

**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  $\pm 0.13$  [ $\pm .005$ ] 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 AMPLIMITE .050 Series Slimline 26-Position Receptacle and Plug Connectors. The receptacles are designed for printed circuit (pc) board applications and the plugs are designed for cable applications. The receptacle connectors are designed for manual or robotic placement in a pc board. The plug connectors can be terminated by automatic machine, manually operated mass termination tooling, or single-wire insertion tool.

Figures 1 and 2 provide connector features referred to throughout this specification. Use these terms when corresponding with Tyco Electronics Representatives to facilitate assistance.

The receptacle connectors are available in two configurations: single and stacked (double) right-angle mounts. The single right-angle connectors feature boardlocks and a metal bracket with threaded holes. The stacked right-angle connectors feature two receptacles in a bracket with boardlocks, solder posts, and an optional metal shroud. Stacked connectors are available with fixed keys that have 2-56 threads in the two top holes and two 4-40 threaded holes in the bottom, or without keys and four 4-40 threaded holes in the bracket. See Figure 1.

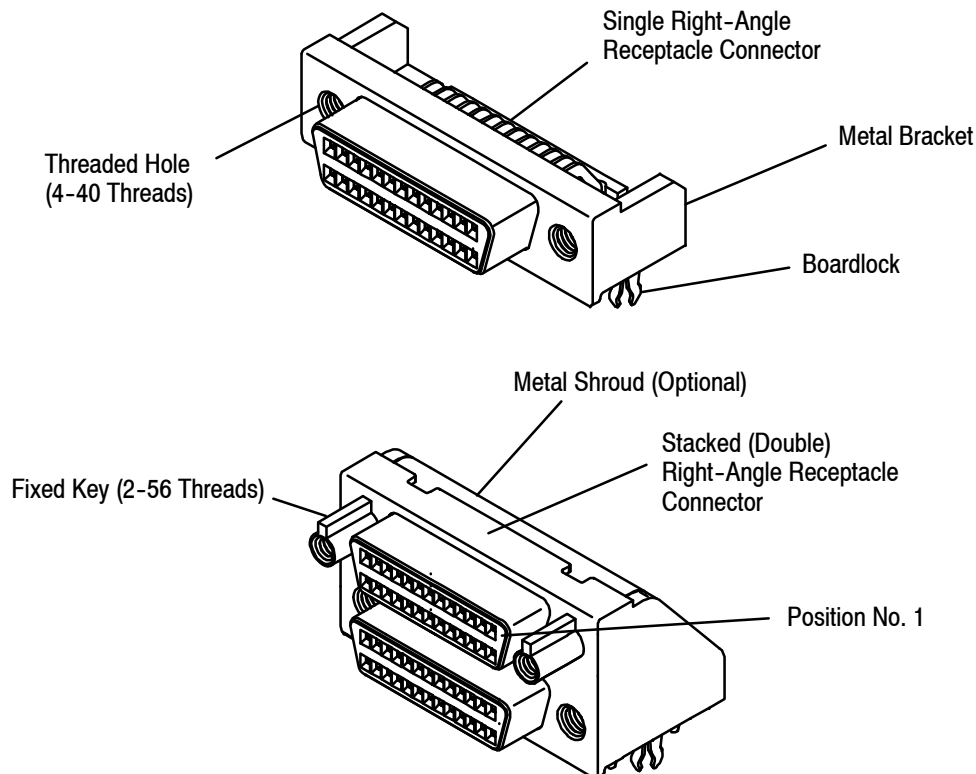


Figure 1

Plug connectors are designed for discrete round wire applications. They feature a plastic housing with a metal shell, insulation displacement contacts, and two termination covers. A backshell kit must be attached to them shortly after termination to avoid unnecessary flexing of the wires at the point of termination and provide strain relief for the cable. The backshell kit consists of an inner and outer backshell, two cover halves, two jackscrews, and two jackscrew tubes. See Figure 2.

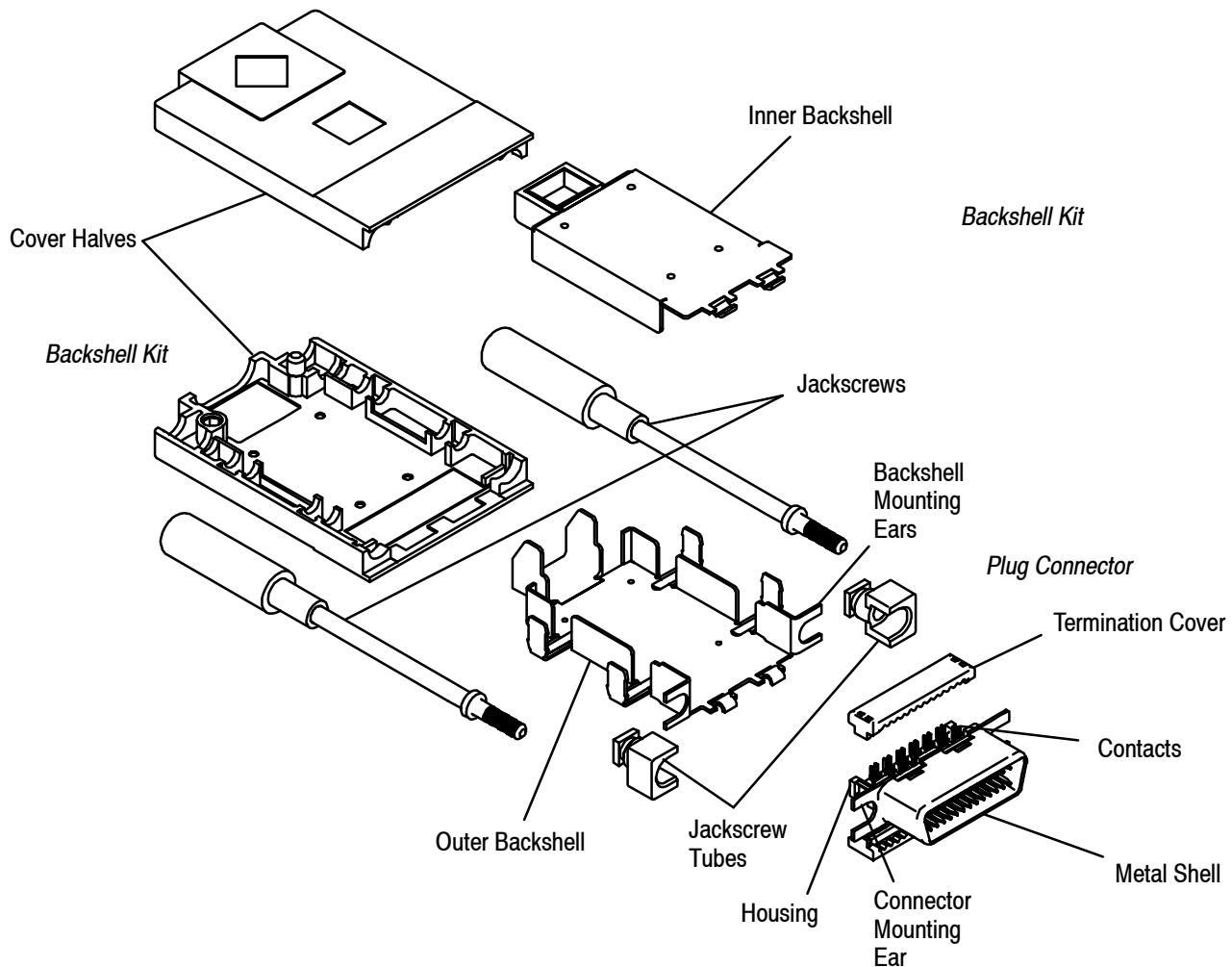


Figure 2

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

- Updated document to corporate requirements
- New logo and format
- Changed, deleted, or added text in Section 1, INTRODUCTION; Paragraphs 2.1, 2.6, 3.7, 3.7.C, 3.9, 3.12, and 3.14.4
- Changed, deleted, or added artwork in Figures 1, 2, 5, 6, 13, 17, 18, and 19
- Deleted Figure 3 and added new Figures 9, 10, and 11 and renumbered

### 2.2. Customer Assistance

Reference Part Number 5750833 and Product Code 0998 are representative of AMPLIMITE .050 Series Slimline Connectors. These numbers are used in a customer service network to access tooling and product application information. This service is provided by your local Tyco Electronics Representative or, after purchase, by calling the 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. The information contained in the Customer Drawings takes priority if there is a conflict with this specification or any other technical documentation supplied by Tyco Electronics.

## 2.4. Specifications

Product Specification 108-1366 provides performance tests 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, 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>
408-6923	Manual Arbor Frame Assembly 58024-1
408-7777	Manual Arbor Frame Assembly 91085-2
408-9200	Repair Tool 58430-1 for AMPLIMITE .050 Series Connectors
408-9663	Installation and Use of Mass Termination Tooling 91291-[ ]
408-9721	Die Holder Assemblies 58449-1, -2, and -3 (Used with Power Unit 312522-3)
408-9746	AMPLIMITE .050 Series Crimper Assembly 856684-1
408-9788	Die Assembly 90437-1
409-5822	2700-lb Pneumatic Power Unit 312522-[ ]

## 2.6. Manuals

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

## 3. REQUIREMENTS

Requirements common to all connectors are covered in Paragraphs 3.1. through 3.4, those common to pc board (receptacle) connectors are covered in Paragraphs 3.5. through 3.9, and those common to cable (plug) connectors are covered in Paragraphs 3.10. through 3.14.

### 3.1. Mating

A pc board receptacle connector must be panel mounted with screwlocks and mated with a terminated plug connector with a backshell kit attached to it. The receptacle must be mounted with sufficient clearance for the plug shell to seat on the receptacle bracket. There must be no obstruction between the receptacle bracket and plug cover that would prevent full mating of the connectors. See Figure 3.

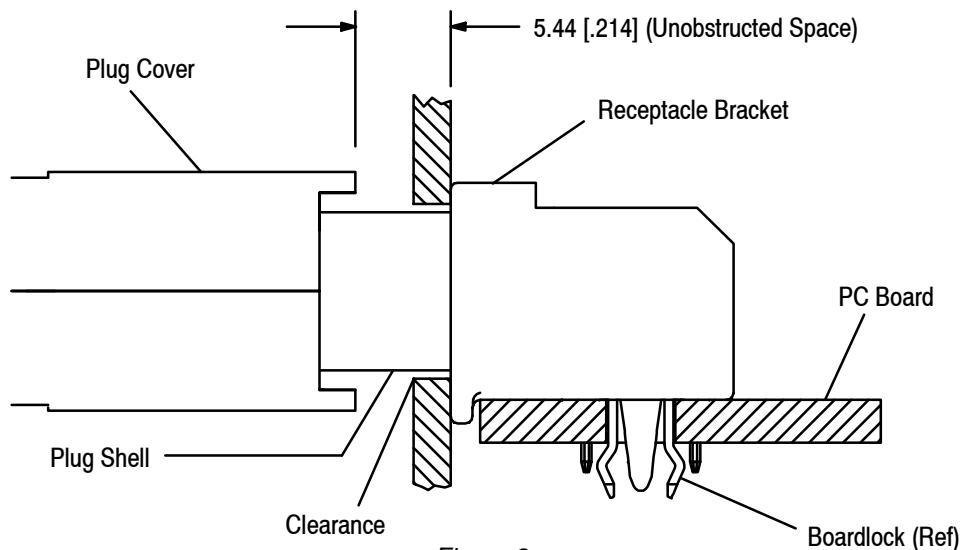


Figure 3

### 3.2. Polarization

The AMPLIMITE .050 Series Connectors are polarized by the keystone configuration of the mating faces. Stacked receptacle connectors are available pre-keyed to prevent inadvertent insertion of mismatched plug connectors.

### 3.3. Circuit Identification

One of the contact cavities in the top of each connector is marked with the number 1 to provide circuit orientation. See Figure 1.

### 3.4. Shielding

These connectors feature tin-plated steel shells which provide continuity for EMC (Electro-Magnetic Compatibility) applications. When mated with corresponding metal shell connectors, shielding and grounding continuity are achieved. The metal hardware provides an additional electrical continuity between the connectors.

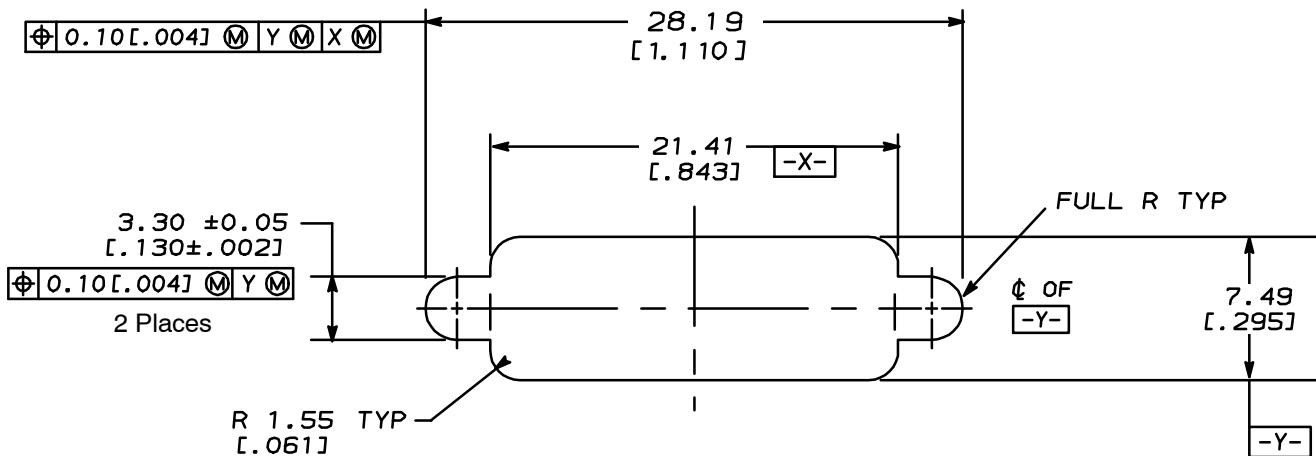
### 3.5. Panel Mounting

Panel mounting is a requirement for receptacle connectors. It will provide additional support for the solder joints during mating and unmating of connectors. The connectors must be mounted to the rear of the panel only. The recommended panel thickness is 1.19 mm [.047 in.]. See Figure 4 for cutout dimensions.

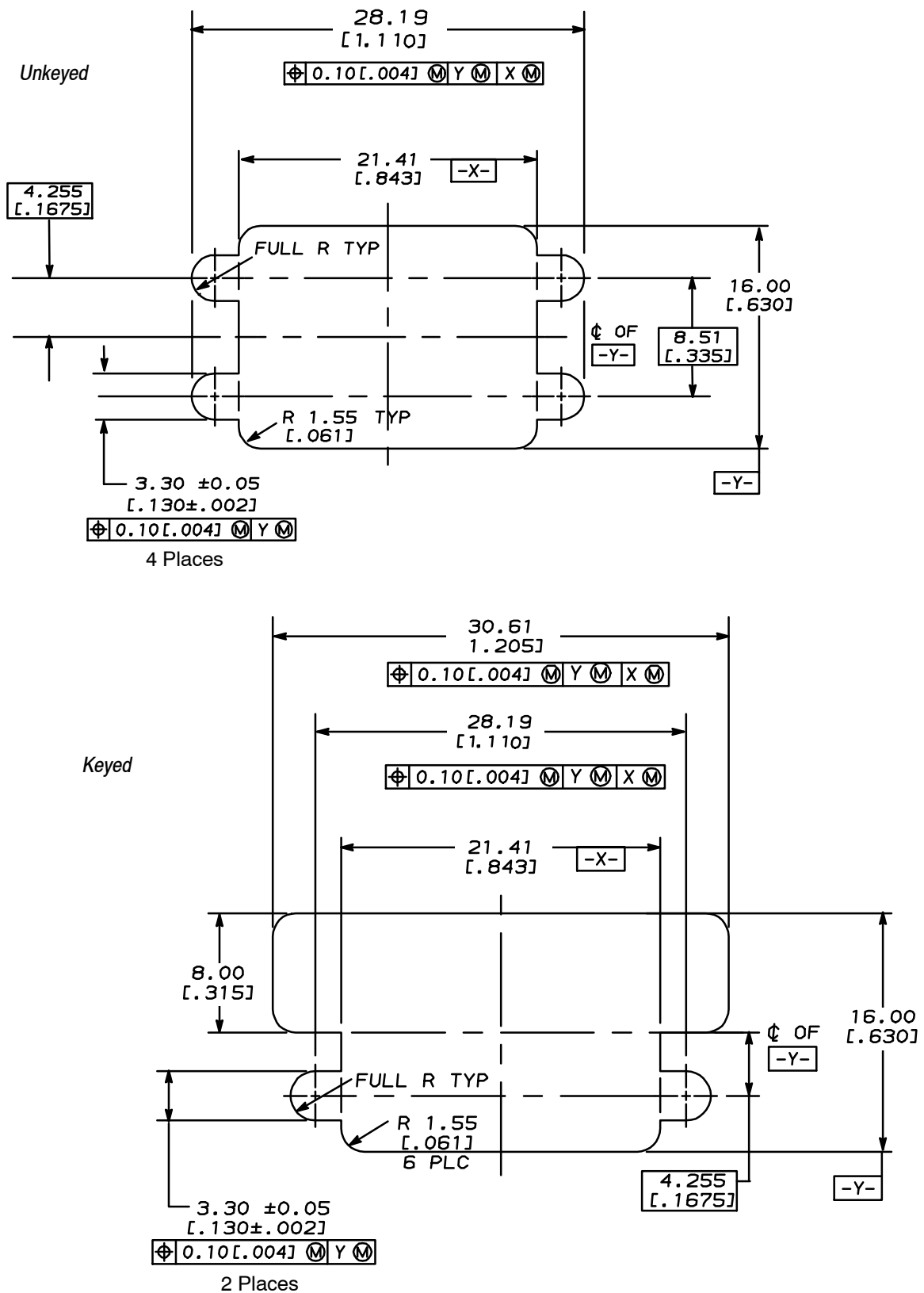
### 3.6. PC Board Layout for Receptacles

The receptacle connectors are supplied with pre-installed contacts with a tail length of 2.79 mm [.110 in.] for through-hole applications in pc boards 1.58 mm [.062 in.] thick. The mounting holes must be precisely located to assure proper contact tail placement and optimum performance of the connector. The pc board layout for each connector type is provided in Figure 5. Note that the layouts apply to the top (connector) side of the board.

*Right-Angle PC Board Receptacle Connectors*

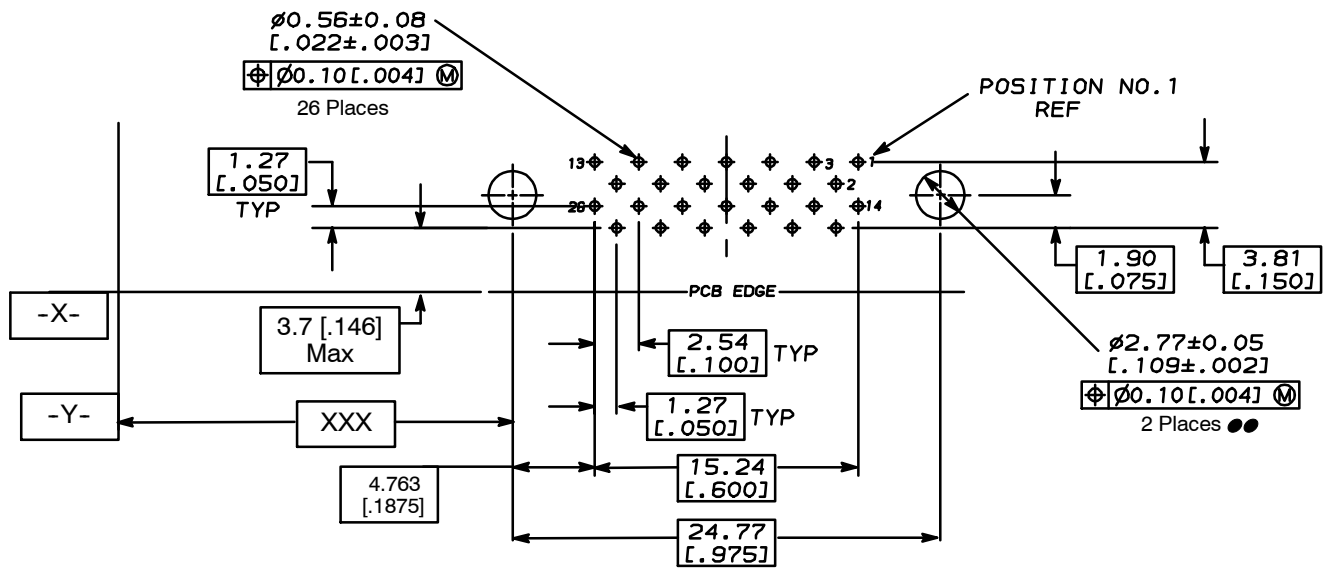


*Figure 4 (cont'd)*

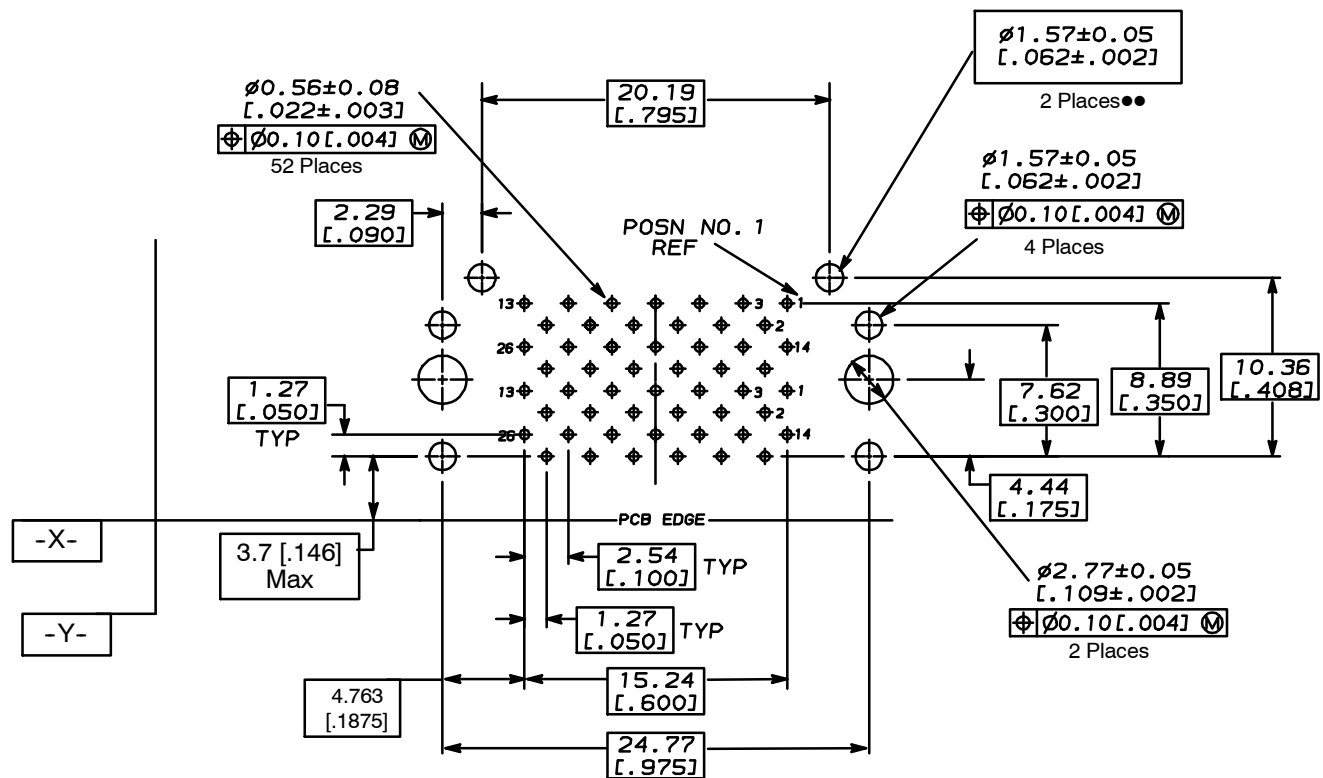


### Stacked Right-Angle PC Board Receptacle Connectors Panel Cutout Dimensions

Figure 4 (end)



### Single Right-Angle PC Board Receptacle Connectors



### Stacked Right-Angle Receptacle Connectors

**NOTE:** X and Y represent datums established by the customer.

●●These holes required only when shrouded connectors are used.

Figure 5

3.7. Receptacle Retention

Right-angle receptacle connectors have boardlocks to assist in holding the connector on the pc board for soldering. The single right-angle connector is supplied with 4-40 threaded holes in the bracket. See Figure 6.

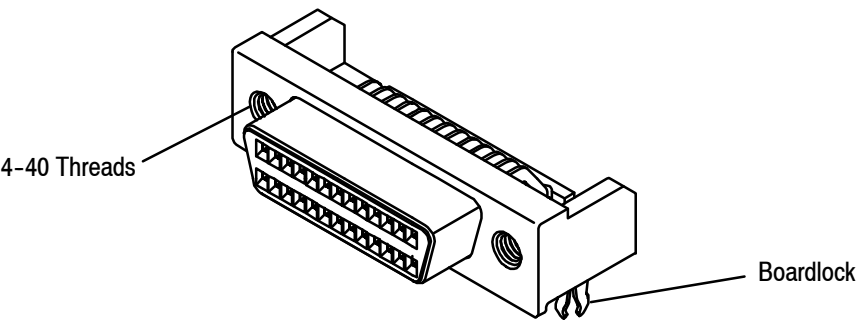


Figure 6

A. Boardlocks

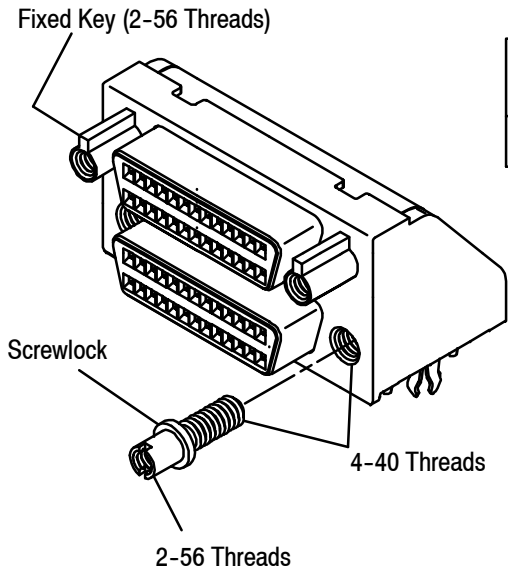
Boardlocks have gripping shoulders that pass through the pc board at the same time the contact tails are inserted through the board. The shoulders engage the underside of pc board when the bracket is seated on the board. See Figure 6.

B. Screwlocks

Screwlocks are available with 2-56 internal threads and 4-40 external threads. They are used to secure receptacle connectors to a panel and provide the mating threaded socket for jackscrews. See Figure 7.

C. Fixed Keys

Fixed keys are pre-installed in the top holes of stacked connectors to provide polarization. They allow plug connectors with different keying arrangement to be used in the same area without mismatching. See Figure 7.



KEY CODE	RECEPTACLE KEY	CORRESPONDING PLUG KEY
1		

Figure 7

### 3.8. Placing Receptacle Connector on PC Board

**CAUTION**

The connectors should be handled by the bracket only to avoid deformation or other damage to the contact tails.



Pick up the connector by the bracket. Align the solder posts and/or boardlocks, and the contact tails into the appropriate holes in the pc board and start them into the holes. Press connector down on pc board until bracket seats on board. After the connector is soldered to the board, the bottoming surface of the bracket must be within the tolerance shown in Figure 8.

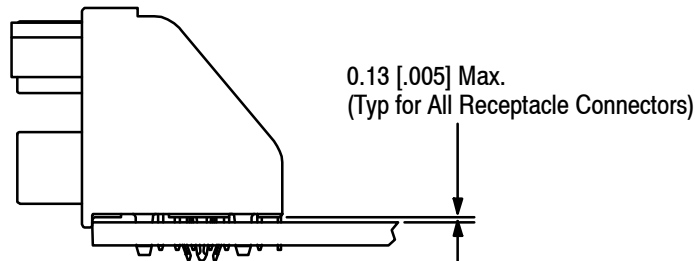


Figure 8

### 3.9. 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 solder process, 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 connectors are provided in Figure 9.

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

Figure 9

#### B. Soldering Guidelines

AMPLIMITE .050 Series Slimline Connectors can be soldered using wave, convection reflow, double sided non-focused infrared reflow processes (IR) or equivalent soldering techniques. The temperatures and exposure time shall be within the ranges specified in Figure 10.

**NOTE**

Manual 402-40 provides some guidelines for establishing soldering practices. Refer to Paragraph 2.6, Manuals.



SOLDERING PROCESS	TEMPERATURE		TIME (At Max Temp)
	CELSIUS	FAHRENHEIT	
WAVE SOLDERING	265±	509±	10 +2/-0 Seconds
INFRARED REFLOW SOLDERING	260	500	20-40 Seconds

± Wave Temperature

Figure 10

#### C. 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 connectors for the time and temperature specified. See Figure 11.



**DANGER**

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 connectors; 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.

**NOTE**

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 Ambient	
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

Figure 11

**D. 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]. Excessive temperatures may cause housing degradation.

**3.10. Plug Connector Cable Selection and Preparation**

Plug connectors are designed to terminate shielded 6.35 - 7.11 mm [.250 - .280 in.] or 7.11 - 7.87 mm [.280 - .310 in.] diameter cables with solid or 7 strand 0.08 mm<sup>2</sup> [28 AWG] wire with primary insulation diameter 0.89 mm [.035 in.]. Consult Tyco Electronics Engineering for wire diameters exceeding these requirements. Cable strip length depends on the type of tooling used. See Figure 12. Do NOT strip insulation from the individual conductors.

**NOTE**

A length of wire 33.0 mm [1.30 in.] minimum must be provided beyond the braid fold to ensure sufficient slack and prevent stress on individual wires. The wires should be terminated and inspected (Figure 14), then immediately thereafter the termination covers and backshell kit should be installed.

**CAUTION**

Care must be used when installing termination covers to avoid breaking the latches. A recommended method is to engage the latches of both covers at one end of the connector and, using your thumb and forefinger, wipe across the termination covers until the latches engage at the other end of the connector.

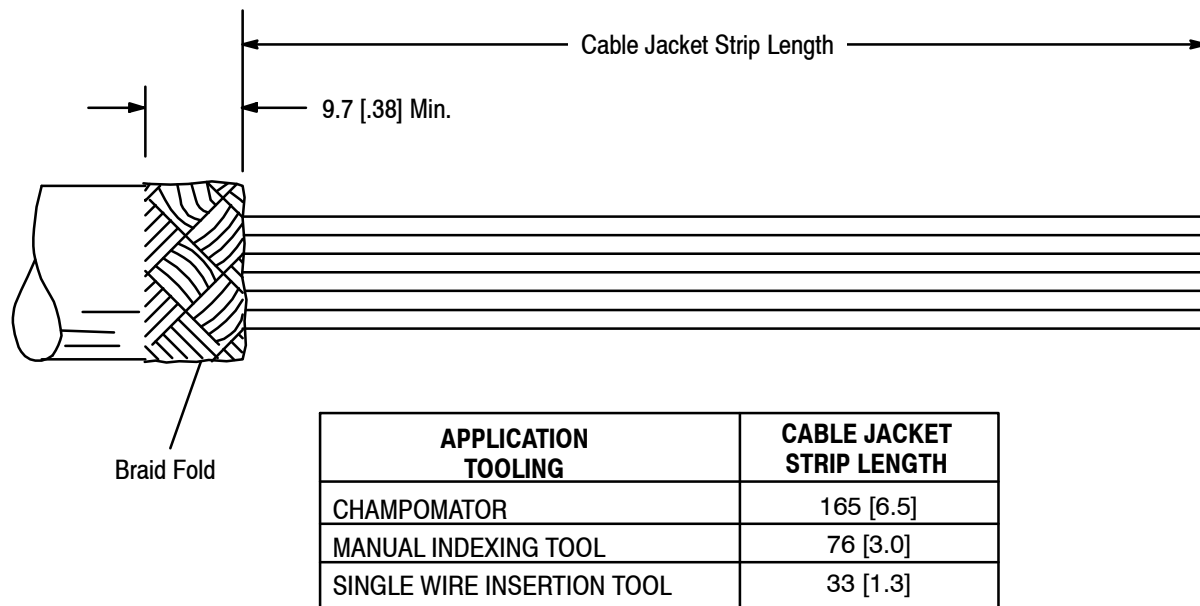


Figure 12

### 3.11. Plug Connectors

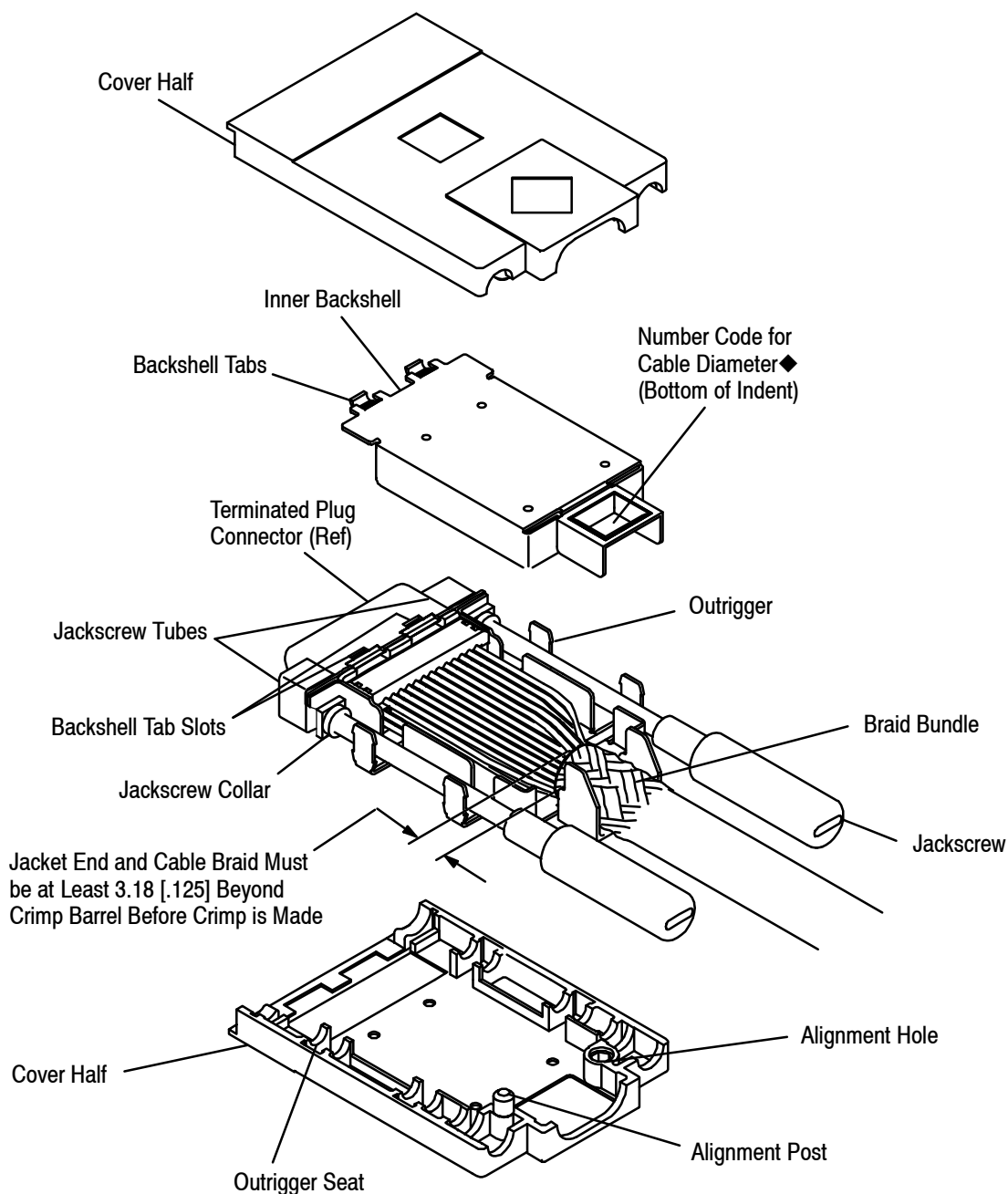
A plug connector consists of a housing preloaded with insulation displacement contacts, a metal shell, and two termination covers. Backshell kits must be attached immediately after the plug is terminated to provide protection and prevent strain on the terminated wires. The cover and jackscrews provide the means of securing the plug to the receptacle.



*Both termination covers must be installed to provide support for the backshell, even though all contacts may not be terminated (ie, selective loading).*

### 3.12. Backshell Kits

There are backshell kits available for different cable sizes. The variable components are keyed inner backshells with a number code in the bottom of the indent that indicates cable diameter. All other kit components are identical -- an outer backshell, two jackscrews, two jackscrew tubes, and two connector cover halves. See Figure 13.



◆The backshell crimp barrel will accommodate cable with up to 80% braid coverage. If cable has higher coverage or if additional metal, tape, or foil is added to build up cable bundle, contact Tyco Electronics.

INNER BACKSHELL NUMBER CODE◆	CABLE DIAMETER	
	mm	IN.
2	7.11/6.35	.280/.250
4	7.88/7.11	.310/.280

Figure 13

### 3.13. Inspecting Insulation Displacement Terminations

All terminated connectors can be inspected externally without damage to the connector. Internal inspection of termination characteristics will require the selection of a sample connector that must be discarded after the inspection is complete. See Figure 14.



*Installed termination covers can be removed from any connector without damage. However, care must be used to avoid breaking the termination cover latches. A recommended method is to press down on the center of the termination cover and insert a thin blade tool under the latch to pry it away from the housing.*

#### A. External Inspection

##### (a) Cable Bundle

There must be a minimum of 9.7 mm [.38 in.] of shield braid folded back over the end of the cable jacket and a minimum distance of 33.0 mm [1.30 in.] from the front of the termination covers to the braid fold.

##### (b) Discrete Wire

Only one wire may be inserted into a contact and only one wire may be in each termination cover rib. Each wire must protrude through the contact beams without turning up at the end.

##### (c) Cover

The locking latches of the termination cover must engage the latch recesses in the housing.

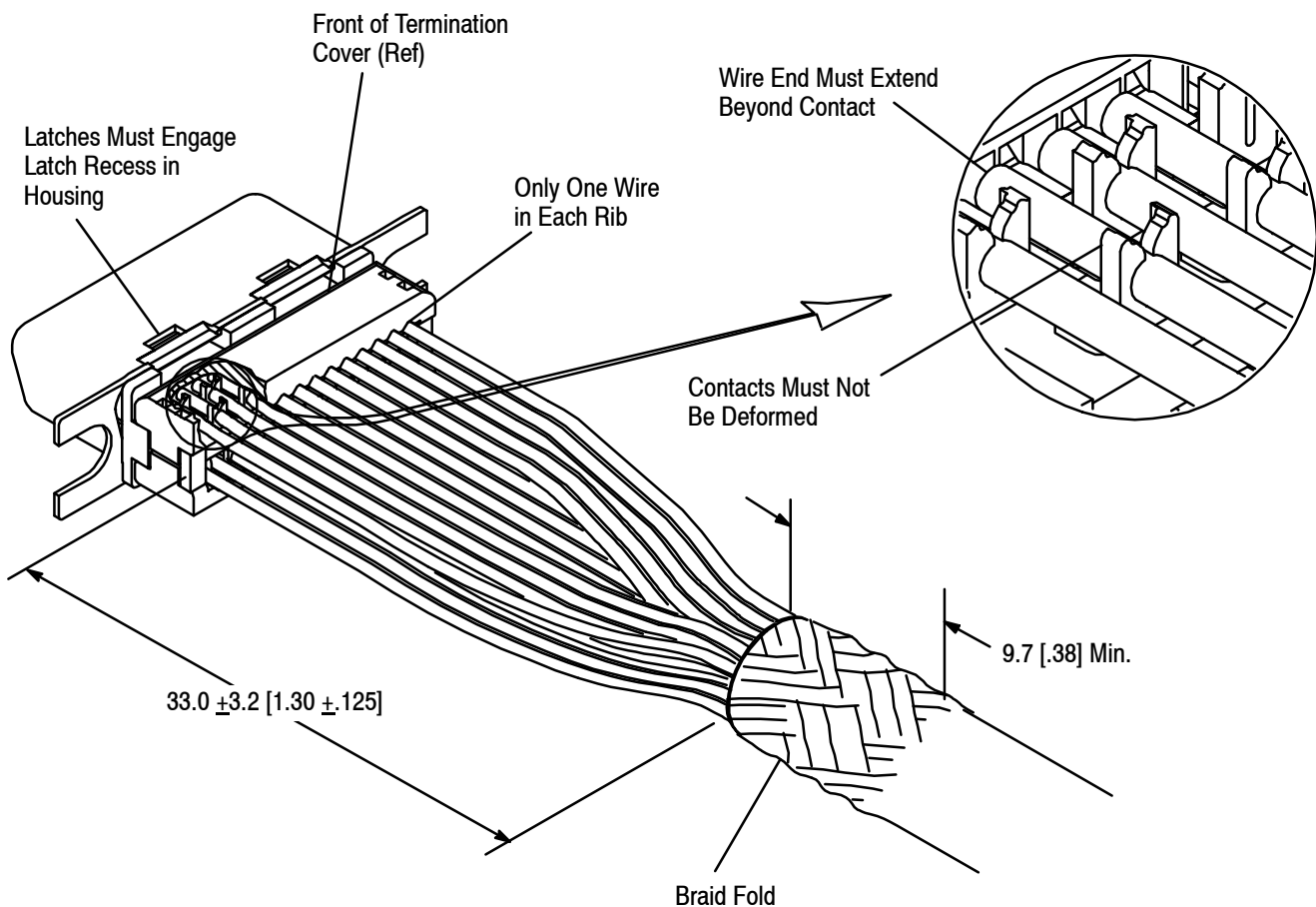


Figure 14

**B. Internal Inspection****NOTE**

Use a sample connector for internal inspection and discard it after the inspection is complete.

**(a) Contacts**

The contact beams of each contact must be straight. They must not fold over, spread apart, or be damaged in any way. The beams must hold the wire firmly. If the contact beams are spread apart enough to allow the wire to move between them, the entire connector must be replaced.

**(b) Wires**

All conductors must be a minimum of one full strand diameter below the transition point in the contact slot. Wire strands should be stacked up with a minimum of three strands deformed. The center of the strands should be on, or slightly above, the center of the contact. The wire insulation on both sides of the contact should be intact. Wire strands may be slightly visible on either side of the contact beams but no strands may be severed. See Figure 15.

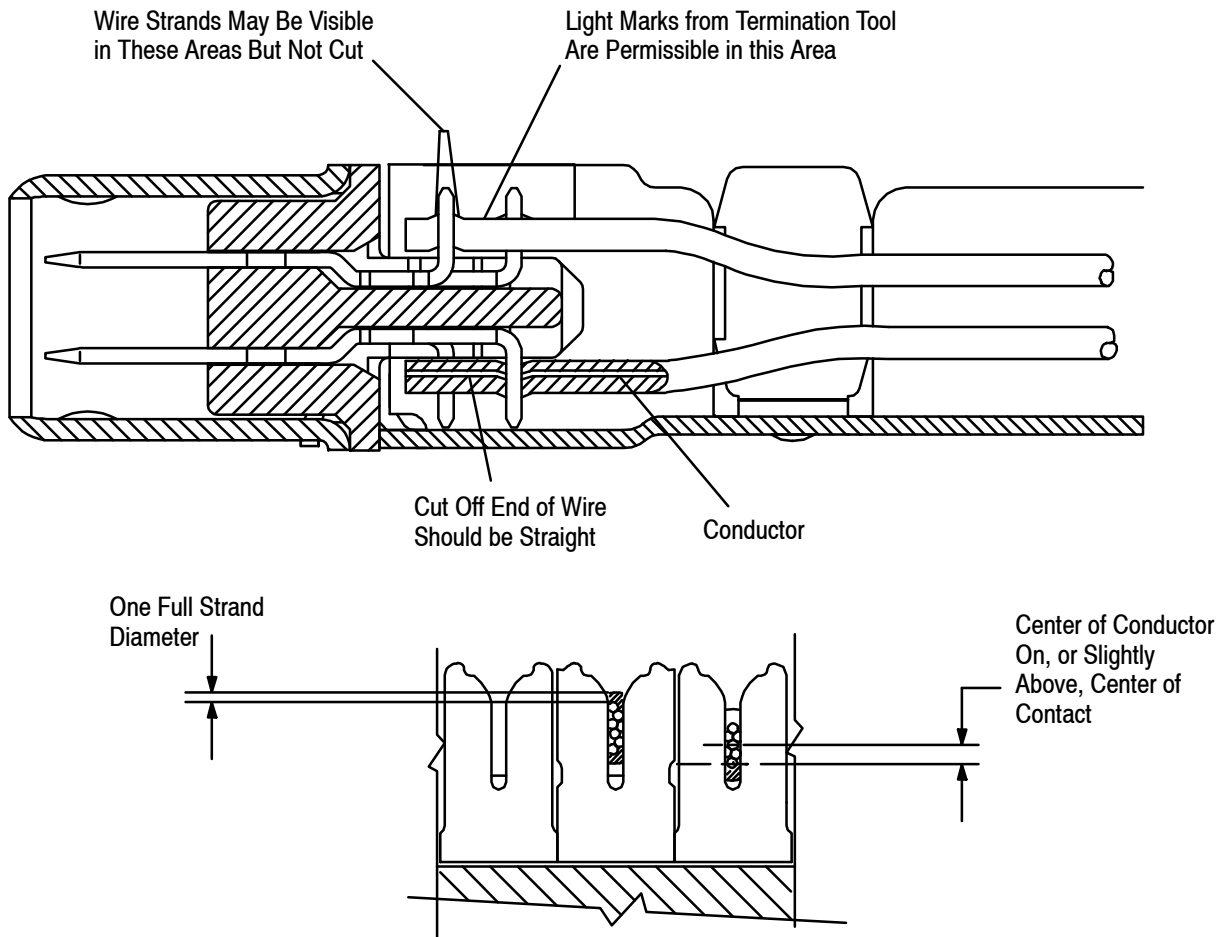


Figure 15

### 3.14. Assembly Inspection

**NOTE**

The connector must be terminated to the proper crimp height and the backshell kit must be installed in accordance with the following requirements:

1. Cable braid must be located in the backshell crimp barrel (reference Figure 13). There should be slack in the wires to prevent stress at the point of termination.
2. The tabs of the inner and outer backshell must be inserted into the connector tab slots and the inner backshell must be inside the outer backshell. Care must be used to avoid pinching wires when closing backshells.
3. The crimp barrel must be crimped to the height shown in Figure 16.

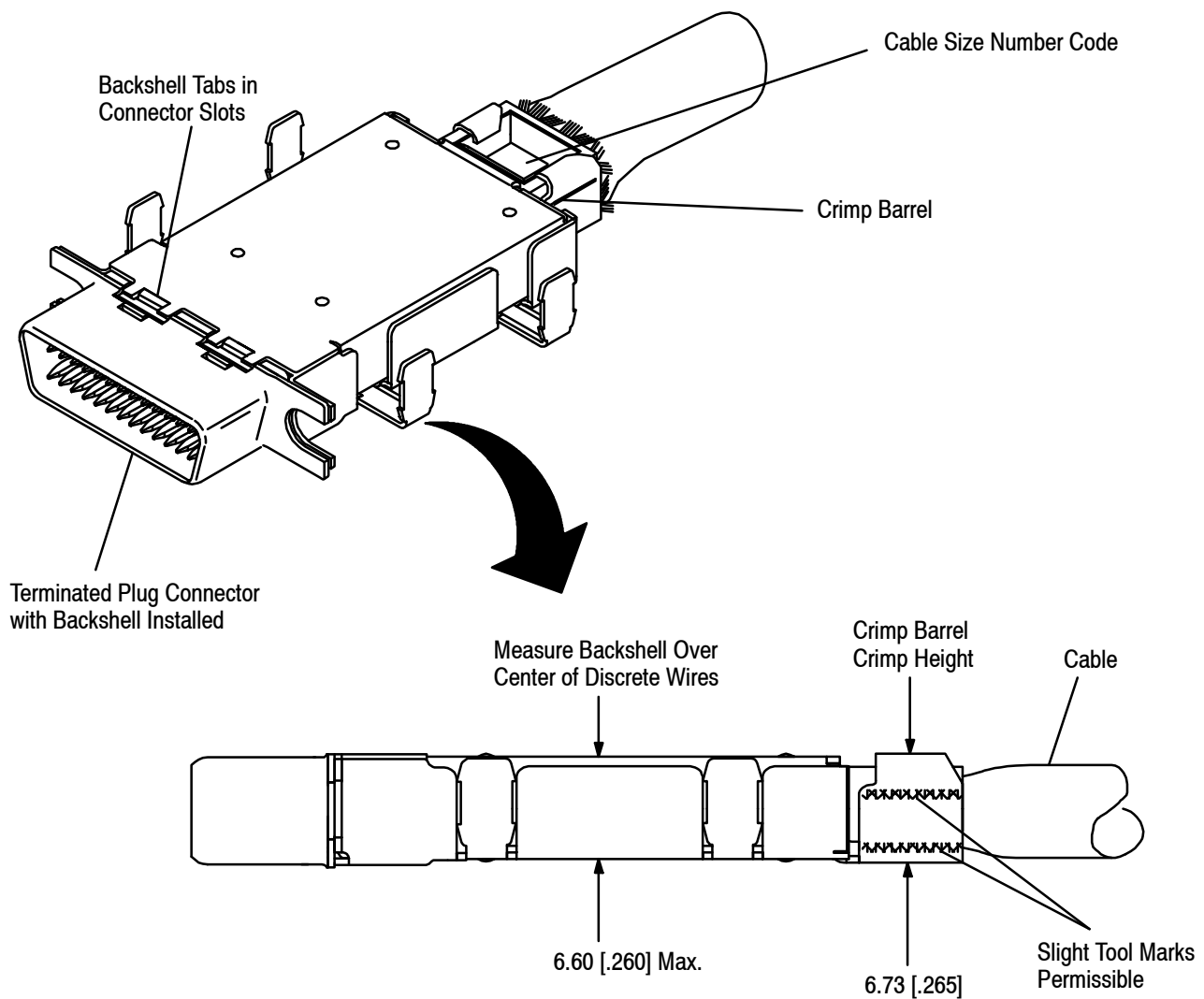


Figure 16

4. Two jackscrew tubes must be placed on the mounting ears of the plug connector and backshell with the open side toward the center of the connector. See View A, in Figure 17.
5. Jackscrew threads must pass through the insert with the collar between the insert and the front outrigger on the backshell. The outrigger and strain relief must be in the appropriate slots in the cover. See View A, Figure 17.
6. Cover halves, measured over the connector mounting ears, must be bottomed on each other within the dimension specified in View B, Figure 17.

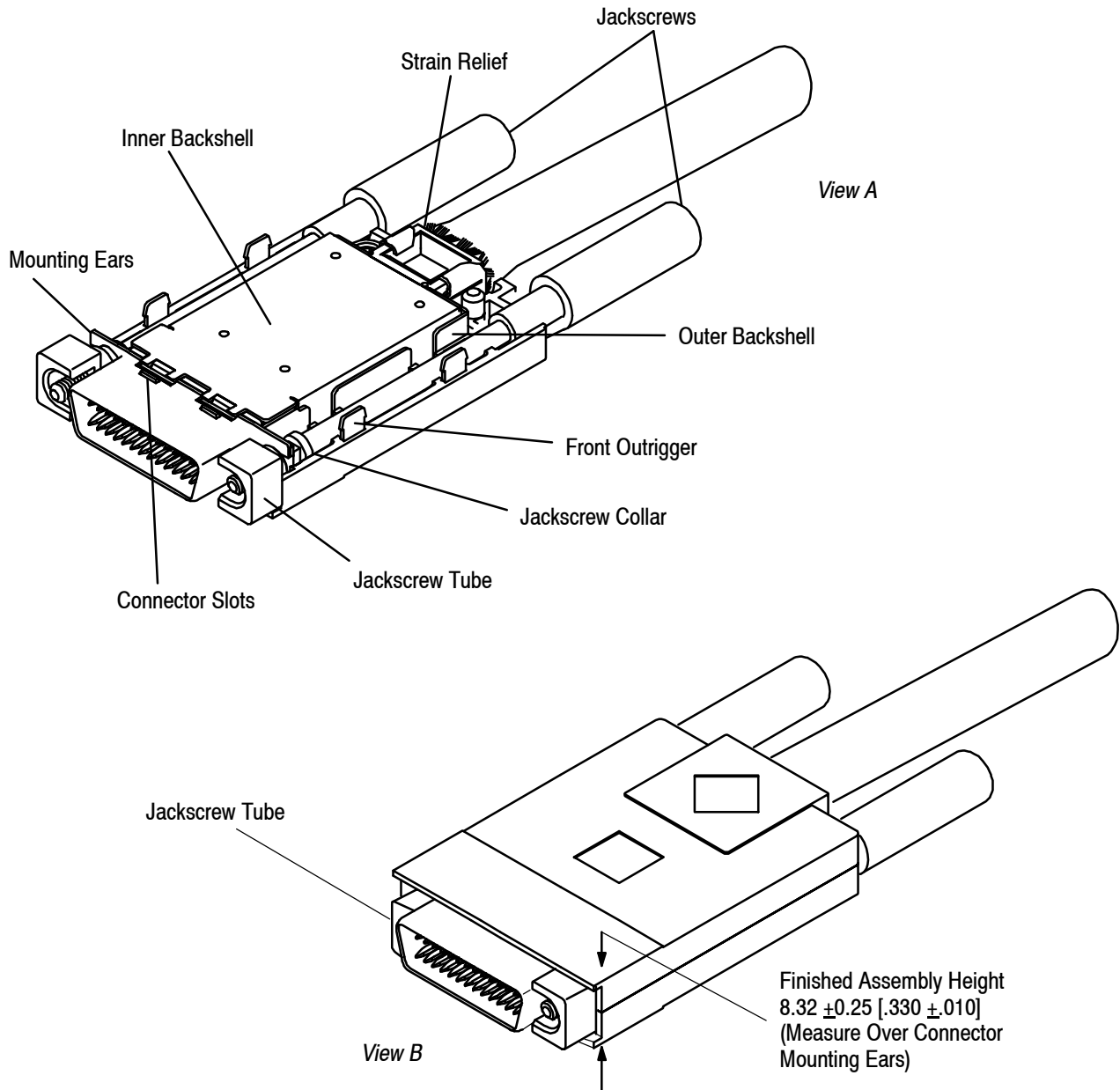


Figure 17

### 3.15. Repair



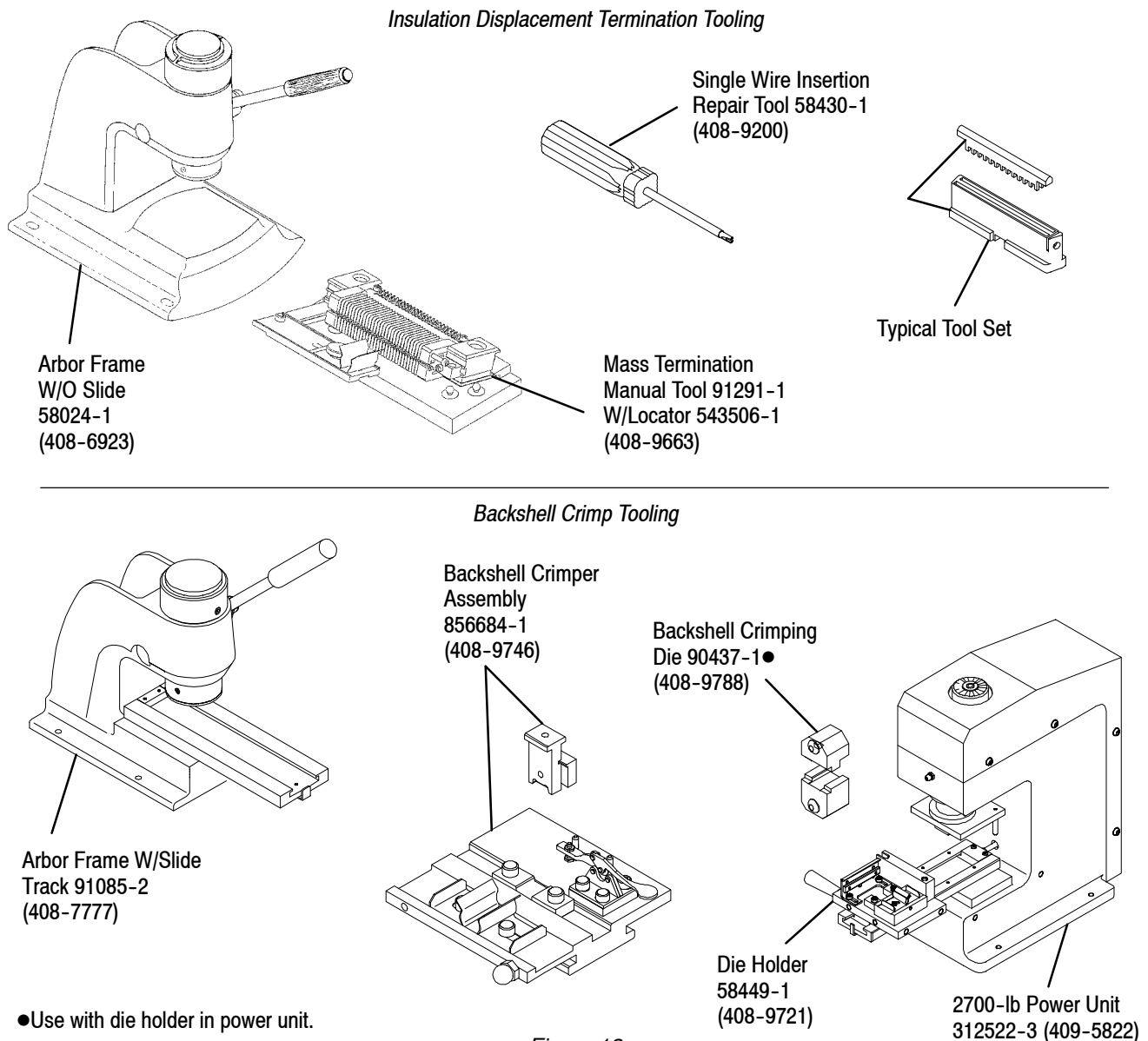
Connector and component parts can not be repaired. If any component is damaged, the entire connector must be replaced.

## 4. QUALIFICATIONS

AMPLIMITE .050 Series Slimline Connectors are Recognized by Underwriters Laboratories Inc. (UL) in File E28476, and Certified to CSA International in File LR7189.

## 5. TOOLING

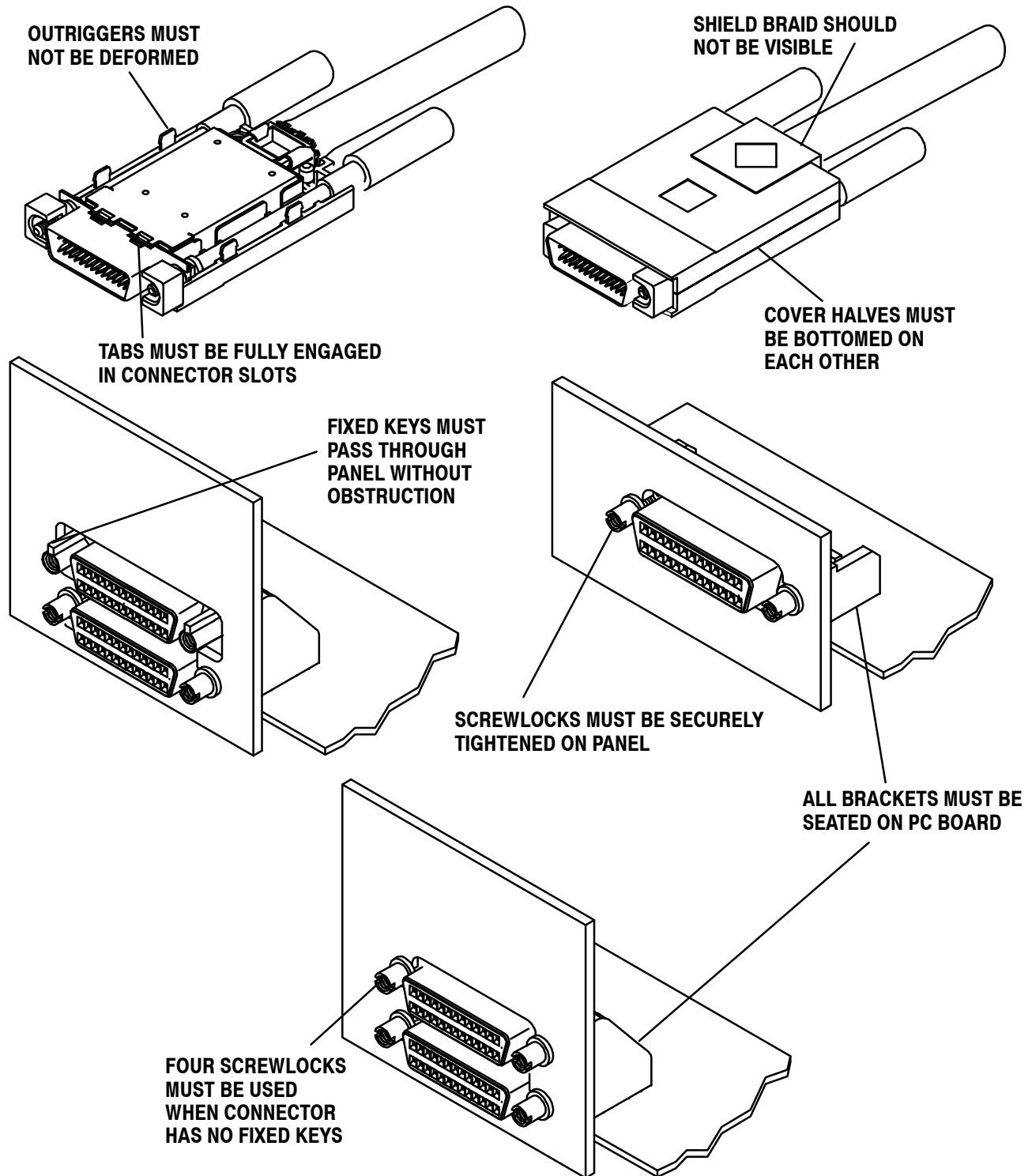
Tools designed to install these connectors are shown in Figure 18. Those in the top half are for plug connector insulation displacement terminations. Those in the lower half are for plug connector backshell crimps. Tools for low volume prototype and repair applications are to the left. Tools for high volume production line applications are to the right.





## 6. VISUAL AID

Figure 19 shows a typical application of AMPLIMITE .050 Series Slimline 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.



**FIGURE 19. VISUAL AID**