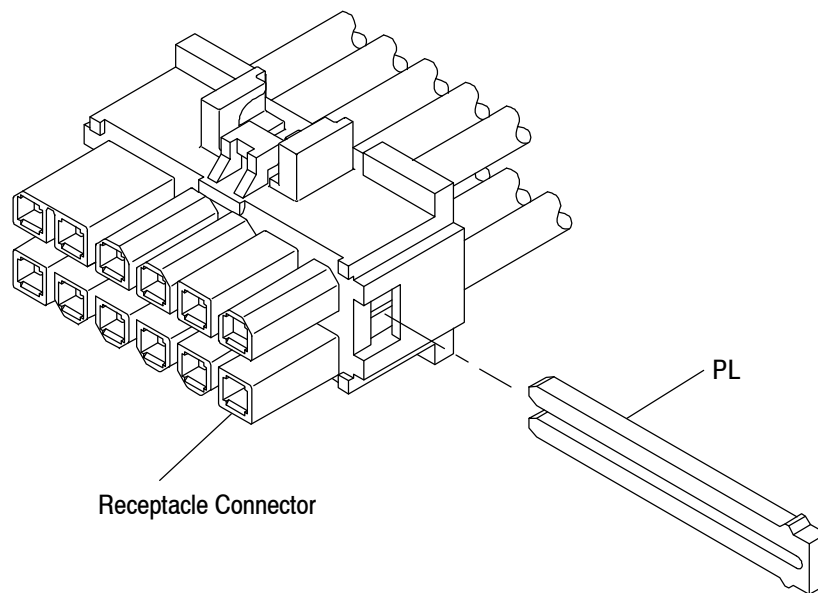


Figure 6

3.9. Customer-Supplied Receptacle Connector Shell

The following procedures explain the assembly of the shell to the receptacle connector. See Figure 7.

1. Place the bottom shell on a flat surface. Insert the receptacle connector in the alignment slots. Make sure the contact wires are evenly aligned with the molded separator.
2. Align the top shell with the bottom shell and receptacle connector. Insert screw and tighten.

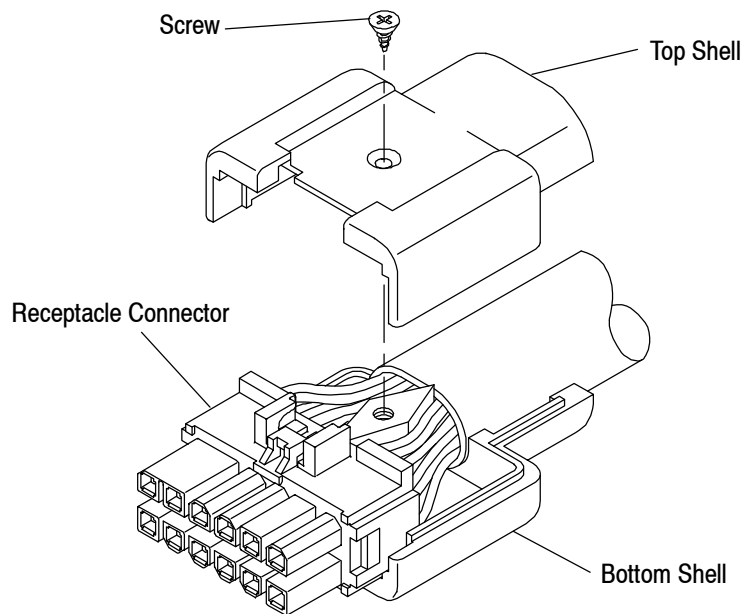


Figure 7

3.10. Latch Assembly

The latch assembly should be inserted onto the receptacle connector after the customer-supplied shell has been attached. This sequence may make it easier for assembly. When the latch is seated, a snap may be heard, indicating the latch assembly has been fully inserted into the receptacle connector slot. An optional extended latch assembly is available for connectors located in hard-to-reach areas. See Figure 8.



The standard and extended latch arms should be held parallel to the receptacle/wire bundle as shown graphically in the left view of Figure 8 when they are being attached to the receptacle housing. Damage to the latch arm spring can occur if the latch arms are assembled at an angle.

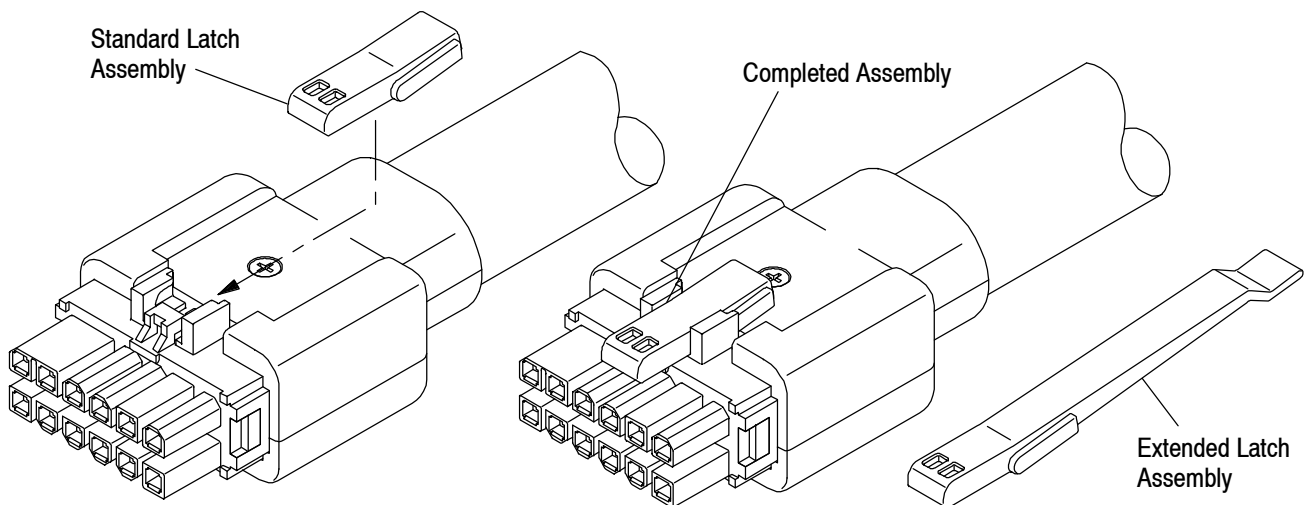


Figure 8

3.11. Wire Bend Radius

Tyco Electronics 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.

3.12. Header Assemblies

The pc board header assemblies are supplied with pre-installed contacts that have right-angle or vertical solder tines. They are designed to mate with cable receptacle connectors that have precision formed, crimp-type contacts inserted into 4-, 6-, or 12-position receptacle housings. These header assemblies may be mounted to the pc board with standard mounting hardware. See Figure 9.

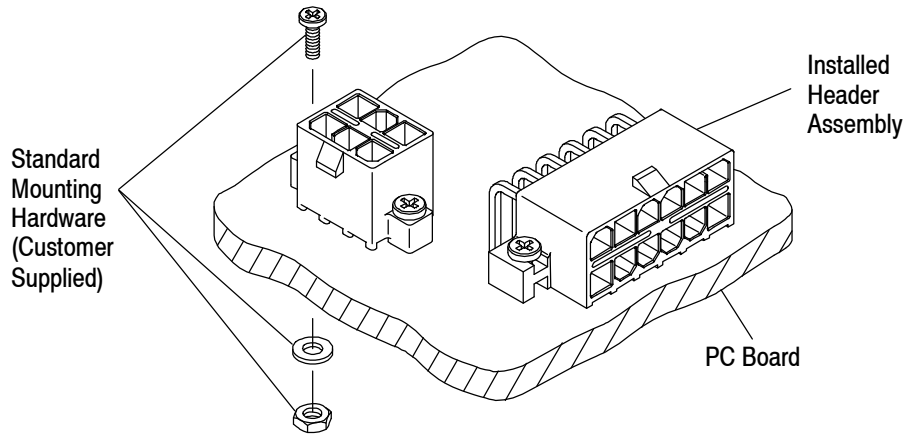


Figure 9

3.13. PC Board

A. Material and Thickness

1. Board material will be glass epoxy (FR-4, G-10).
2. Board thickness shall be 1.57 ± 0.18 mm.

Contact the Product Information Center or the Tooling Assistance Center number listed at the bottom of page 1 for suitability of other board materials or thicknesses.

B. Tolerance

Maximum allowable bow of the pc board shall be 0.03 mm over the length of the header assembly.

C. PC Board Layout

The mounting and contact holes in the pc board must be precisely located to ensure proper placement and optimum performance of the header assembly. Design the pc board using the dimensions provided in Figure 10. The layout shows the top (component) side of the board.

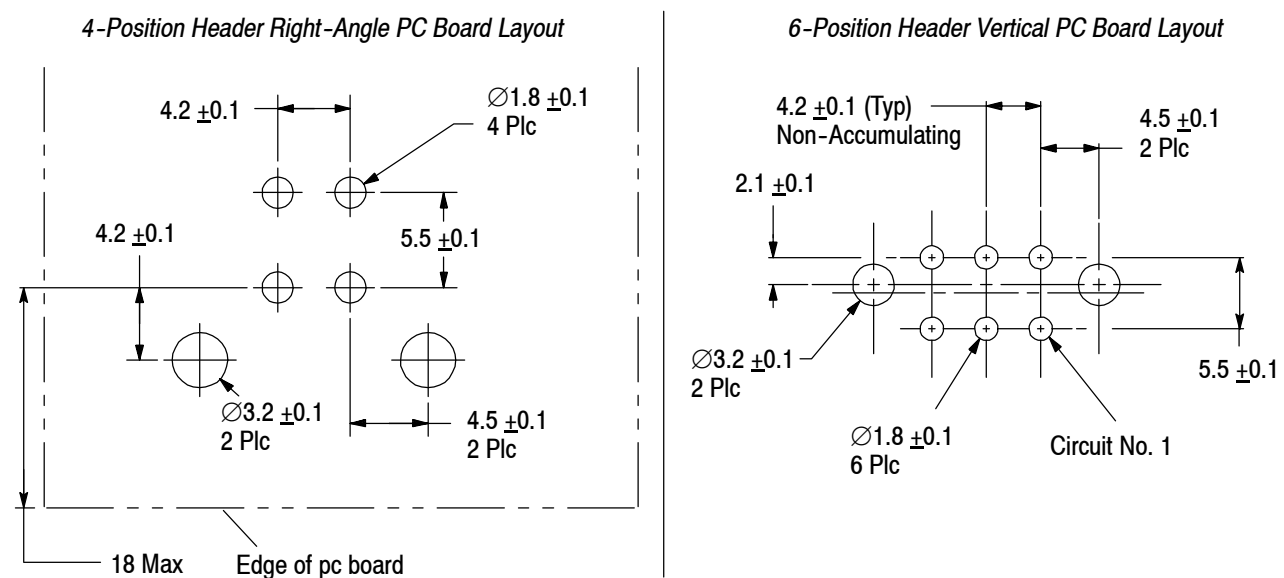


Figure 10 (cont'd)

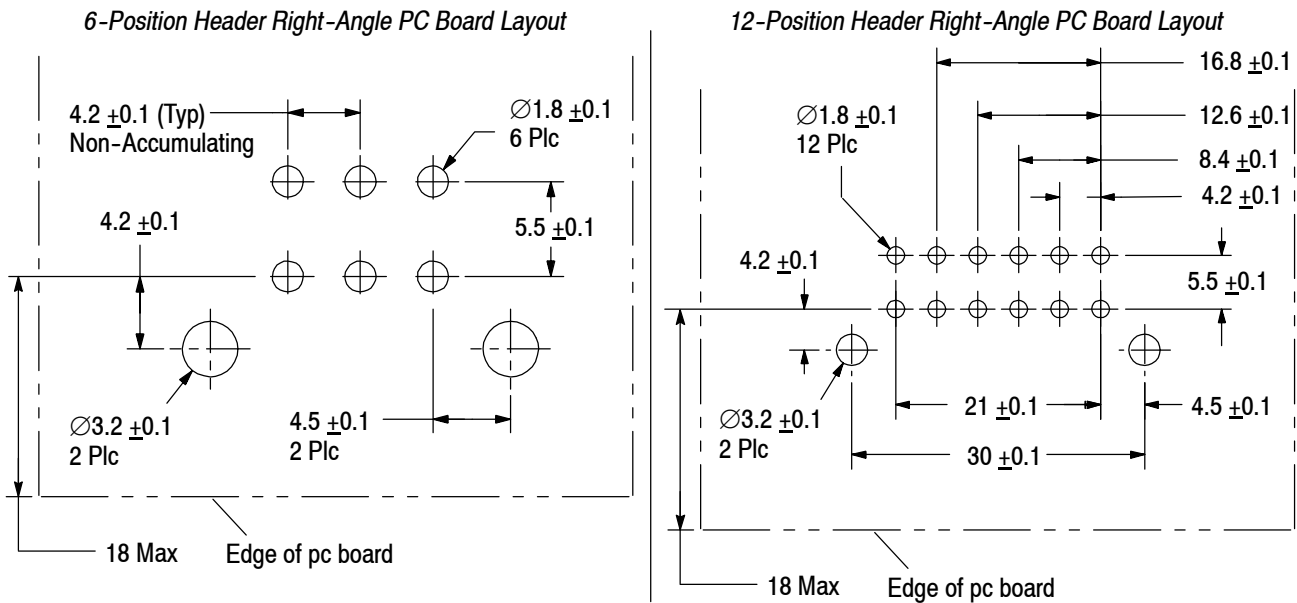


Figure 10 (end)

3.14. PC Board Solder Tine Holes

The holes in the pc board for the solder tines must be drilled and plated through to specific dimensions. See Figure 11.

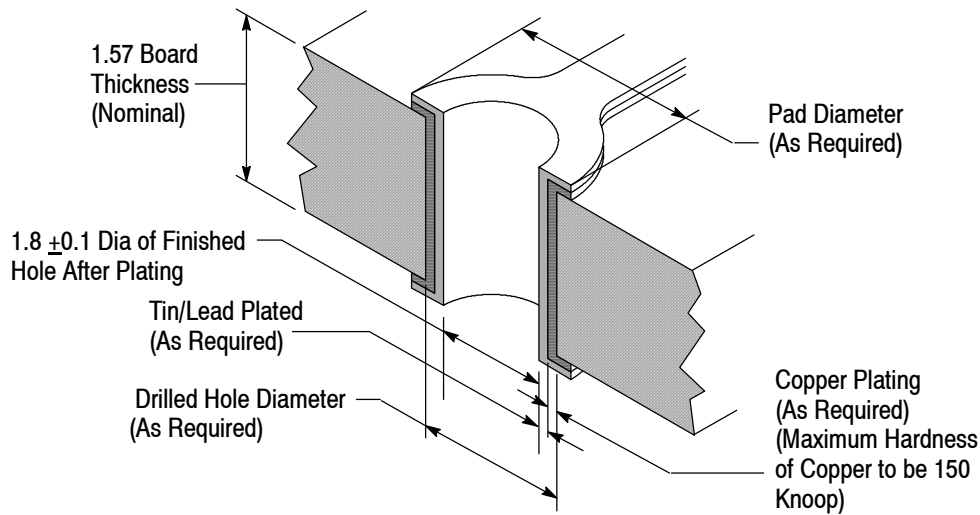
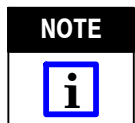


Figure 11

3.15. PC Board Header Assembly Placement



The header assemblies should be handled only by the housing to prevent deformation or other damage to the solder tines.

A. Manual Placement

Align the header assembly solder tines with the appropriate holes in the pc board. Start all solder tines into the board, then press on the header until it seats on the pc board.

B. Robotic Placement

The robotic equipment must be adjusted to feed, pick up, and place the headers on the pc board with an accuracy of 0.25 mm. The header assembly datum surfaces detailed on the customer drawing will ensure correct placement of the header. For information on robotic equipment, see Section 5, TOOLING.

3.16. Soldering

A. Flux Selection

Contact solder tines must be fluxed prior to soldering with a mildly active, rosin base flux. Selection of the flux will depend on the type of pc board and other components mounted on the board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. Call the Product Information phone number at the bottom of page 1 for consideration of other types of flux. Some fluxes that are compatible with these header assemblies are provided in Figure 12.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER■	ALPHA■
Type RMA (Mildly Activated)	Mild	Noncorrosive	186	611

■ KESTER and ALPHA are trademarks.

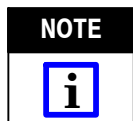
Figure 12

B. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. The following is a listing of common cleaning solvents that will not affect the header assemblies for the time and temperature specified. See Figure 13.



Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the manufacturer's Material Safety Data Sheet (MSDS) for characteristics and handling of cleaners. Trichloroethylene and Methylene Chloride can be used with no harmful affect to the header assemblies; however Tyco Electronics does not recommend them because of the harmful occupational and environmental effects. Both are carcinogenic (cancer-causing) and Trichloroethylene is harmful to the earth's ozone layer.



If you have a particular solvent that is not listed, contact the Tooling Assistance Center or Product Information number at the bottom of page 1.

CLEANER		TIME (Minutes)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
Alpha◆ 2110	Aqueous	1	132	270
Bioact◆ EC-7	Solvent	5	100	212
Butyl Carbitol◆	Solvent	1	Room Ambience	
Isopropyl Alcohol	Solvent	5	100	212
Kester◆ 5778	Aqueous	5	100	212
Kester 5779	Aqueous	5	100	212
Loncoterge◆ 520	Aqueous	5	100	212
Loncoterge 530	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

◆Alpha, Bioact, Butyl Carbitol, Kester, and Loncoterge are trademarks.

Figure 13

C. Drying

When drying cleaned assemblies and printed circuit boards, make certain that temperature limitations are not exceeded: -55° to 105°C [-67° to 221°F] for standard temperature products. Excessive temperatures may cause header assembly degradation.

D. Soldering Guidelines

AMP-DUAC/PL Header Assemblies can be soldered using wave or equivalent soldering techniques. The temperatures and exposure time shall be within the ranges specified in Figure 14. We recommend using SN60 or SN62 solder for these header assemblies.

NOTE *Manual 402-40 provides some guidelines for establishing soldering practices. Refer to Paragraph 2.4, Manuals.*

SOLDERING PROCESS	TEMPERATURE		TIME (At Max Temperature)
	CELSIUS	FAHRENHEIT	
WAVE SOLDERING	260**	500**	5 Seconds

** Wave Temperature

Figure 14

3.17. Checking Installed Header Assemblies

The header assemblies must be seated on the pc board to the dimensions shown in Figure 15.

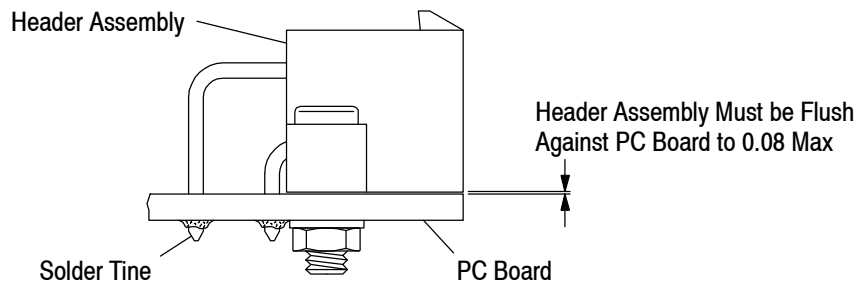


Figure 15

3.18. Polarization

The configuration of the AMP-DUAC/PL Connector mating face prevents accidental inversion when mating the two components. See Figure 16.

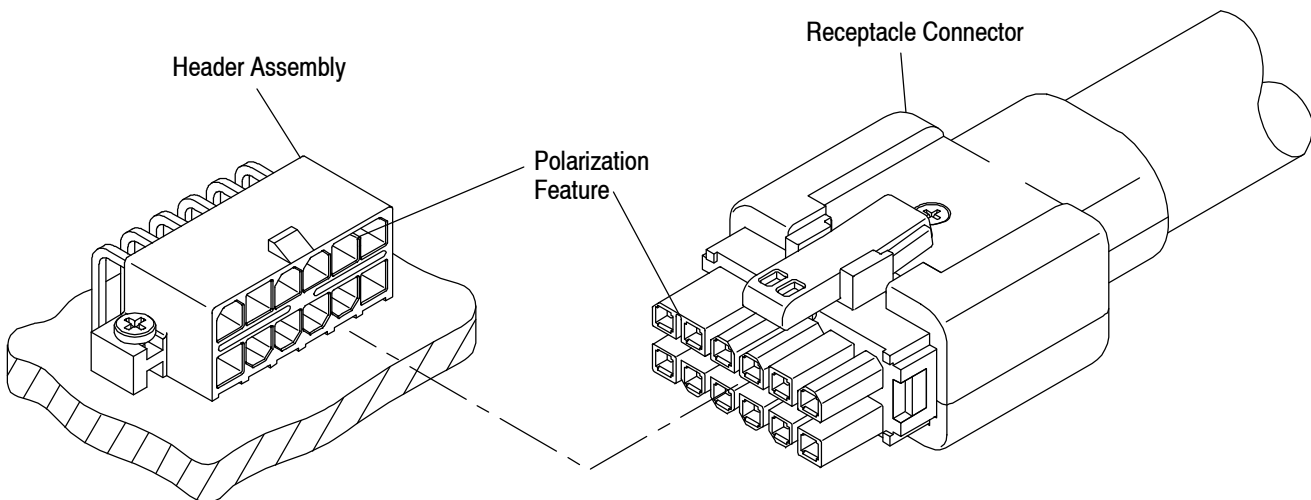


Figure 16

3.19. Mating of Connectors

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

3.20. Header Assembly Spacing

Care must be used to avoid interference between adjacent header assemblies and/or other components. The information provided in Figure 17 is to ensure proper mating.

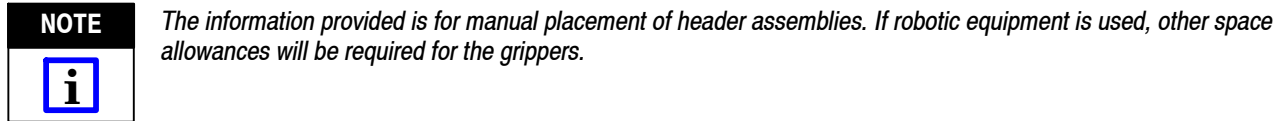
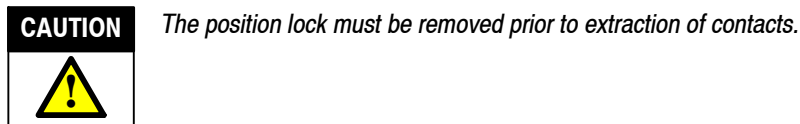


Figure 17

3.21. Repair/Removal



Use an extraction tool to remove individual contacts from connectors for replacement or for relocation to another housing cavity. Extraction Tool 188688-1 is used to extract contacts from receptacle connectors. See Figure 18. Reset the locking lances to the original spread before reusing contacts. Damaged or worn contacts may be replaced provided there is sufficient slack, after restripping the wire, to insert the new contact into the connector. Refer to Section 5, TOOLING. Damaged pc board header assemblies may be removed from the pc board by standard desoldering methods.

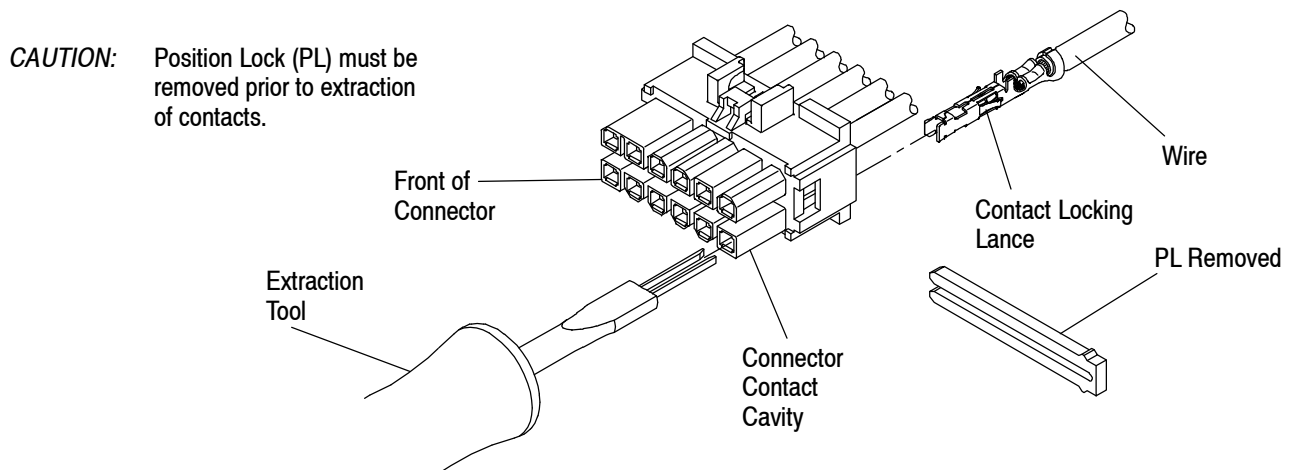


Figure 18

4. QUALIFICATIONS

AMP-DUAC/PL Connectors have been Listed by Underwriters Laboratories Inc. (UL) in File E28476 and Certified by CSA International in File LR7189.

5. TOOLING (Figure 19)

A listing of tooling recommendations covering the full wire size range of the contacts is provided in Application Specification 114-19048. 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 Tyco Electronics Tool Engineering through your local Tyco Electronics Representative or call the Tooling Assistance Center number at the bottom of page 1.

- **Robotic Equipment**

Robotic equipment for placement of the header assemblies on a pc board must have a true position accuracy of 0.25 mm to ensure proper location and insertion of the solder tines. This includes gripper and fixture tolerances as well as equipment repeatability. It must use the assembly datum surface to ensure reliable header placement.

- **PC Board Support**

A pc board support must be used to prevent bowing of the pc board during insertion of the headers. It should have a flat surface with holes or a channel large enough to receive the solder tines during installation.

- **Extraction Tools**

Extraction Tools are designed to release the contacts inside the receptacle connector without damaging the housing or contacts. Refer to Paragraph 3.22.

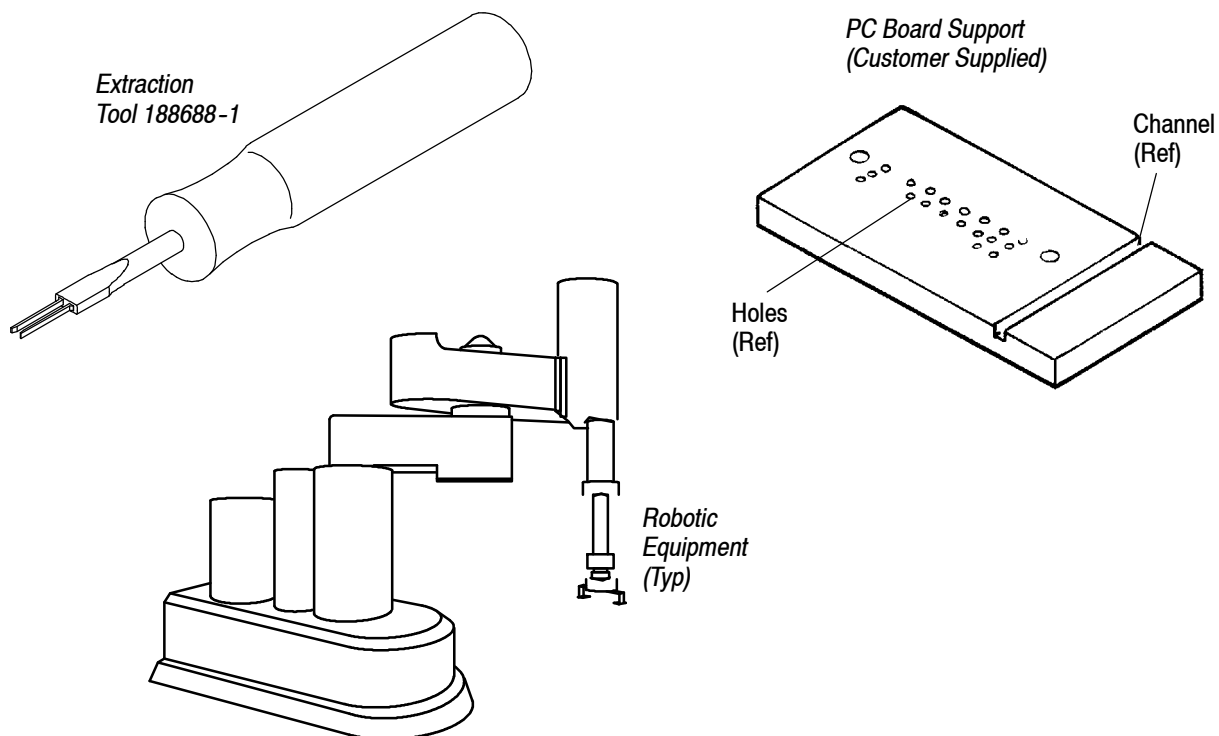


Figure 19

6. VISUAL AID

Figure 20 shows a typical application of AMP-DUAC/PL 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.

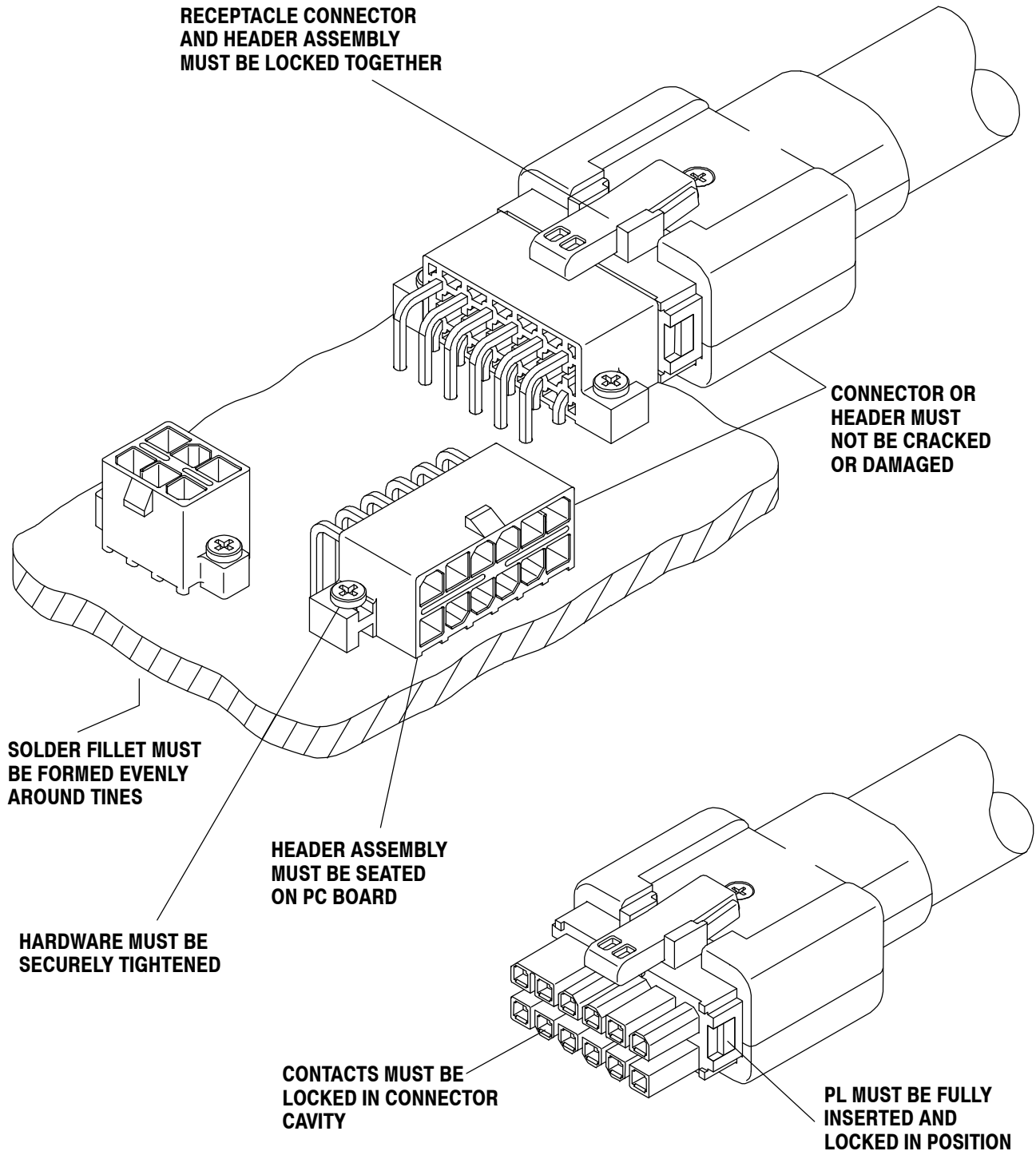


FIGURE 20. VISUAL AID