



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 AMPINNERGY WTW Connectors. A mating connector consists of two hermaphroditic housings, each loaded with a terminated hermaphroditic contact. The connectors are stackable in four directions and may be used as free hanging applications, surface mounted, or panel mounted. Built-in interlocking features provide the connectors and accessory mounting adapter with resistance to shock and vibration. This application specification obsoletes Instruction Sheet 408-3198.

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.

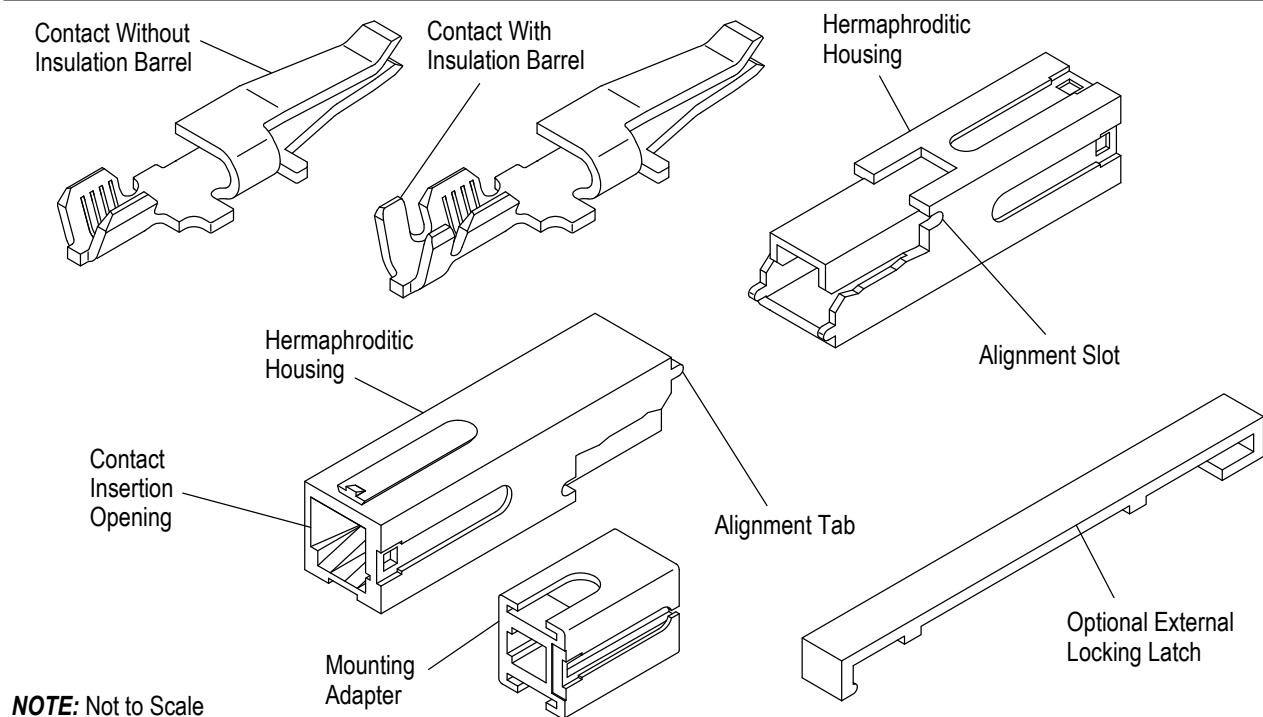


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

- Changed Tyco Electronics to TE Connectivity or TE in all instances
- Changed text in Paragraph 2.2

2.2. Customer Assistance

Reference Product Base Part Number 556137 and Product Code 3951 are representative of AMPINNERGY WTW Connectors. 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 this page.

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, the information contained in the Customer Drawings takes priority.

2.4. Specifications

Product Specification [108-1373](#) provides product performance requirements and test information for these connectors.

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, and customer manuals (409-series) that provide setup, operation, and maintenance of machines.

<u>Document Number</u>	<u>Document Title</u>
408-2095	Hand Crimping Tool 69710-1
408-3277	AMPINNERGY Wire to Wire Stackable Connectors
408-3295	Preparing Reel of Contacts for Application Tooling
408-4105	Straight Action Crimper 217200-1
408-4190	C-Head Pneumatic Adapter 318161-1
408-7424	Checking Terminal Crimp Height or Gaging Die Closure
408-8040	Heavy Duty Miniature Quick-Change Applicators (Side-Feed Type)
408-8053	Conversion Guide for Miniature Quick-Change Applicators
408-9685	Extraction Tool 844751-2
408-9807	Crimping Die Assemblies 58490-1 and 58491-1
408-9816	Handling of Reeled Products
408-9905	Crimping Die Assemblies 58492-1 and 58493-1
409-5128	Basic AMP-O-LECTRIC* Model "K" Terminating Machines, and Accessories
409-5842	AMP-O-LECTRIC Model "G" Terminating Machine 354500-1
409-5852	AMPOMATOR* CLS III-G Lead-Making Machine
409-5862	626 Pneumatic Tool Assemblies 189721-[] and 189722-[]
409-5878	AMPOMATOR CLS IV+ Lead-Making Machine

3. REQUIREMENTS

3.1. Storage

A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the housing material.

B. Reel Storage

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

C. Shelf Life

The contacts and housings should remain in the shipping containers until ready for use to prevent deformation to those components. The components 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 product near any chemical listed below as they may cause stress corrosion cracking in the material.

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

AMPINNERGY WTW Connectors are single-position, hermaphroditic housings available in different colors for circuit coding and identification. The housings are stackable in four different directions through the use of molded interlocking keys and keyways. The housings are designed for free hanging, panel mounting, or surface mounting applications with accessory mounting adapters.

The contacts are supplied in strip or loose piece form. Strip form contacts are designed to be crimped by a miniature quick-change applicator used in a Terminating Machine. Loose piece form contacts are designed to be crimped by a die assembly used in a Pneumatic Adapter or Hand Crimping Tool.

3.3. Wire Selection

AMPINNERGY WTW Contacts will accept wire sizes and insulation diameters listed in Figure 2, along with the strip lengths, crimp heights, and crimp widths.



CAUTION

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



NOTE

The applied crimp dimension (within the functional range of the product) is dependent on the termination tooling being used. Refer to the documentation (applicator logs and instruction sheets) supplied with the termination tooling for the applied crimp height. See Section 5, TOOLING.

WIRE SIZE	INSULATION DIAMETER RANGE	STRIP LENGTH	WIRE BARREL CRIMP		INSULATION BARREL CRIMP HEIGHT	BELLMOUTH CRIMP HEIGHT	
			HEIGHT	WIDTH (REF)			
18	---	5.54-6.35 [.218-.250]*	2.26-2.16 [.089-.085]	3.56 [.140]	---	2.97-2.47 [.117-.097]	
	2.11-2.3 [.083-.118]				3.15-2.95 [.124-.116]		
16	---		2.36-2.16 [.093-.085]	3.56 [.140]	---	3.07-2.57 [.121-.101]	
	2.11-2.3 [.083-.118]				3.45-3.25 [.136-.128]		
14	---		2.54-2.39 [.100-.094]	3.56 [.140]	---	3.25-2.75 [.128-.108]	
	2.11-2.3 [.083-.118]				3.95-3.75 [.156-.148]		
12	---		6.35-7.14 [.250-.281]* 7.87-8.66 [.310-.341]	2.97-2.79 [.117-.110]	4.57 [.180]	---	3.68-3.18 [.145-.125]
	3.71-4.29 [.146-.169]					4.55-4.35 [.179-.171]	
10	---			3.33-3.15 [.131-.124]	4.57 [.180]	---	4.03-3.53 [.159-.139]
	3.71-4.29 [.146-.169]					5.15-4.95 [.203-.195]	

*Applicators only •Die Assembly only

Figure 2

3.4. Crimped Contact Requirements

Locate the contact to be crimped in the appropriate tooling according to the instructions packaged with that tooling. Detailed instructions covering the placement of contacts in the tooling and the use of such tooling is packaged with each tool.

Terminate the contact according to the directions shipped with the appropriate tooling. See Section 5, TOOLING.



CAUTION

Wire insulation shall NOT be cut or broken during the crimping operation, nor shall the insulation be crimped into the contact wire barrel. Reasonable care should be taken by tooling operators to provide undamaged wire terminations.



NOTE

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

A. Wire Barrel Crimp Height

The crimp applied to the wire portion of the contact is the most compressed area and is most critical in ensuring optimum electrical and mechanical performance of the crimped contact. The crimp height must be within the dimensions provided in Figure 3.

B. Wire Barrel Crimp Length

For optimum crimp effectiveness, the crimp must be within the area shown and must meet the crimp dimensions provided in Figure 2. 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 Figure 16.

C. Bellmouth Crimp Height

Rear bellmouth crimp height 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.

NOTE: Contact Without Insulation Barrel Shown

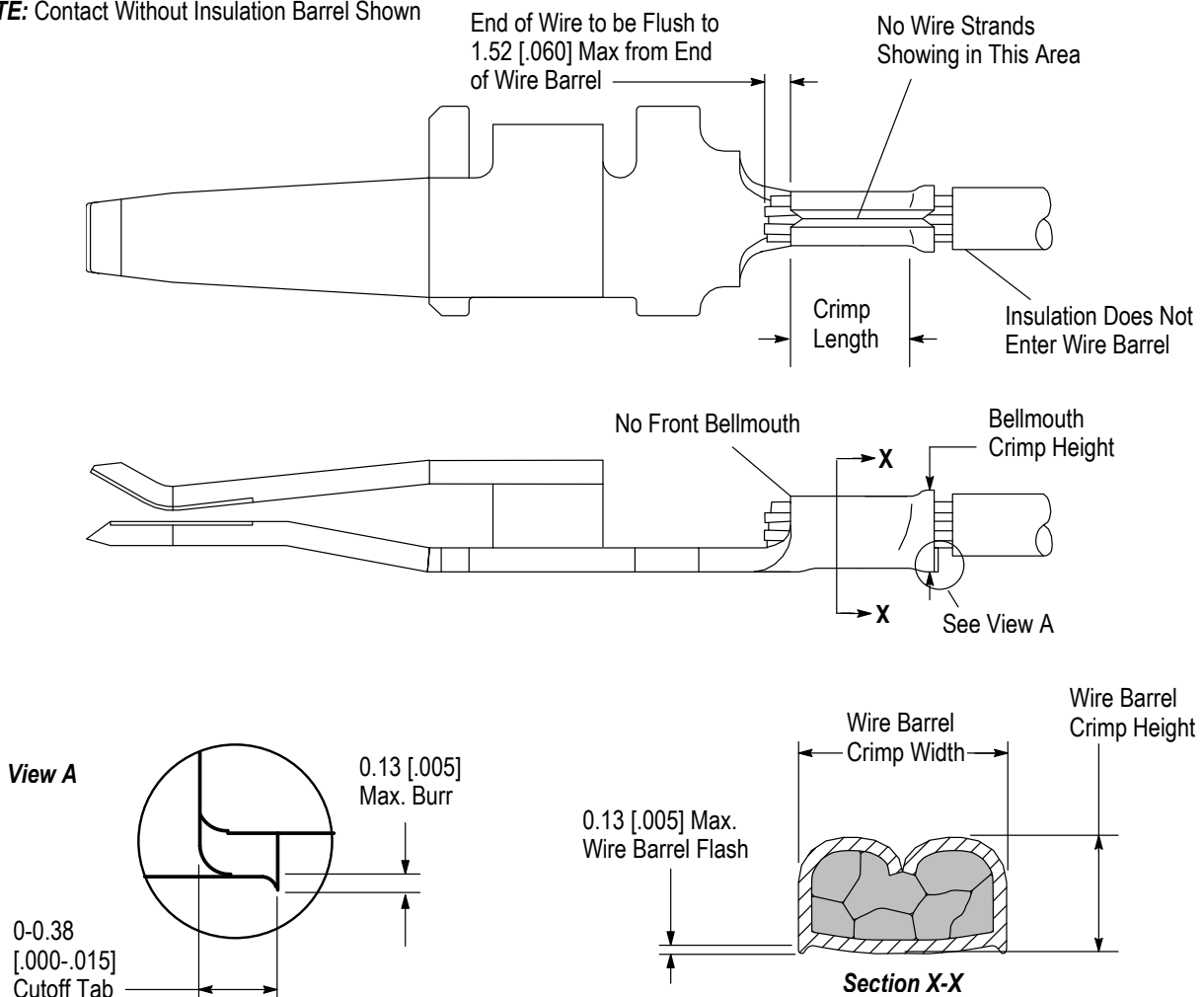


Figure 3 (cont'd)

NOTE: Contact With Insulation Barrel Shown

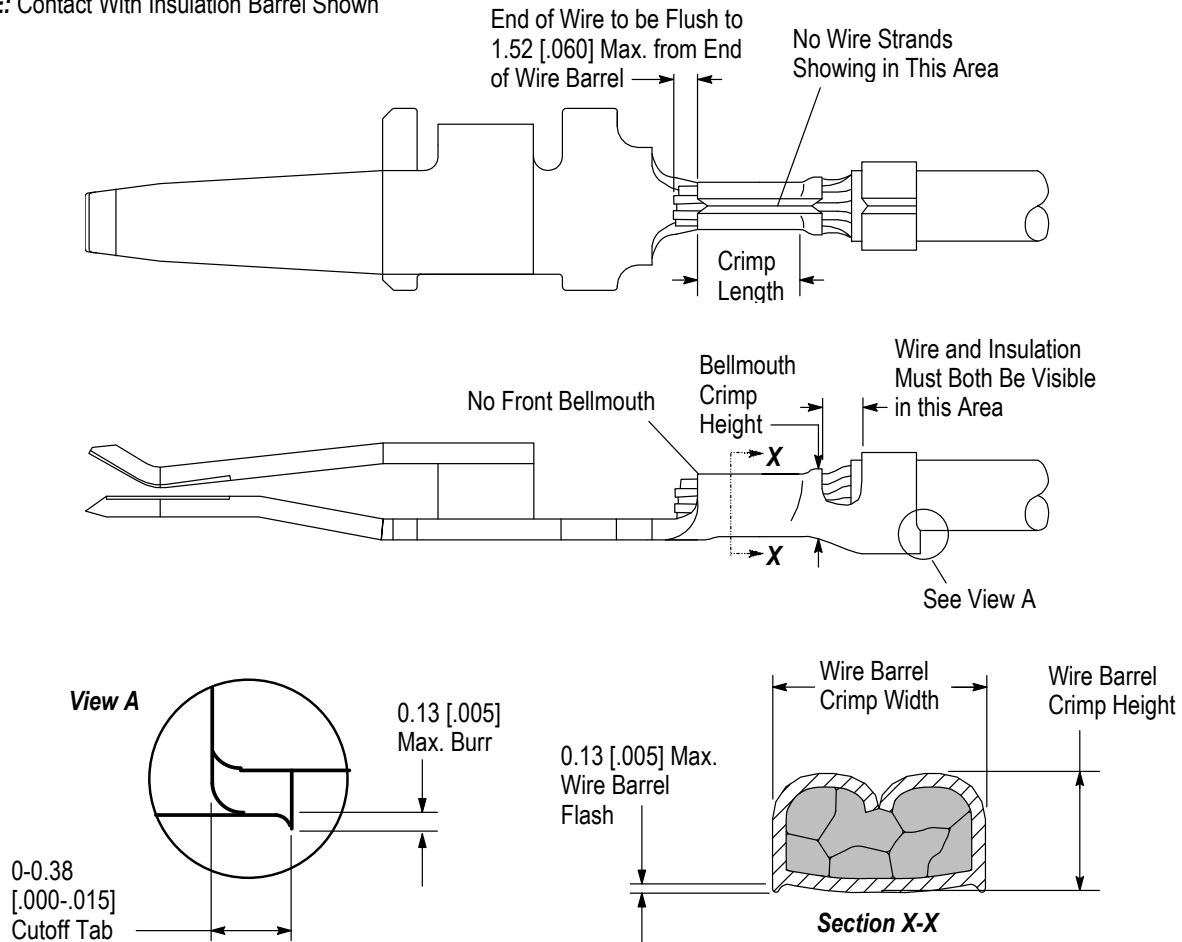


Figure 3 (end)

E. Burrs

The cutoff burr shall not exceed the dimensions shown in Figure 3 in view A.

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.

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. See Figure 4.

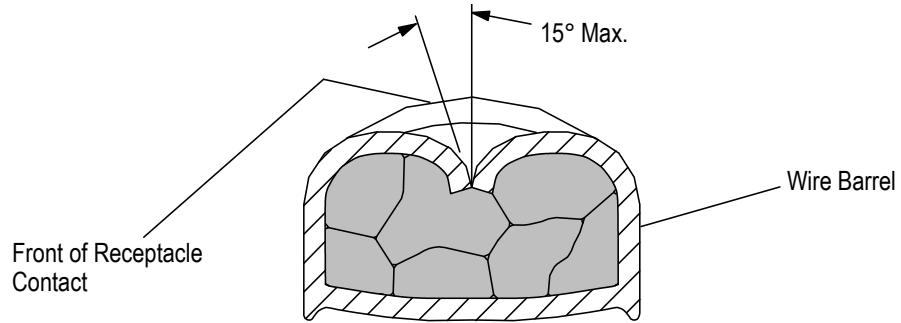


Figure 4

K. Straightness

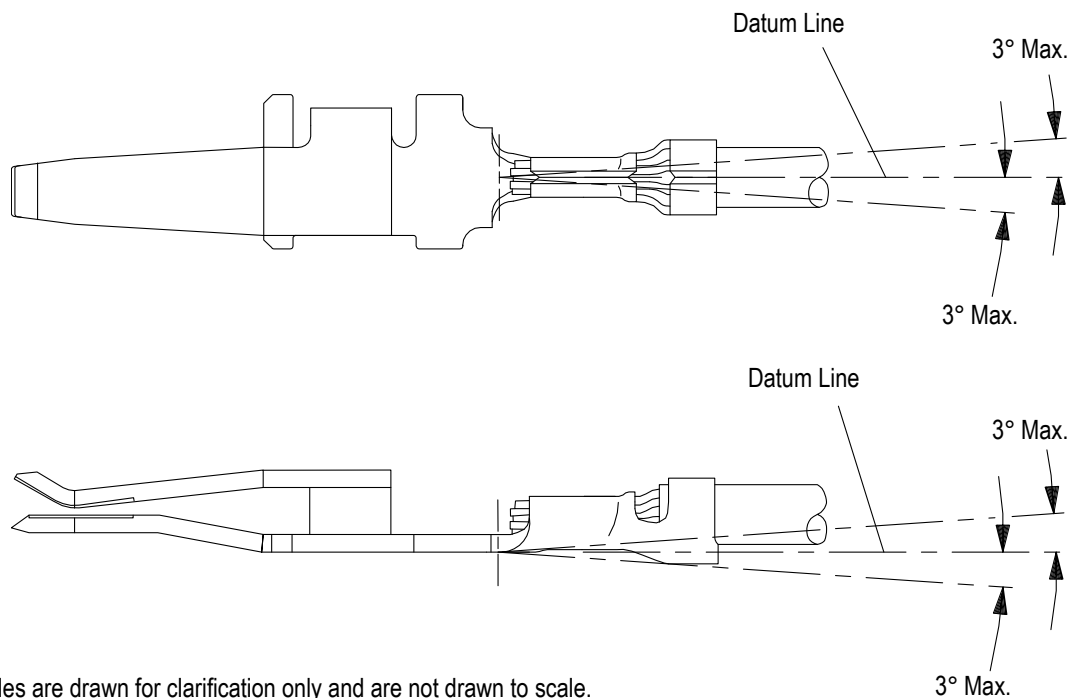
The force applied during crimping may cause some bending between the crimped wire barrel and the mating portion of the contact. Such deformation is acceptable within the following limits.

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: Angles are drawn for clarification only and are not drawn to scale.

Figure 5

3.5. Tensile Strength

Crimped contacts should hold the wire firmly and have a crimp pull-out test value meeting that specified in the table in Figure 6.



NOTE

Adjust tensile testing machine for head travel of 25.4 mm [1 in.] per minute. Directly and gradually apply force for 1 minute.

WIRE BARREL CRIMP PULL-OUT TEST

WIRE SIZE, AWG	MINIMUM FORCE	
	NEWTONS	POUNDS
18	89	20
16	133	30
14	222	50
12	311	70
10	356	80

Figure 6

3.6. Assembly and Contact Installation

A. Housing Assembly

Align key on one housing with keyway on other housing as shown in Figure 7. Slide housing forward until special locking feature is engaged (an audible click). Repeat this procedure until desired multiple assembly is engaged.

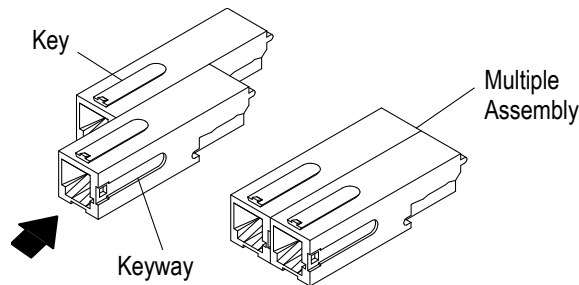


Figure 7

B. Contact Installation

Orient crimped contact so that the stabilizing ears align with the housing slots as shown in Figure 8. Insert contact into housing until it bottoms, and audible click is heard or felt. Pull back lightly on wire to assure retention of crimped contact in housing. Repeat this procedure for multiple assembly.

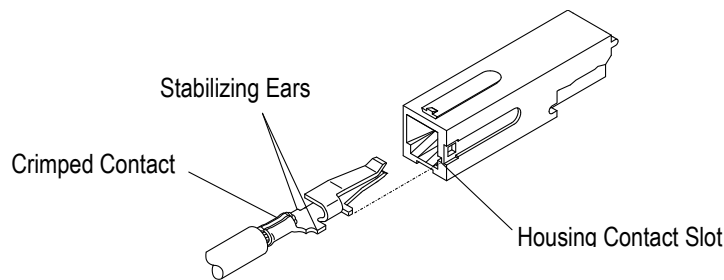


Figure 8

C. Mounting Adapter

The mounting adapter is available in black only. It is designed to slide into the molded keyways of the housing and allow the connector to be surface mounted or panel mounted. See Figure 9.

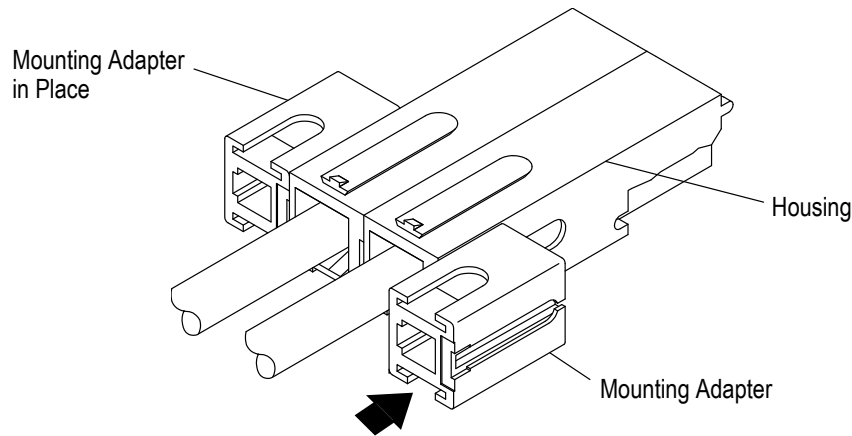


Figure 9

3.7. Strain Relief

When bending or forming wires, hold wires at least 6.35 mm [.250 in.] beyond rear of connector before bending them in desired direction.



CAUTION

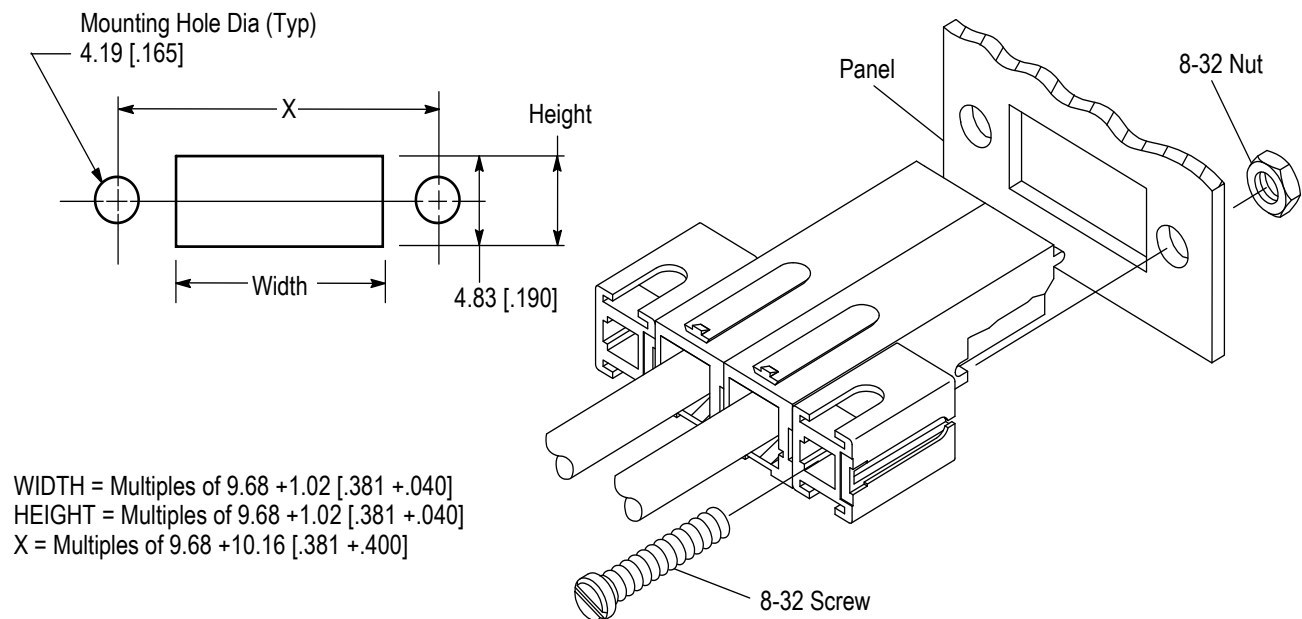
Do not bend unsupported wires. This may put strain on the contacts inside the connectors.

Provide strain relief for wires approximately 25.4 mm [1 in.] from rear of housing if the installation is to be subjected to bending forces.

3.8. Panel Mounting

Slide accessory mounting adapters onto appropriate housings until locking feature is engaged (an audible click). See Figure 9.

Cut panel opening as required for single or multiple position connectors, see Figure 10. Insert connector through panel cutout and secure connector with 8-32 screws and nuts or equivalent (customer supplied).



WIDTH = Multiples of 9.68 +1.02 [.381 +.040]
 HEIGHT = Multiples of 9.68 +1.02 [.381 +.040]
 X = Multiples of 9.68 +10.16 [.381 +.400]

Figure 10

3.9. Surface Mounting

Slide accessory mounting adapters onto appropriate housings until locking feature is engaged (an audible click). See Figure 9.

Drill holes as indicated in Figure 11 and secure connector with 8-32 screws and nuts or equivalent (customer supplied).

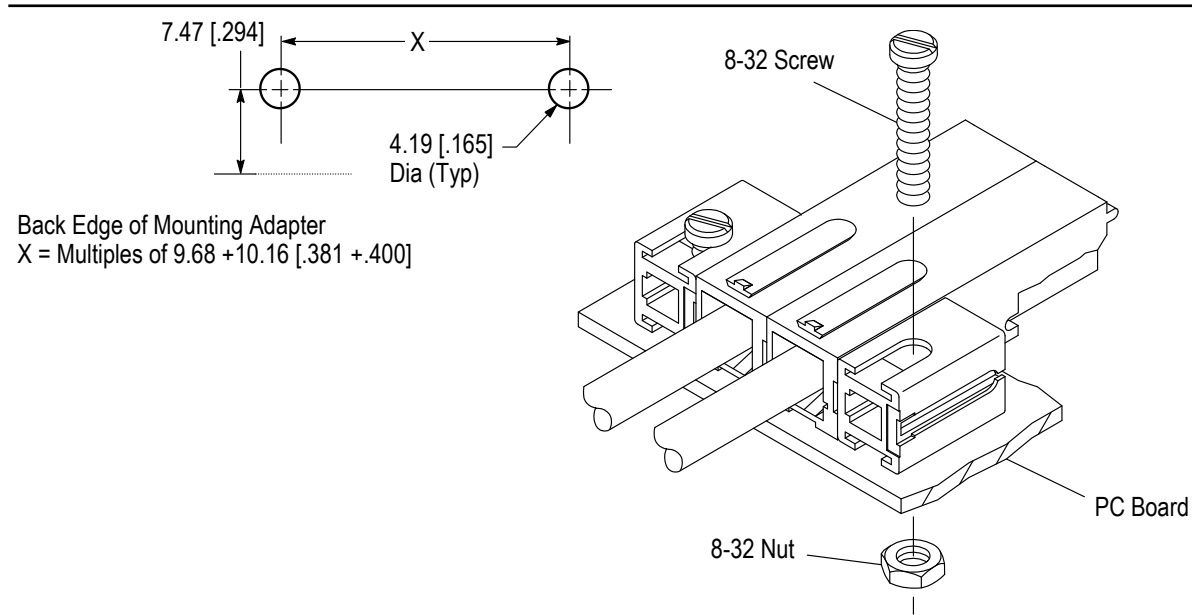


Figure 11

3.10. Mating Connectors

Orient housing alignment slot with housing alignment tab. Snap mating connectors together; see Figure 12.

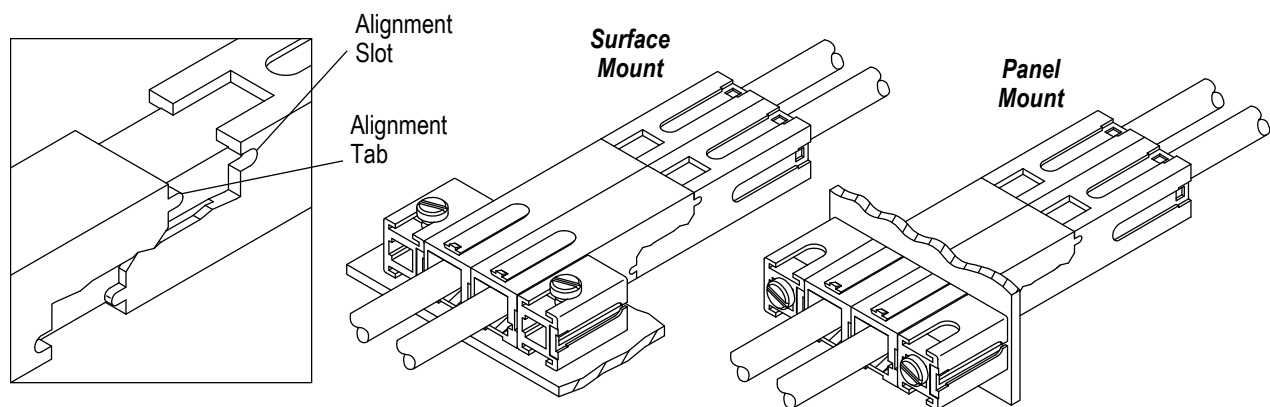


Figure 12

3.11. Disassembly Procedures

A. Contact Removal



DANGER

To avoid personal injury, disconnect the electrical supply prior to removing contacts.

The contact is retained in the housing by an internal latch. It is necessary to deflect the latch upward to remove the contact. Align blade of Extraction Tool 844751-2 (408-9685) with FRONT of connector. Insert blade between the contact and the internal latch. While pulling lightly on contact wire, lift up internal latch and pull contact from housing. See Figure 13.

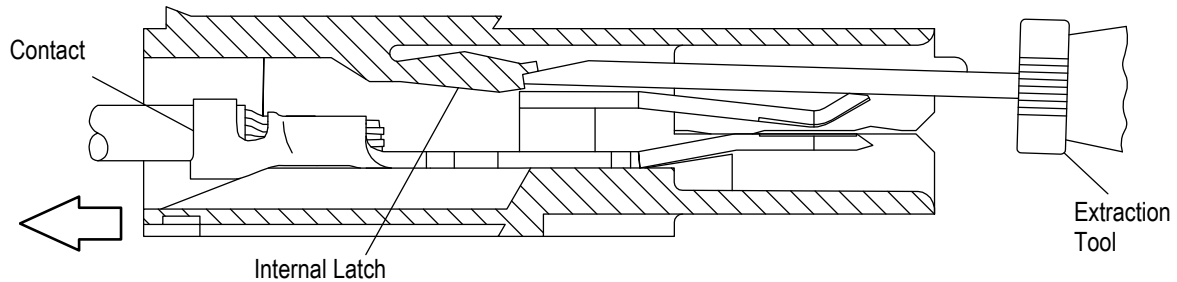


Figure 13

B. Separate Housings and Mounting Adapters

Insert a flat tip screwdriver between a housing and a mounting adapter, or between two housings as shown in Figure 14. Twist screwdriver to pry apart connectors.

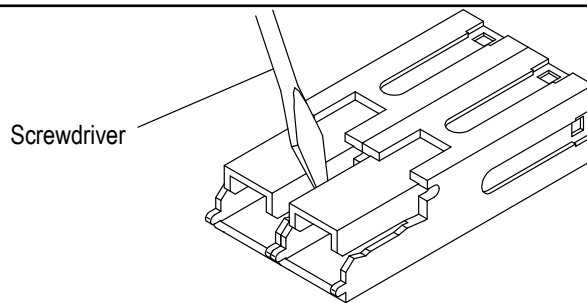


Figure 14

3.12. External Locking Latch

An external locking latch is available for AMPINNERGY WTW Connectors for extra mated retention force. This latch provides approximately 100 lbs of retention force. See Figure 15.

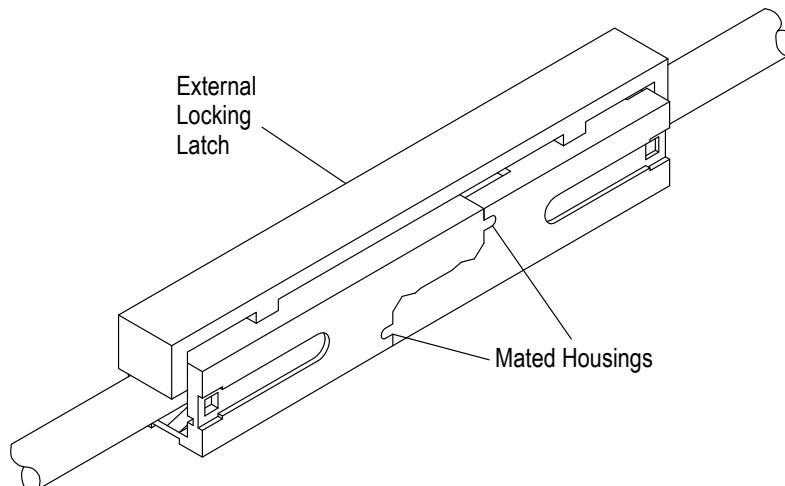


Figure 15

4. QUALIFICATIONS

AMPINNERGY WTW Connectors are Listed by Underwriters Laboratories Inc. (UL) in File E28476, and Certified by CSA International, in File LR7189.

5. TOOLING

This section provides a selection of tools for various application requirements. They include hand tools for manual application of loose piece form contacts, and semi-automatic and automatic machines for power assist 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. A listing of tooling recommendations covering the full wire size range is provided in Figure 16.

i **NOTE**
 • Terminals will accept one each wire sizes 18, 16, and 14 or combinations of 18 and 16 AWG wire. Terminals will also accept one each wire sizes 12 or 10, or combinations of 12, 18, 16, and 14 AWG wire. • Use with 626 Pneumatic Tooling Assemblies 189721-2 or 189722-2.

WIRE SIZE•	INSUL RANGE	STRIP LENGTH	APPL (408-8040)	POWER UNIT (DOC)	HAND TOOL (DOC)	DIE ASSY (DOC)	CRIMPING HEAD• (DOC)	PNEU HOLDER• (DOC)	EXT TOOL (408-9685)
18-16	---	---	567403-1	122500-2, -3 (409-5852)	69710-1 (408-2095)	58493-1 (408-9905)	---	---	844751-2
				356500-1, -2 (409-5878)					
				1213400-1, -2 (409-5878)					
			567403-2	354500-1 (409-5842)					
				565435-5 (409-5128)					
				567403-3					
18-16-14	2.11-2.3 [083-.118]	5.54-6.35 [218-.250]	680447-1	122500-2, -3 (409-5852)	---	---	---	---	844751-2
				356500-1, -2 (409-5878)					
				1213400-1, -2 (409-5878)					
			680447-2	354500-1 (409-5842)					
				565435-5 (409-5128)					
				680447-3					
14	---	---	567403-1	122500-2, -3 (409-5852)	69710-1 (408-2095)	58492-1 (408-9905)	217200-1 (408-4105) 318161-1 (408-4190)	189928-1 408-4190)	844751-2
				356500-1, -2 (409-5878)					
				1213400-1, -2 (409-5878)					
			567403-2	354500-1 (409-5842)					
				565435-5 (409-5128)					
				567403-3					
12	---	---	567256-3	122500-2, -3 (409-5852)	69710-1 (408-2095)	58490-1 (408-9807)	217200-1 (408-4105) 318161-1 (408-4190)	189928-1 408-4190)	844751-2
				356500-1, -2 (409-5878)					
				1213400-1, -2 (409-5878)					
			567256-4	354500-1 (409-5842)					
				565435-5 (409-5128)					
				567256-4					

Figure 16 (cont'd)

WIRE SIZE●	INSUL RANGE	STRIP LENGTH	APPL (408-8040)	POWER UNIT (DOC)	HAND TOOL (DOC)	DIE ASSY (DOC)	CRIMPING HEAD-(DOC)	PNEU HOLDER-(DOC)	EXT TOOL (408-9685)
12-10	3.71-4.29 [.146-.169]	6.76-7.54 [.266-.297]	680449-1	122500-2, -3 (409-5852)	---	---	---	---	844751-2
				356500-1, -2 (409-5878)					
				1213400-1, -2 (409-5878)					
			680449-2	354500-1 (409-5842)					
				565435-5 (409-5128)					
				680449-3					
122500-2, -3 (409-5852)	567256-3	---	---		---	---	---		
356500-1, -2 (409-5878)									
1213400-1, -2 (409-5878)									
567256-4		354500-1 (409-5842)							
	565435-5 (409-5128)								

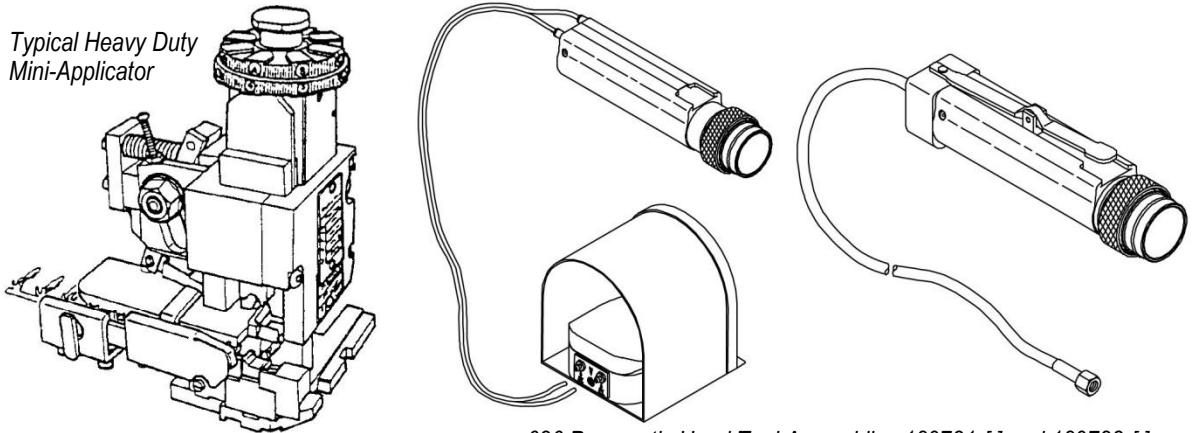
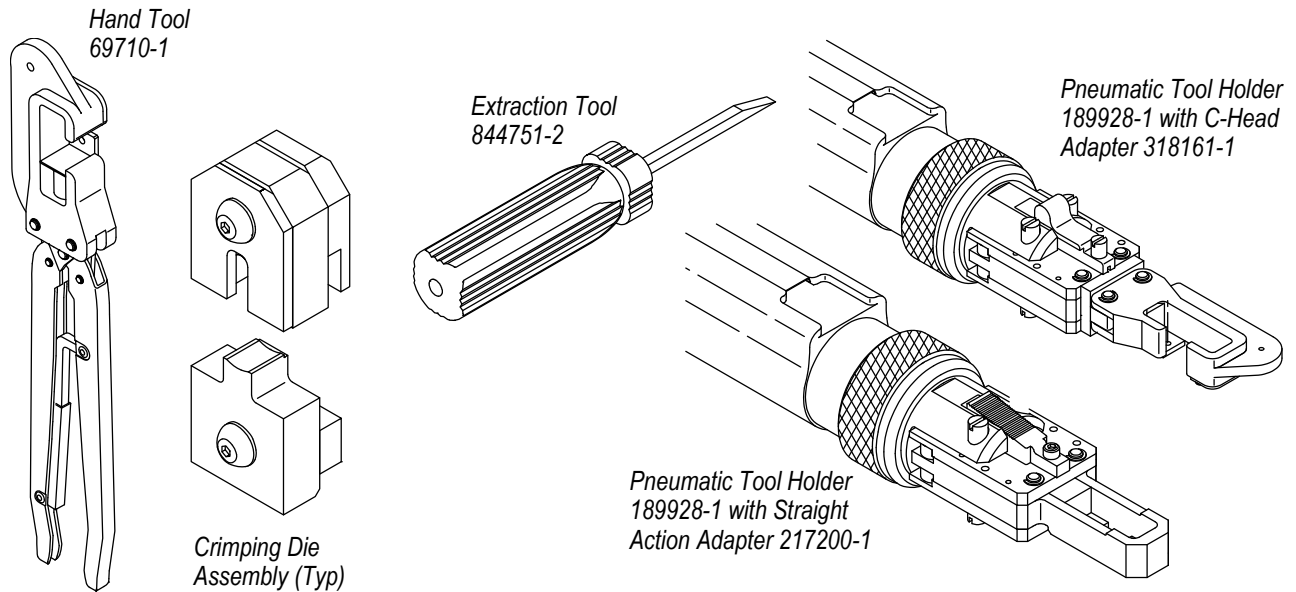
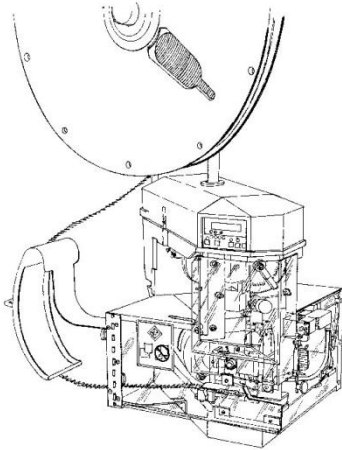
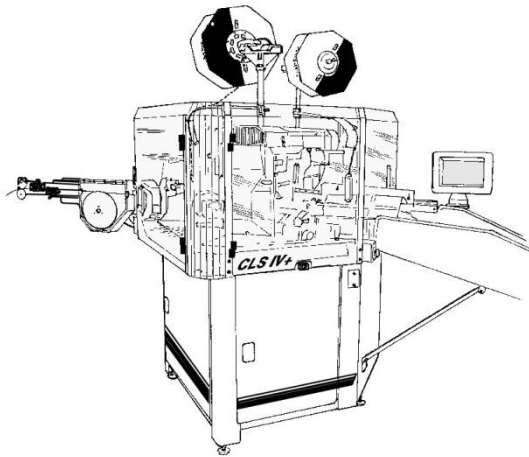


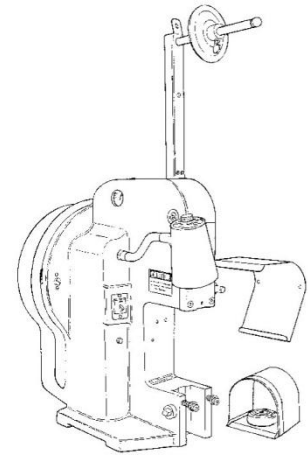
Figure 16 (cont'd)



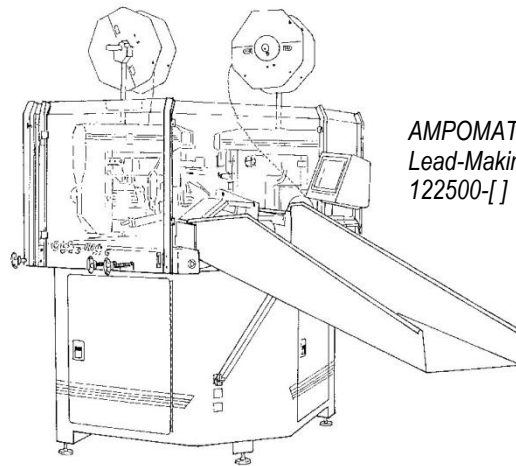
*AMP-O-ELECTRIC Model "G"
Terminating Machine 354500-[]*



*AMPOMATOR CLS IV+ Lead-Making
Machine 356500-[] or 1213400-[]*



*AMP-O-ELECTRIC Model "K"
Terminating Machine 565435-5*



*AMPOMATOR CLS III-G
Lead-Making Machine
122500-[]*

Figure 16 (end)

6. VISUAL AID

The illustration below shows a typical application of AMPINNERGY WTW 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.

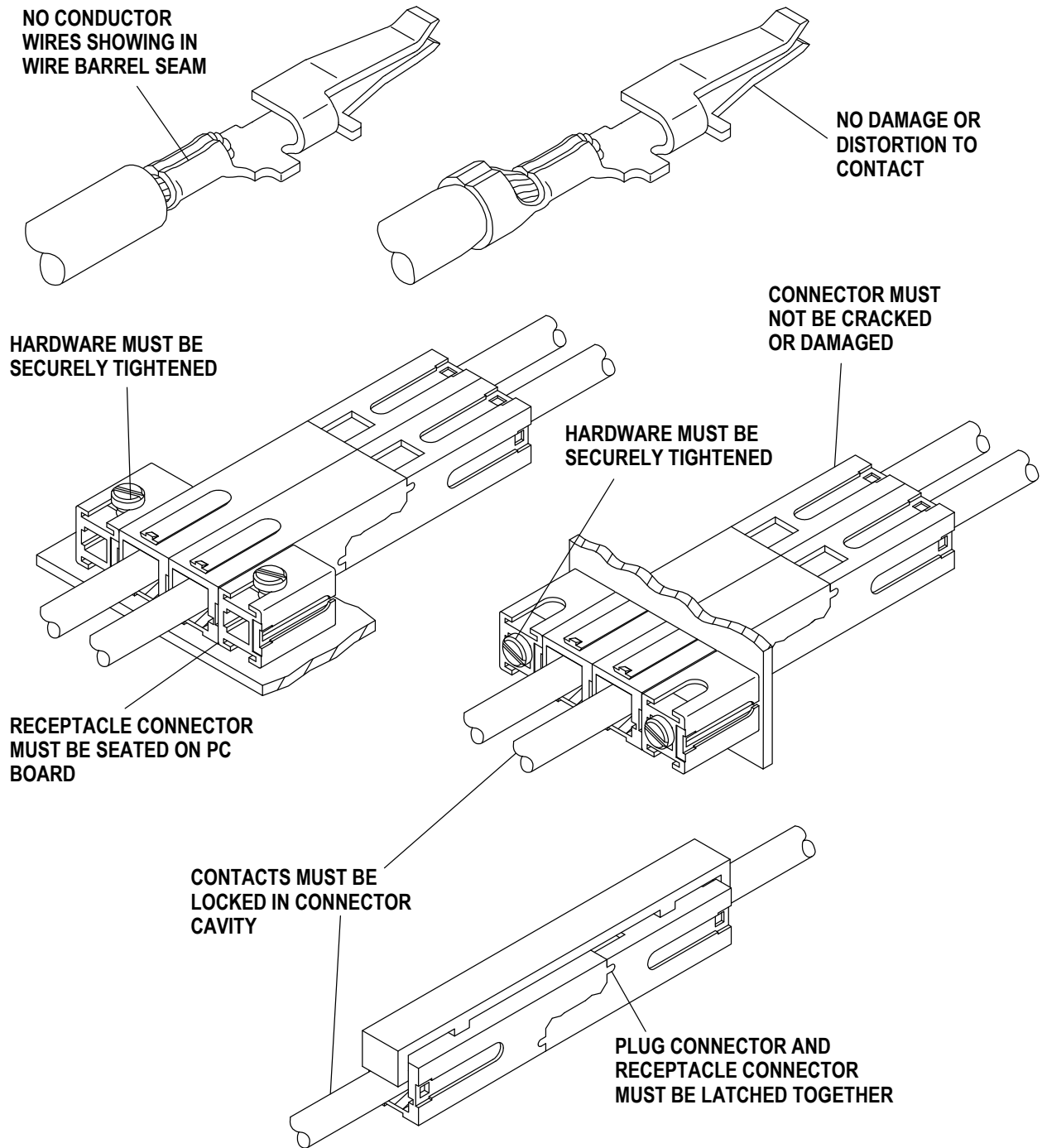


FIGURE 17. VISUAL AID