

**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 Cable End Insulation Displacement Connectors (IDC) and Printed Circuit (PC) Board Connectors. The connectors offers high-density "D" mating interfaces (keystone configuration) with 1.27 x 2.54 mm [.050 x .100 in.] contact centerlines and 20 through 120 positions. They are compatible with SCSI-2, EIA RS-232, IPI, and HIPPI standards. Connectors are available with metal shells over plastic housings for EMI/ESD-shielded applications, and with all-plastic housings for unshielded applications.

IDC Cable End Connectors are available with pre-assembled or unassembled termination covers, and are designed to terminate solid or 7-strand, 30 to 28 AWG wire with an insulation diameter range of 0.74 to 0.91 mm [.029 to .036 in.]. There are connectors designed for free-hanging applications and others for panel mount applications. Free-hanging connectors will require the use of a backshell while panel mounted connectors do not. See Figure 1.

**NOTE**



IDC Feed-Through Connectors are also available. See Application Specification 114-40049.

PC Board Connectors are available with solder-type or ACTION PIN\* (solderless) contacts tails. Those with solder-type contacts are available as straight and right-angle single configurations, or as right-angle stacked configurations. Those with ACTION PIN (solderless) contacts are available in straight configurations only. The connectors are available with cast or formed metal shells for shielded applications, and with all plastic housings for unshielded applications. All of these connectors can be mounted through a panel. Cast metal shell connectors are designed to be used with spring latches. Connectors with formed metal shells are designed for screwlock and jackscrew applications. See Figure 1.

Accessories such as keying inserts, attaching hardware, and backshells are covered later in this specification.

When corresponding with Tyco Electronics Personnel, use the terminology provided in this specification to facilitate your inquiry for information. Basic terms and features of the connectors are provided in Figure 1.

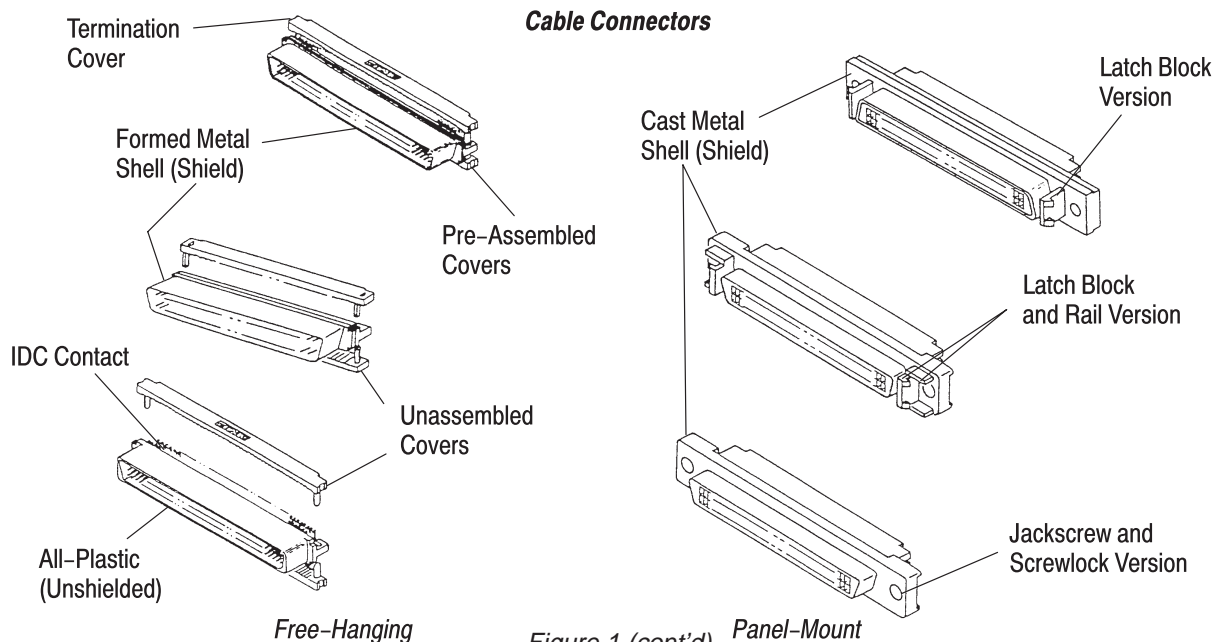


Figure 1 (cont'd)

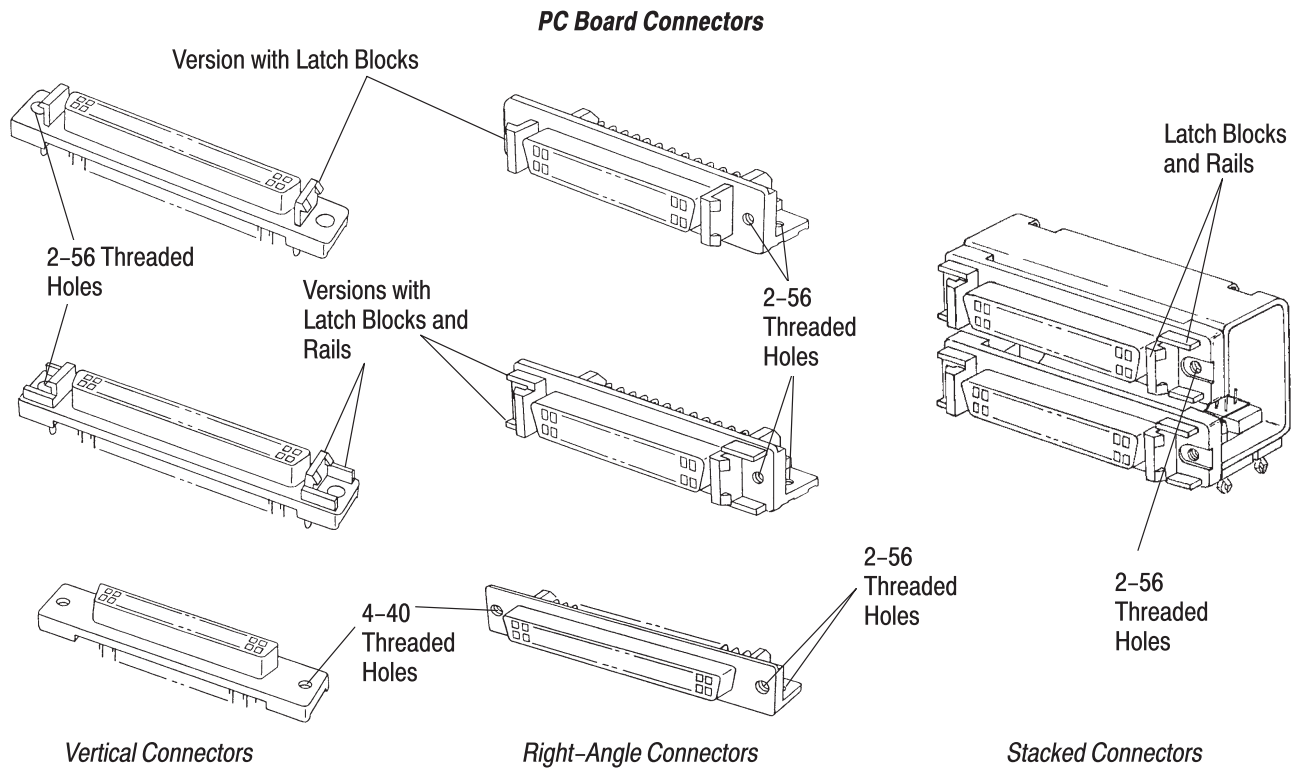


Figure 1 (end)

**2. REFERENCE MATERIAL**

**2.1. Revision Summary**

This paragraph is reserved for a revision summary of changes and additions made to this specification. The following changes were made for this revision.

- Updated document to corporate requirements
- Changed 68/68 pc board layout in Figure 13

**2.2. Customer Assistance**

Reference Part Number 749621 and Product Code 4620 are representative numbers of AMPLIMITE .050 Series 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 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 other technical documentation supplied by Tyco Electronics.

**2.4. Manuals**

Manual 402-40 is available from the service network. This manual provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is included in the manual as required for information on soldering problems.

**2.5. Specifications**

The following list includes available Product Specifications (108-series) that cover test and performance requirements for the connectors; and Application Specifications (114-series) that cover product design and application requirements.

<u>Document Number</u>	<u>Document Title</u>
108-1228	AMPLIMITE Shielded .050 Series Connectors
108-1228-1	AMPLIMITE Stacked .050 Series Connectors
114-40049	AMPLIMITE .050 Series Feed-Through Connectors for 0.64 mm [.025 in.] Ribbon Cable

## 2.6. 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>
408-6923	Manual Arbor Frame Assembly 58024-1
408-9027	Adapter Kit for Greenerd Frame Assemblies 3A and 3B
408-9200	Repair Tool 58430-1 for AMPLIMITE .050 Series Connectors
408-9427	AMPLIMITE .050 Series Connectors (Round-to-Flat-Cable)
408-9663	Installation and Use of Mass Termination Tooling 91291-[ ]
408-9750	Cover Lacing Fixture 91293-1 for AMPLIMITE .050 Series Connectors
408-9757	Tooling Assembly 856371
408-9817	Manual Miniature Applicator Frame Assembly 91295-1
408-9820	Cover Closing and Staple Inserter Kits for AMPLIMITE .050 Series Connectors
408-9822	Tooling Kit 768900-1 for CHAMPOMATOR* 2.5
409-5791	CHAMPOMATOR 2.5 Terminating Machine Control Module 852423-[ ]
409-5839	CHAMPOMATOR 2.5 Bench Terminating Machines 762734-3, -4

## 3. REQUIREMENTS

### 3.1. Storage

#### A. Ultraviolet Light

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

#### B. Shelf Life

The connectors should remain in the shipping containers until ready for use to prevent deformation to the contacts. The connectors should be used on a first in, first out basis to avoid storage contamination that could adversely affect signal transmissions.

#### C. Chemical Exposure

Do not store the connectors near any chemical listed below as they may cause corrosion stress cracking in the contacts.

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 if available.



### 3.2. Contact Position Assignment

All AMPLIMITE .050 Series Connectors are marked to indicate contact position no. 1 only. Pins are numbered in plug connectors from left to right, top row first. Sockets are numbered in receptacle connectors as a mirror image of the plugs: right to left, top row first. Figure 2 shows typical assignments.

#### NOTE

The connectors in Figure 2 are viewed from the mating interface.



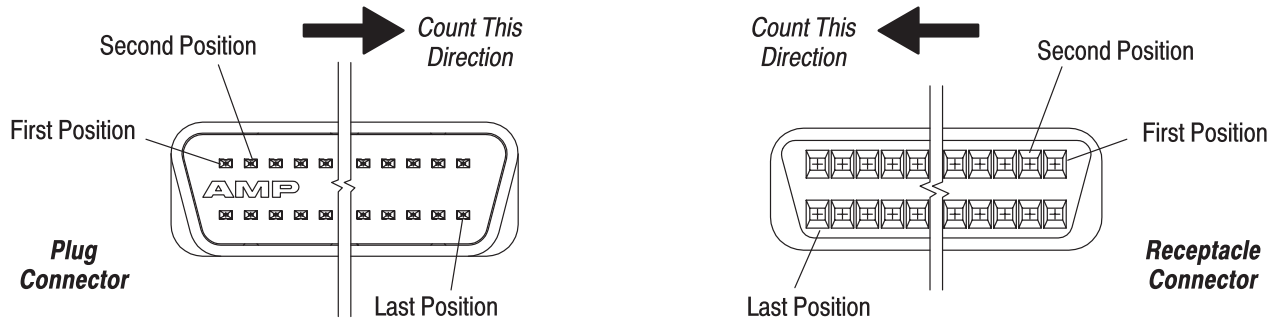


Figure 2

**3.3. IDC Connector Cable Selections**

Wires used with these connectors should be 30 or 28 AWG with solid or 7-strand conductors and an insulation range of 0.74 to 0.91 mm [.029 to .036 in.]. Connector size, maximum cable diameter, backshell type, and staple sizes are provided in Figure 3. Under certain circumstances, other wire and cable sizes may be used with some restrictions. Consult Tyco Electronics Engineering by calling the number at the bottom of page 1.



All wire and cable (including ribbon and round-to-flat processed cable) to be used with the AMPLIMITE .050 Series Connectors must be approved by Tyco Electronics Engineering.

CONNECTOR SIZE	CABLE DIAMETER (MAX)	BACKSHELL DESCRIPTION	
		MATERIAL	STAPLE SIZE
20	6.86 [.270]	METAL	SMALL
26	6.86 [.270]	METAL	SMALL
28	7.49 [.295]	METAL	SMALL
40	8.64 [.340]	METAL	SMALL
50	9.02 [.355]	METAL	MEDIUM
50	10.16 [.400]	METAL and PLASTIC	MEDIUM
50	12.19 [.480]	METAL and PLASTIC	MEDIUM
60	9.65 [.380]	METAL	MEDIUM
68	10.16 [.400]	METAL	MEDIUM
68	11.18 [.440]	METAL	MEDIUM
68	13.21 [.520]	PLASTIC	LARGE
80	10.67 [.420]	METAL	LARGE
80	12.70 [.500]	METAL	LARGE
100	12.70 [.500]	METAL	LARGE
100	13.97 [.550]	METAL	LARGE
120	13.97 [.550]	METAL	LARGE

Figure 3

**A. Cable Preparation**

The strip length of jacketed cable will depend on the type of tooling used to terminate the wire. Refer to the instructions packaged with the applicable tool for the proper cable jacket strip length. The only preparation for ribbon cable is to cut it squarely.



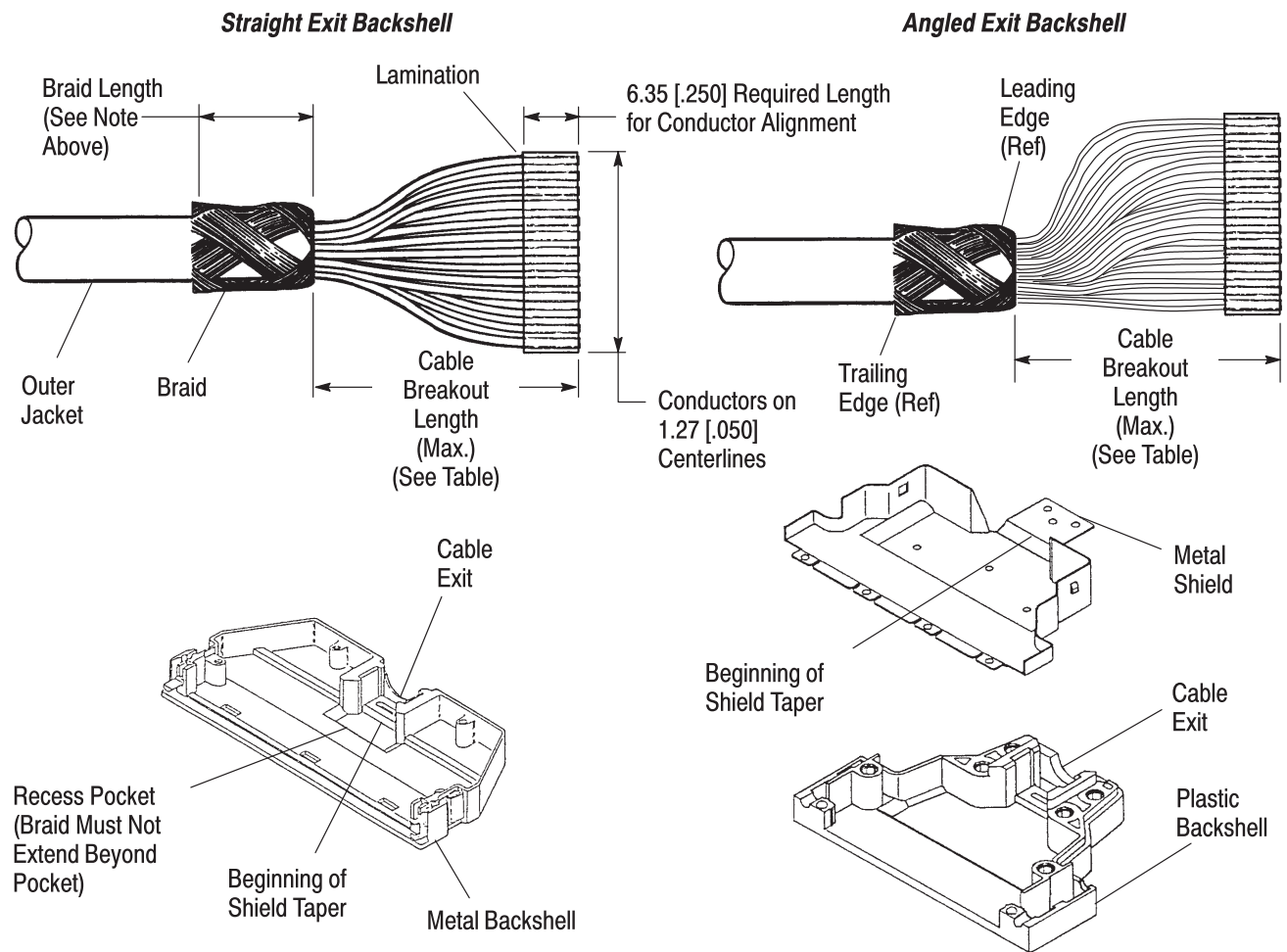
The braid length will vary depending on the backshell style, cable bundle size, and slack needed to assure strain relief for all wires. Essential requirements are that the leading edge of the braid fold extends slightly beyond the beginning of the shield taper and the trailing ends of the braid be trimmed so they do not extend beyond the backshell cable exit. See Figure 4.

**B. Lamination of Discrete Wires**

Discrete wire cable may be laminated for mass termination by flattening the round bundle of wires and applying a thin lamination over the ends of the wire as shown in Figure 4.



Do NOT cut individual wire insulation during stripping cable insulation, or when trimming braid shield and foil from wrapping.



CONNECTOR SIZE	CABLE BREAKOUT LENGTH (MAX)	
	STRAIGHT EXIT BACKSHELL	ANGLED EXIT BACKSHELL
20-26-28	22.86 [.900]	22.86 [.900]
40	22.86 [.900]	27.94 [1.100]
50-60-68-80	27.94 [1.100]	27.94 [1.100]
100-120	27.94 [1.100]	38.10 [1.500]

Figure 4

**3.4. Terminated Connector Requirements**

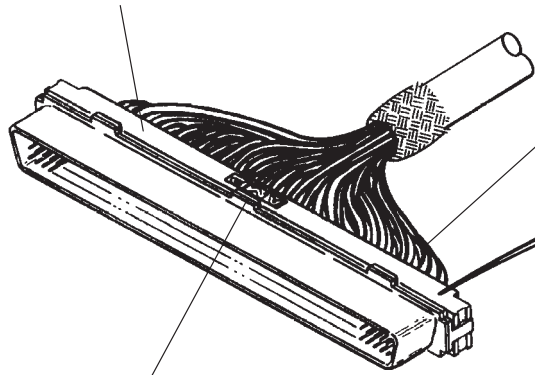
Prepared wires shall be located and terminated according to the procedures given in the applicable tooling instructions. See Paragraph 5 for details on tooling options and instructions for using them.



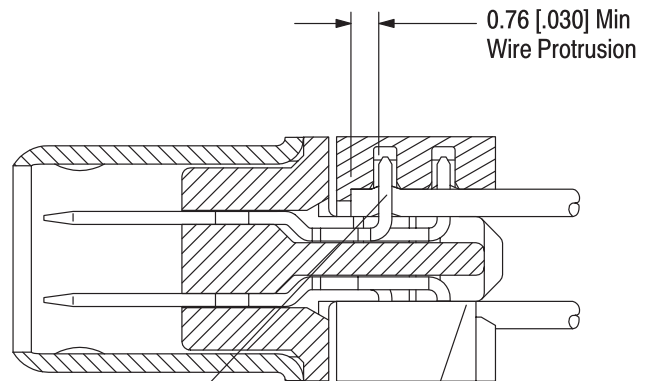
Reasonable care should be taken by tooling operators to provide undamaged wire terminations. An improper termination in any of the insulation displacement contacts will be reason to discard the entire connector. Contacts are designed for one-time termination, and cannot be replaced, repaired, or re-used. Figure 5 shows criteria for an acceptable termination.

For Discrete Wire, Termination Covers Must be Installed *Immediately* After Contact Termination is Completed

Allow for Slack in Wires Between Covers and Strain-Relief Staple Area (Front of Braid)



Logo Readable from Back of Connector

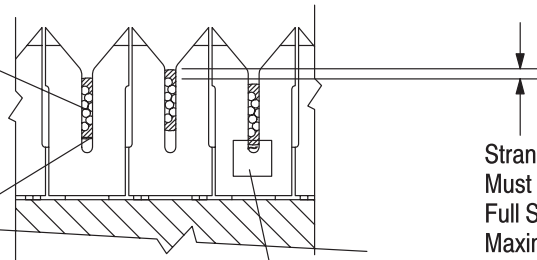


0.76 [.030] Min Wire Protrusion

Contacts Must Not be Bent After Termination and Must Fit Within the Termination Cover Slots

Covers Fully Seated Against Connector Housing at Cover Ends

For Destructive Testing, Remove Wire from Slot (Conductor Must Be Exposed and Deformed n Both Sides to be Considered a Good Termination)



Strand Closest to Transition Must be a Minimum of One Full Strand Diameter, to a Maximum of Three Full Strand Diameters, from the Transition

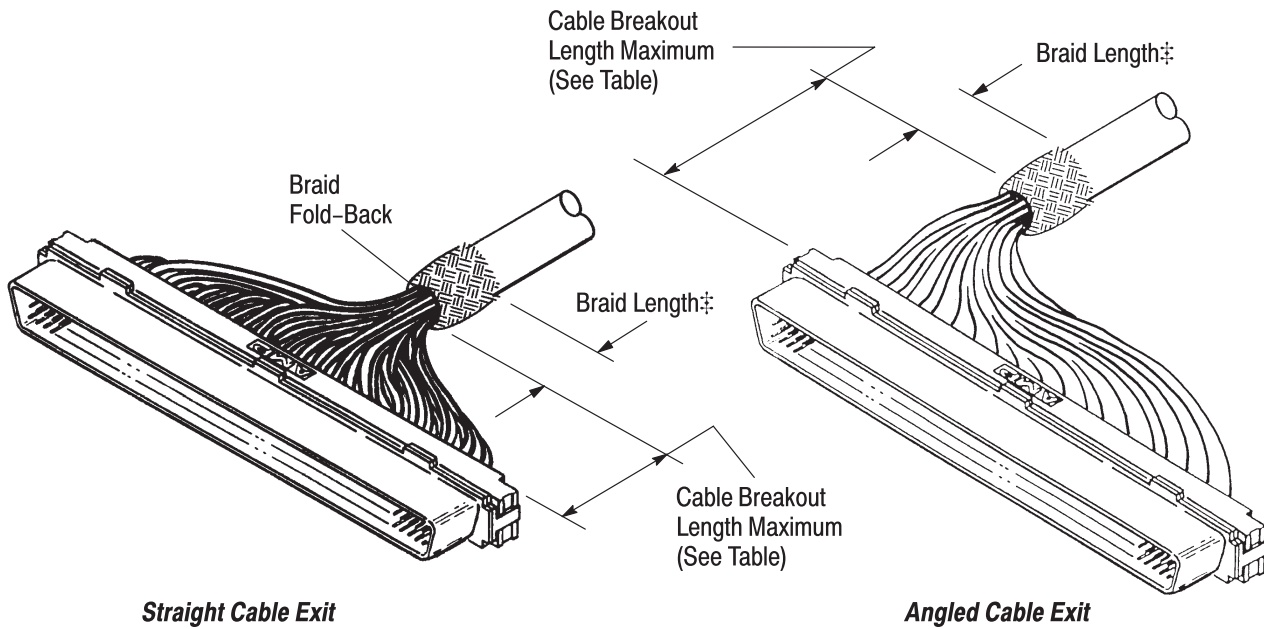
Insulation Must be Intact, Except in Area of Slot (Tooling Marks On Wire Insulation Are Acceptable)

Contact Base Metal Must Not be Exposed or Deformed During Termination

Figure 5

### 3.5. Cable Breakout Length

Correct breakout length is required for proper assembly of the terminated connector and cable into the backshells. Breakout dimensions are measured from the front edge of the termination cover to the braid fold-back. The points for measurement and the dimension for each connector size and backshell combination is provided in Figure 6.



‡ Braid length will vary depending on backshell style. See Figure 4.

CONNECTOR SIZE	CABLE BREAKOUT LENGTH††	
	STRAIGHT EXIT BACKSHELL	ANGLED EXIT BACKSHELL
20	22.86 [.900]	22.86 [.900]
26	22.86 [.900]	22.86 [.900]
28	22.86 [.900]	22.86 [.900]
40	22.86 [.900]	27.94 [1.100]
50	27.94 [1.100]	27.94 [1.100]
60	27.94 [1.100]	27.94 [1.100]
68	27.94 [1.100]	27.94 [1.100]
80	27.94 [1.100]	27.94 [1.100]
100	27.94 [1.100]	38.10 [1.500]
120	27.94 [1.100]	38.10 [1.500]

†† Cable Breakout Length is based on standard application, and may be adjusted for your specific insulation diameter, wiring technique, and tooling.

Figure 6

### 3.6. Backshell

#### A. Types

Backshells must be installed on shielded connectors used for a free-hanging application to provide strain relief and to prevent movement of the terminated wires in the insulation displacement contact. There are all-metal backshells with a straight or angled cable exit, and there are plastic backshells with two intermating shield halves. A serrated staple is used to clamp the cable bundle to the lower backshell. There is a straight metal backshell design for latches and keys, and one for jackscrew applications. There is an angled metal backshell that can be used with latches and keys. Plastic backshell kits are available with jackscrews or latches. See Figure 7.

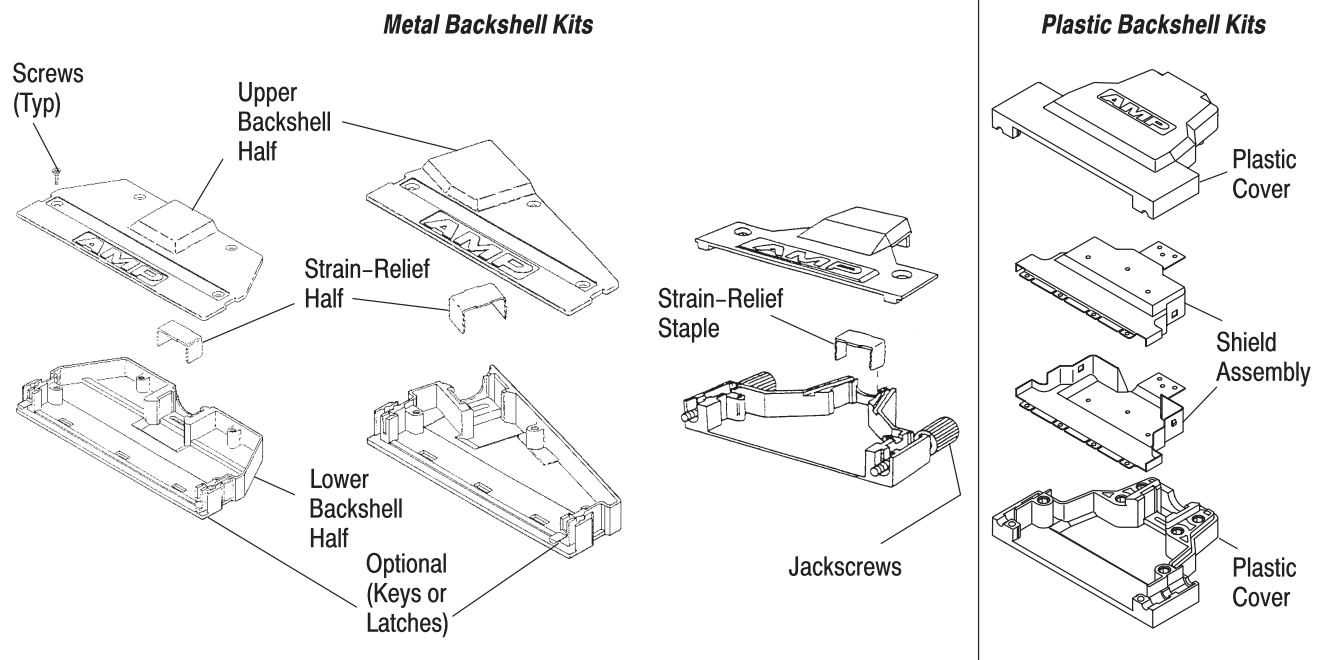


Figure 7

**B. Staple Installation**

The terminated connector must be placed in the lower backshell half and the strain relief staple installed to reduce stress on the terminated wires. The insertion depth of the staple will depend on the insulation diameter of the individual wires and the effect they have on the overall cable bundle. If staple insertion is too shallow there will not be adequate strain relief on the cable bundle. If staple insertion is too deep, the conductors could be stretched or broken. If in doubt about the proper insertion depth, install the staple in increments. Check each increment by holding the connector firmly and gently moving the cable bundle in a circular motion. If the wires between the termination point and strain relief staple move, the staple will need to be inserted deeper. Recommended staple insertion depth for most cable bundles is provided in Figure 8.



*It is extremely important to ensure that all conductors extending from the strain relief area to the connector assembly are positioned within the sides of the lower backshell. Any conductors extending over the sides of the lower backshell will be pinched and consequently shorted when the upper backshell is secured to the lower backshell.*

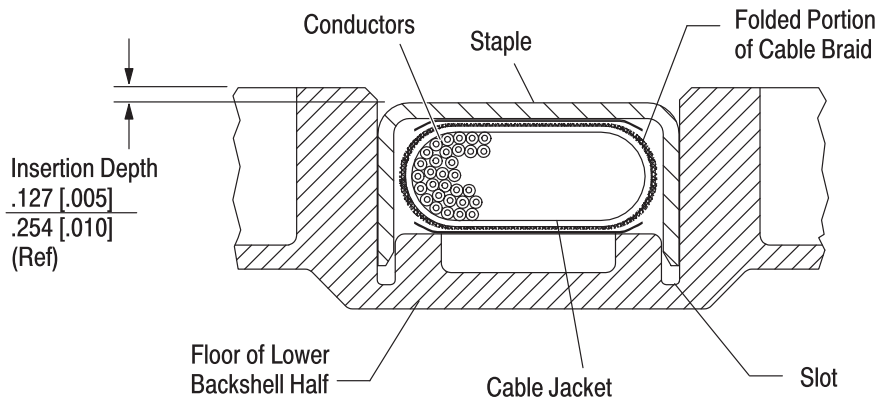


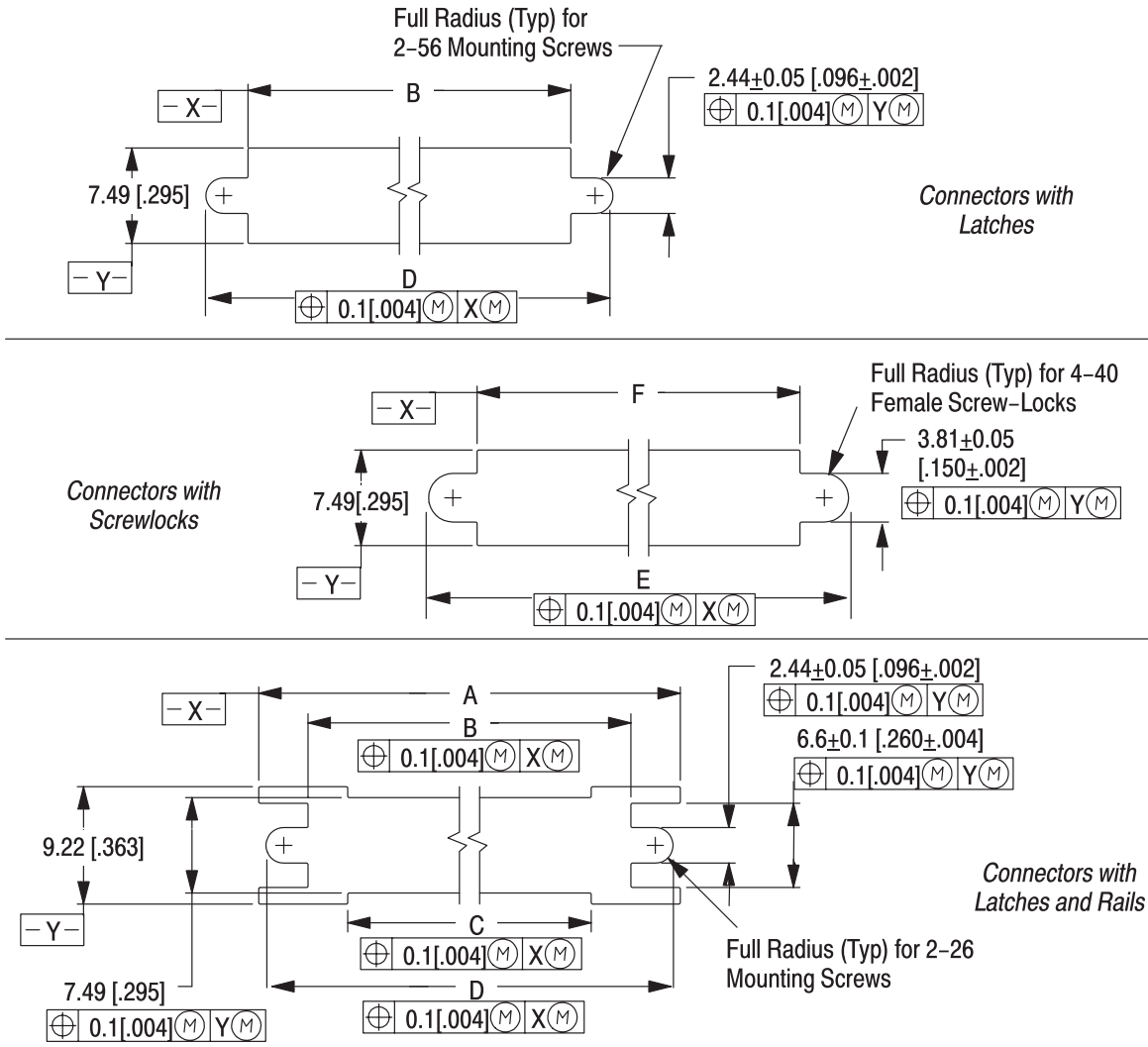
Figure 8

**3.7. Panel Cutout**

Panel cutout patterns and dimensions are provided in Figure 9.



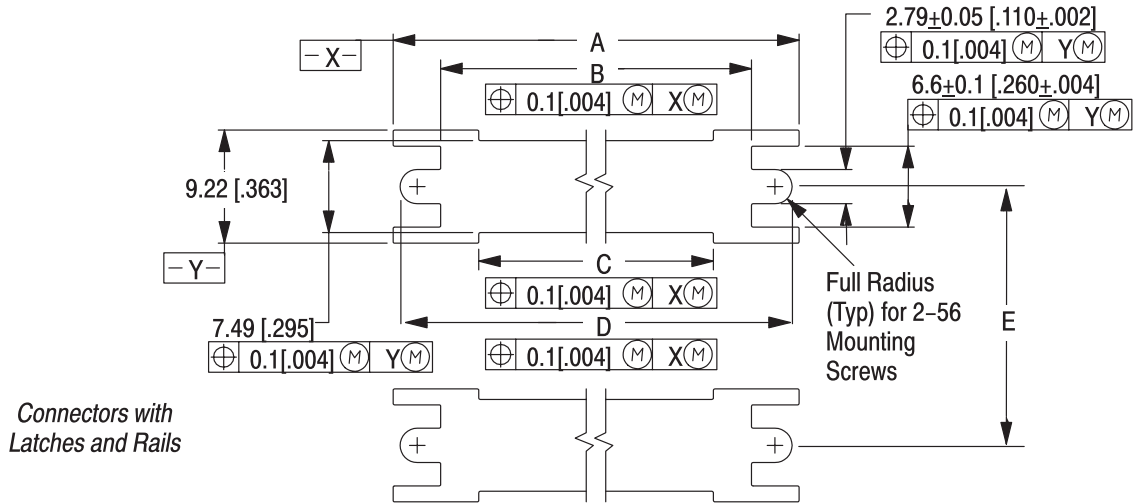
**Panel Cutouts for Single Connectors**



DIMENSION	CONNECTOR SIZE									
	20	26	28	40	50	60	68	80	100	120
A	31.50 [1.240]	35.31 [1.390]	36.58 [1.440]	44.2 [1.740]	50.55 [1.990]	56.9 [2.240]	61.98 [2.440]	69.6 [2.740]	82.3 [3.240]	95 [3.740]
B	23.75 [.935]	27.56 [1.085]	28.83 [1.135]	36.45 [1.435]	42.8 [1.685]	49.15 [1.935]	54.23 [2.135]	61.85 [2.435]	74.55 [2.935]	87.25 [3.435]
C	17.37 [.684]	21.18 [.834]	22.45 [.884]	30.07 [1.184]	36.42 [1.434]	42.77 [1.684]	47.85 [1.884]	55.47 [2.184]	68.17 [2.684]	80.87 [3.184]
D	29.87 [1.176]	33.68 [1.326]	34.95 [1.376]	42.57 [1.676]	48.92 [1.926]	55.27 [2.176]	60.35 [2.376]	67.97 [2.676]	80.67 [3.176]	93.37 [3.676]
E	31.24 [1.230]	35.05 [1.380]	36.32 [1.430]	43.94 [1.730]	50.29 [1.980]	56.64 [2.230]	61.72 [2.430]	69.34 [2.730]	82.04 [3.230]	94.74 [3.730]
F	18.64 [.734]	22.45 [.884]	23.72 [.934]	31.34 [1.234]	37.69 [1.484]	44.04 [1.734]	49.12 [1.934]	56.74 [2.234]	69.44 [2.734]	82.14 [3.234]

Figure 9 (cont'd)

**Panel Cutouts for Stackable Connectors**



DIMENSION	CONNECTOR SIZE			
	26	50¥	50¥	68
A	35.31 [1.390]	50.55 [1.990]	50.55 [1.990]	61.98 [2.440]
B	27.56 [1.085]	42.80 [1.685]	42.80 [1.685]	54.23 [2.135]
C	21.18 [.834]	36.42 [1.434]	36.42 [1.434]	47.85 [1.884]
D	34.04 [1.340]	49.28 [1.940]	49.28 [1.940]	60.71 [2.390]
E	10.54 [.415]	14.00 [.551]	12.70 [.500]	19.05 [.750]

¥The difference between the two 50-position stacking connectors is stacking connector dimension "E".

Figure 9 (end)

**3.8. Accessories**

**A. Keying Inserts**

Keying inserts (keys) are designed to provide unique mating combinations for similar types of connector assemblies used in the same location. They can be installed in the metal backshells that have post holes and latch slots. Each key can be placed in one of six different positions. When keys are used, the locking latches may not be used. See Figure 10.

**NOTE**

The keys in mating connector assemblies must be at 180° to each other for mating.



**B. Latches and Latching Blocks**

These components are used to lock mating connectors together. They are designed to be installed in metal backshells that have latch slots and post holes. The latches must be installed in the latch slots of one of the connector assemblies with the locking tips turned inward. The latch blocks must be installed in the post holes of the mating connector assembly with the gripper turned outward. When latches are used, keys can not be used. See Figure 10.

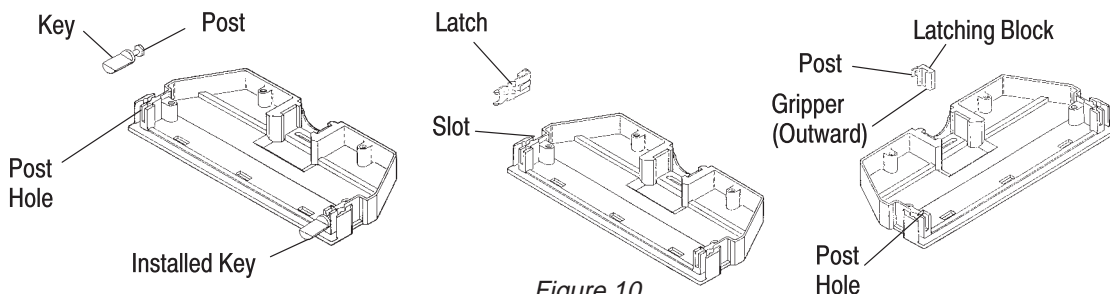


Figure 10

**C. Jackscrews and Screwlocks**

There are 2-56 threaded male and female jackscrews available for metal and plastic shield kits that have jackscrew slots. Jackscrews with opposite threads (male/female) can be used with each other or with mating 2-56 threaded screwlocks.

Screwlocks are available for pc board mounted connectors. There are screwlocks with double-ended male threads (2-56 on one end and 4-40 on the other), female (2-56) and male (4-40) screwlocks, and female (2-56) and male (4-40) screwlock for connectors with rails and latches which allows the mating connector to have spring latches or jackscrews. See Figure 11.



*Tighten screwlocks to connectors using a maximum of 0.68 N•m [6in.-lb] of torque.*

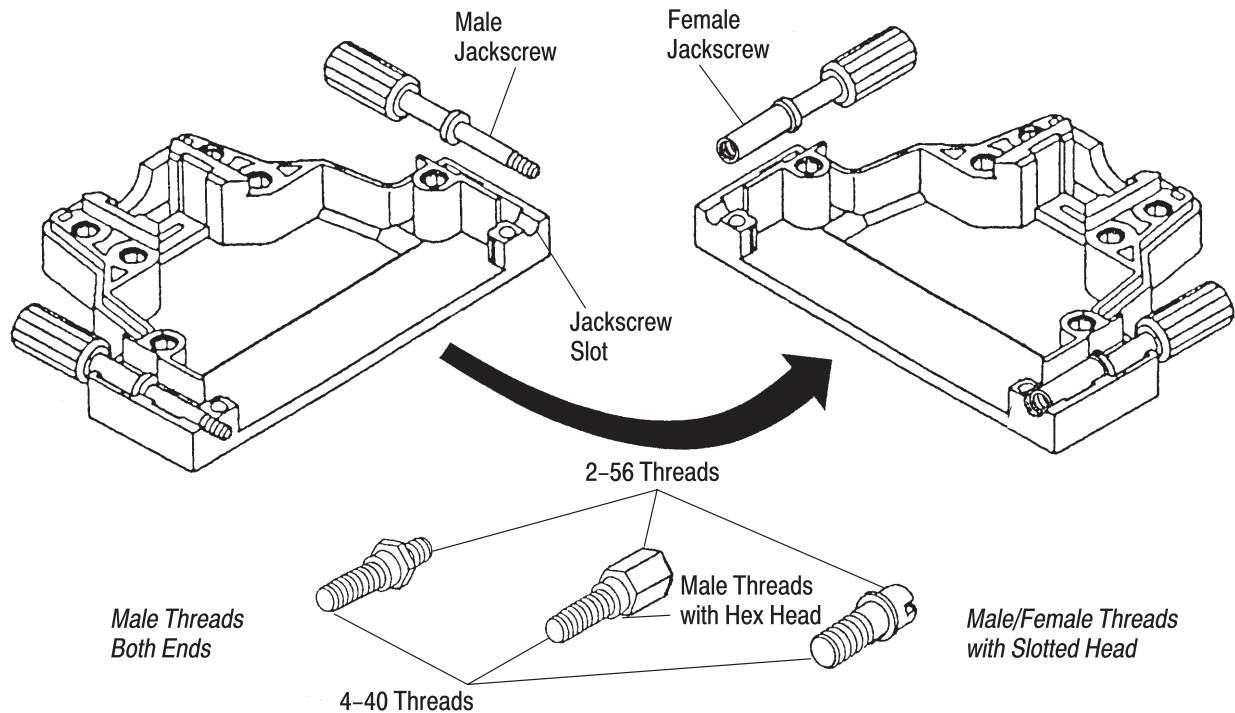


Figure 11

**D. Hardware**

Connectors are available with threaded holes or boardlocks. Those with threaded holes in right angle mounting flanges can be secured to the pc board with commercially available hardware (screw thread size will depend on thread size: 2-56 or 4-40). See Figure 12.

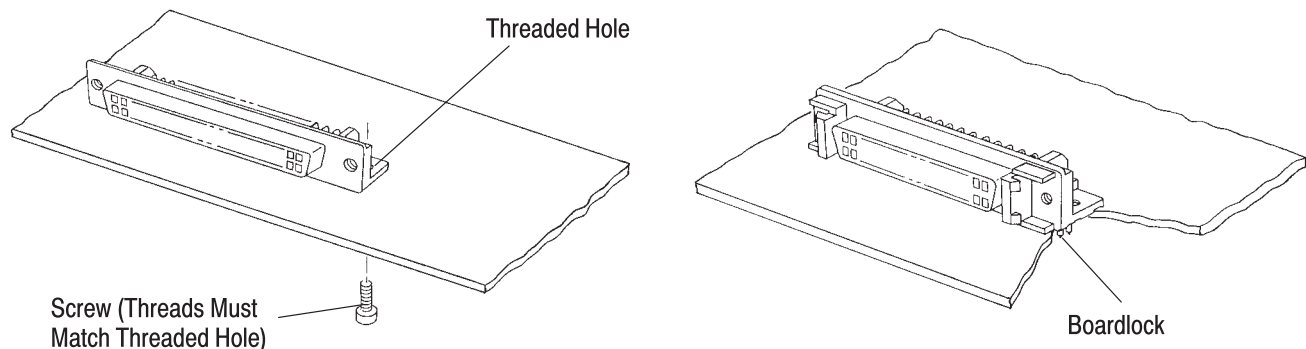
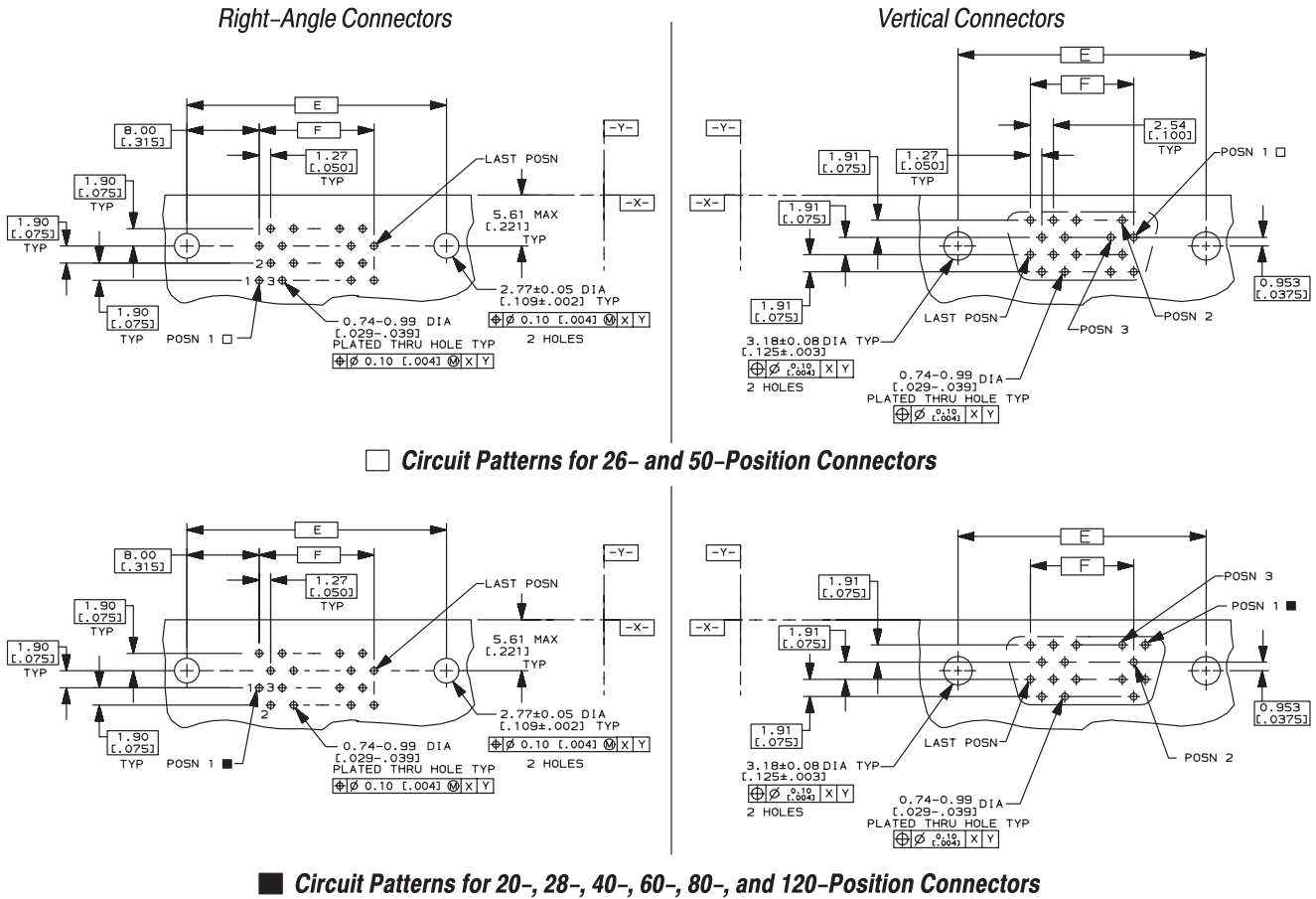


Figure 12

3.9. PC Board Layouts

The contact and mounting holes must be precisely located to assure proper contact tail placement and optimum performance of the connector. The “X” and “Y” symbols on the pc board layout represent customer-established datums for locating hole centers. They are the points of reference from which all positions must be located. The dimensions from these datums to the first mounting and contact holes represent the basic dimensions from which permissible tolerances and variations are established. The layout for both the solder-type and ACTION PIN Connectors is from the (component) side of the pc board as provided in Figure 13.



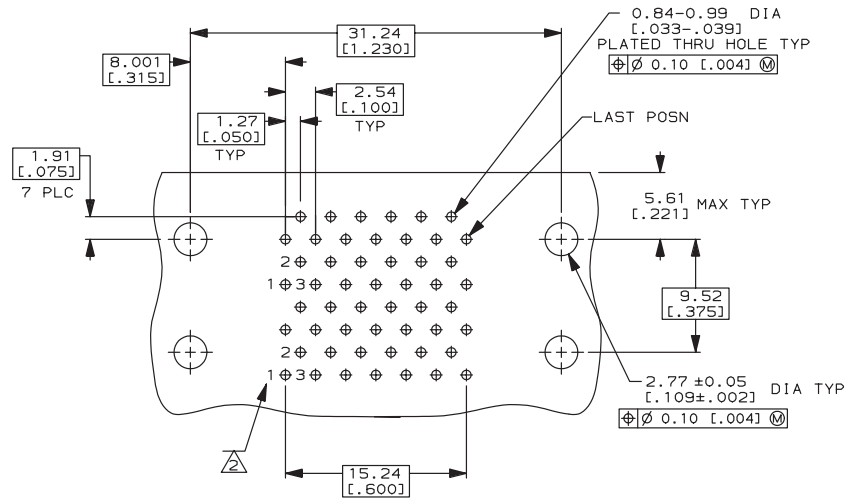
74.93 [2.950]	90.93 [3.580]	120
62.23 [2.450]	78.23 [3.080]	100
49.53 [1.950]	65.53 [2.580]	80
41.91 [1.650]	57.91 [2.280]	68
36.83 [1.450]	52.83 [2.080]	60
30.48 [1.200]	46.48 [1.830]	50
24.13 [.950]	40.13 [1.580]	40
16.51 [.650]	32.51 [1.280]	28
15.24 [.600]	31.24 [1.230]	26
11.43 [.450]	27.43 [1.080]	20
F	E	NO OF POSN

**NOTE:** A range has been provided for the contact hole diameter. The actual diameter will depend on trace routing requirements between holes and the technique for placing the connector on the pc board.

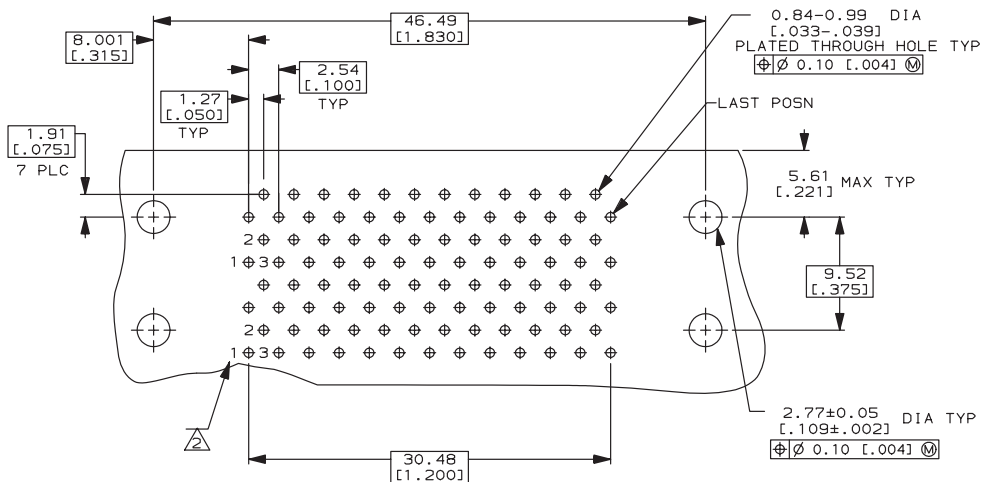
**NOTE:** See Figure 14 for ACTION PIN contact hole requirements.

Single Connector Layouts

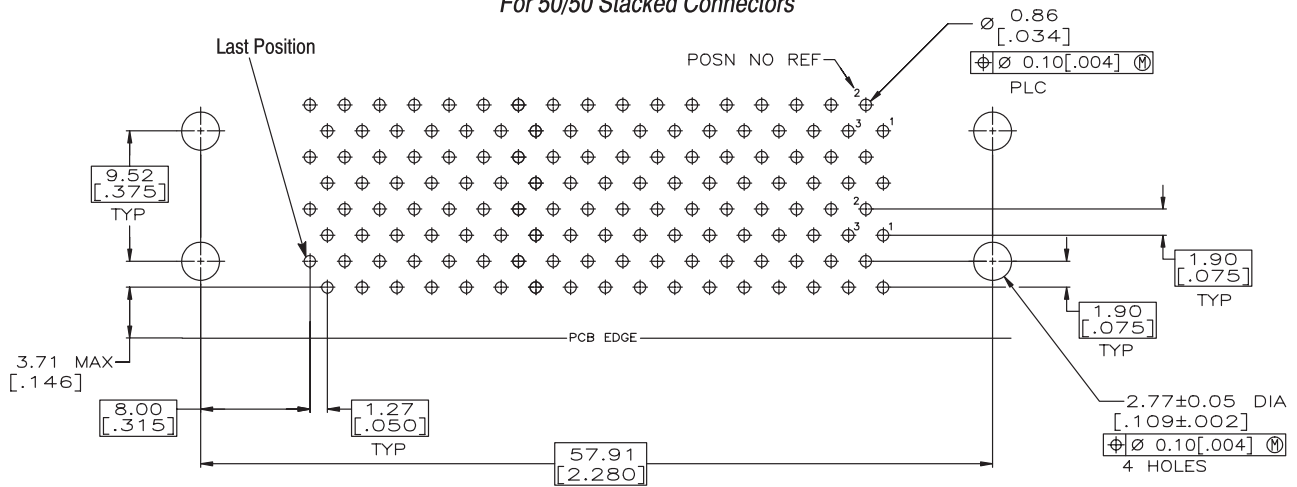
Figure 13 (cont'd)



For 26/26 Stacked Connectors



For 50/50 Stacked Connectors



For 68/68 Stacked Connectors

**Stacked Connector Layouts**

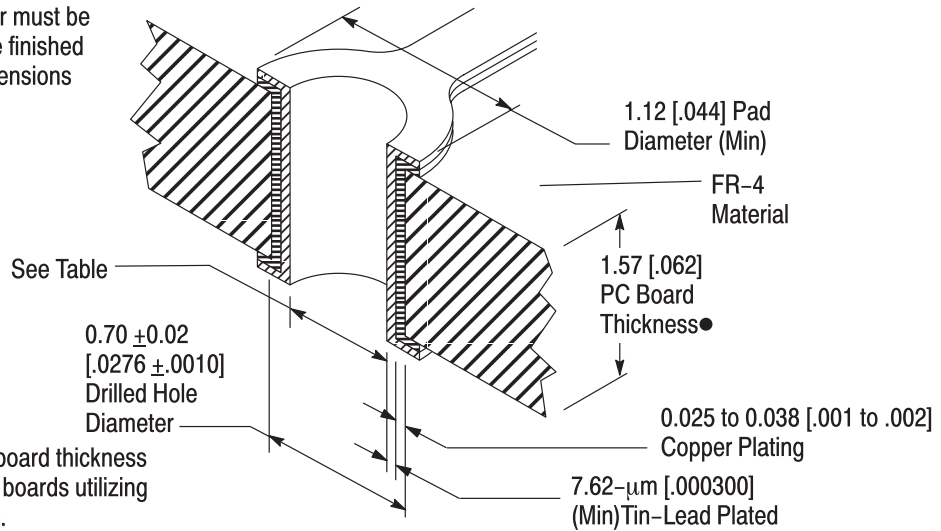
Recommended PC Board Mounting Dimensions  
 Connector Side  
 PC Board Thickness 1.57 ± 0.18 mm [0.062 ± .007 in.]

Figure 13 (end)

**A. ACTION PIN Contact Connectors**

Connectors with contact tail lengths of 4.39 mm [.173 in.] are designed for boards with a nominal thickness of 1.57 mm [.062 in.] and 2.36 mm [.093 in.]. Connectors with contact tail lengths of 7.11 mm [.280 in.] are designed for boards with a nominal thickness of 3.18 mm [.125 in.] and 5.08 mm [.200 in.]. Holes for connectors with ACTION PIN Contacts must be drilled and plated-through to specific dimensions. See Figure 14.

**NOTE:** The drilled hole diameter must be sized so that the diameter of the finished hole after plating meets the dimensions as shown.



**SURFACE FINISH TABLE**

THICKNESS mm [in.]	PLATING
0.004-0.010 [.0002-.0004]	Hot Air Solder Leveling (HASL) Tin-Lead (Sn Pb)
0.0005-0.004 [.00002-.0002]	Immersion Tin (Sn)
0.0002-0.0005 [.00001-.00002]	Organic Solderability Preservative (OSP)
0.0001-0.0005 [.000004-.00002] (Au)	Immersion Gold (Au) Over Nickel (Ni) (ENIG)
0.00127-0.0076 [.000050-.00030] (Ni)	
0.0001-0.0005 [.000004-.00002]	Immersion Silver (Ag)

Figure 14

**B. Solder-Type Contact Connectors**

Vertical pc board connectors with post tail lengths of 3.18 mm [.125 in.], and all right-angle connectors are designed for boards with a nominal thickness of 1.57 mm [.062 in.]. Vertical connectors with post tail lengths of 4.78 mm [.188 in.] are designed for boards with a nominal thickness of 3.18 mm [.125 in.]. If other pc board thicknesses are desired, contact Tyco Electronics Engineering through the Tooling Assistance Center or Product Information number at the bottom of Page 1.

**C. Connector Placement**

All pc board connectors shall be fully seated and securely attached. This may be accomplished with pre-installed boardlocks, screwlocks, or commercially available 2-56 screws. After final assembly, the connector must be seated to within the dimension shown in Figure 15.

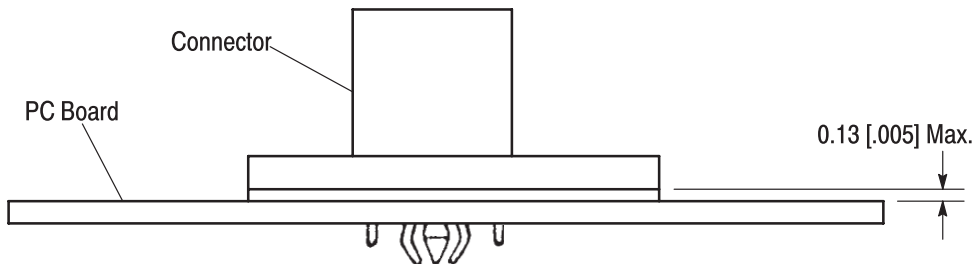


Figure 15

**3.10. Soldering Solder-Type Connectors**

Soldering, cleaning, and drying of pc board assemblies shall be according to the following guidelines.

**A. Soldering Guidelines**

Refer to Paragraph 2.4 for instructional material that is available for establishing soldering guidelines.

**B. Fluxing**

Solder-type contact tails and, if applicable, attaching hardware 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 one of the phone numbers 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 16.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
Type RMA (Mildly Activated)	Mild	Noncorrosive	185/197	611

Figure 16

**C. Cleaning Connectors**

After soldering, removal of fluxes and activators is necessary. Cleaners must be free of dissolved flux and other contaminants. If using an organic solvent, we recommend vapor phase cleaning with the pc board on its edge. If using an aqueous cleaner, we recommend standard equipment such as a soak-tank or an automatic in-line machine. Consult the supplier of the solder and flux for recommended cleaners.

Common organic and aqueous cleaners that these connector can be exposed to for a period of 5 minutes at 40.5°C [105°F] with no harmful affect are provided in Figure 17.



*Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Trichloroethylene and Methylene Chloride can be used with no harmful affect to the sockets; 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 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 17

**D. Drying**

When drying cleaned assemblies DO NOT exceed operating temperature limits stated in Product Specification 108-1228. Excessive temperatures may cause degradation of the connector housing.

## 4. QUALIFICATIONS

AMPLIMITE .050 Series Connectors are Recognized by Underwriters Laboratories Inc. (UL) Component Recognition Program in Electrical File Number E-28476. They are also Certified by CSA International in File Number LR-7189A-207.

## 5. TOOLING

This section provides a selection of tools for various application requirements. They include hand tools for manual application of product, and semi-automatic and automatic machines for power assist application product. 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 product range is provided in Figures 19 and 20.

### 5.1. Wire Insertion Tooling

#### A. CHAMPOMATOR 2.5 Machine

For producing cable assemblies, the CHAMPOMATOR 2.5 Bench Terminating Machine equipped with Control Module terminates AMPLIMITE .050 Series Connectors. Based on connector size, the appropriate Tie Bar referenced in Figure 18 will be needed. For machine number and instructional material, see Figure 19.

TIE BAR	
CONNECTOR SIZE	PART NUMBER
20	762637-1
26	1-762637-1
28	1-762637-2
40	762637-3
50	762637-4
60	762637-5
68	762637-6
80	762637-7
100	762637-9
120	1-762637-0

Figure 18

#### B. Termination Cover Closing Tooling

Manual Miniature Applicator Frame Assembly equipped with Cover Closing Kit terminates ribbon cable, round-to-flat laminated cable, and wire lacing covers. This tool can also be used to close connector termination covers after using the CHAMPOMATOR 2.5 Machine. See Figure 19.

#### C. Lacing Termination Cover Tooling

Manual Arbor Frame Assembly can be equipped with Cover Lacing Tooling for lacing, inserting, and trimming discrete wire into wire lacing covers. See Figure 19.

#### D. Mass Termination Tooling for Discrete Wires

Manual Arbor Frame can be equipped with Mass Termination Tooling for terminating loose-strand discrete wires. See Figure 19.

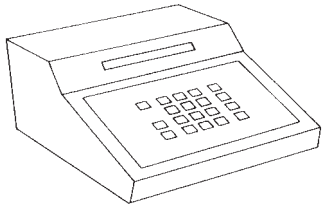
#### E. Repair Tool

Single Wire Insertion Tool terminates individual wires to contacts left unterminated in a previous termination process. See Figure 19.

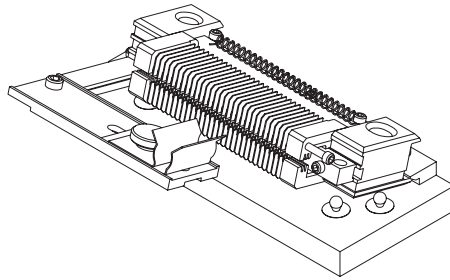
### 5.2. Strain-Relief Staple Tooling

Use Manual Miniature Applicator Frame Assembly equipped with Strain Relief Staple Insertion Kit to install cable strain relief staples into lower backshells. See Figure 19.

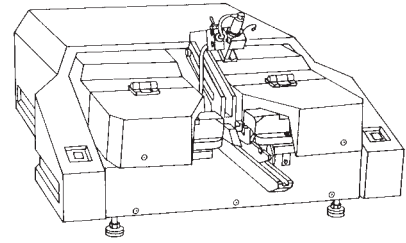




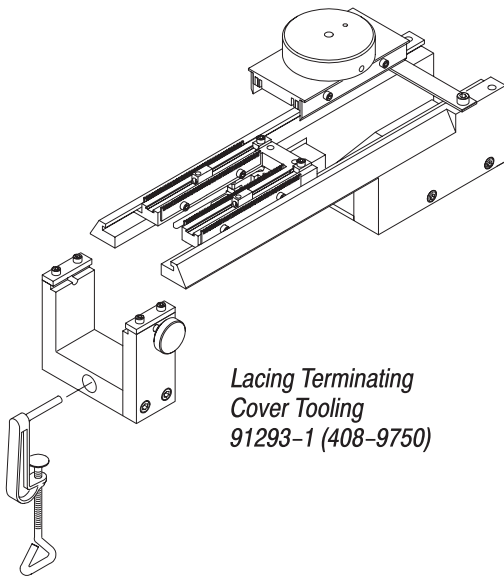
**CHAMPOMATOR 2.5**  
Control Module  
852423-1 (409-5791)



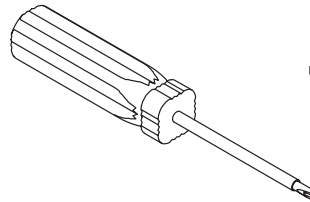
**Discrete Wire Tooling**  
91291-1 or -2 (408-9663)



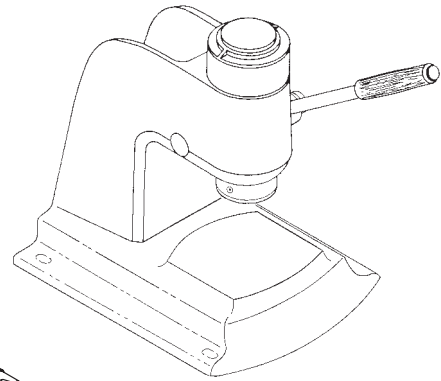
**Tool Kit 354786-1**  
Including CHAMPOMATOR 2.5  
762734-3 (409-5839)



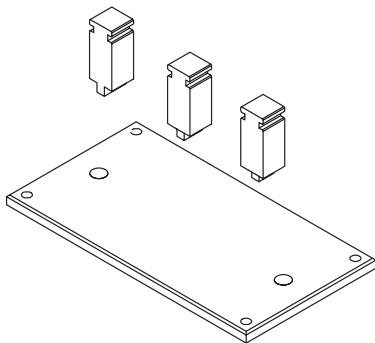
**Lacing Terminating**  
Cover Tooling  
91293-1 (408-9750)



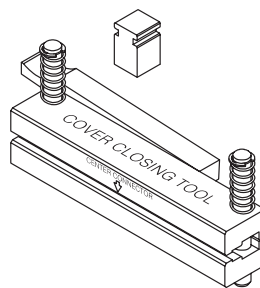
**Single Wire**  
Insertion Tool  
58430-1 (408-9200)



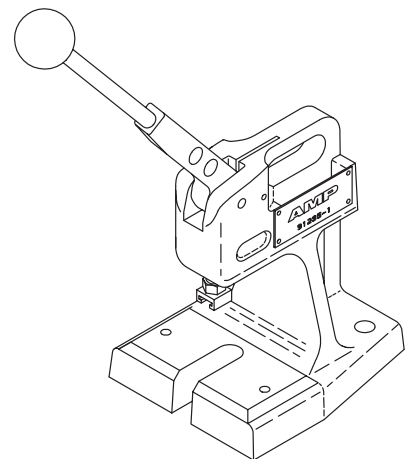
**Manual Arbor**  
Frame Assembly  
58024-1 (408-6923)



**Strain Relief Staple**  
Insertion Tooling  
543515-1 (408-9820)



**Termination Cover**  
Closing Tooling  
543508-1 (408-9820)



**Manual Miniature**  
Applicator Frame Assembly  
91295-1 (408-9817)

Figure 19

**5.3. ACTION PIN Connector Tooling**

**A. Seating Tools**

Seating Tool, and a PC Board Support made to accommodate the contact posts and other components of the system are recommended for installing ACTION PIN Connectors. For low volume applications, we recommend the Adapter Kit with Greenerd Frame Assemblies 3A and 3B. For higher volume applications, we recommend the SM-3 Machine or H-Frame Machine. See Figure 20.

**B. Housing Support Tool**

Housing Support Tool is designed for removing damaged connectors from a pc board. It supports the pc board while pressure is applied evenly to all contact tails using a piece of flat bar and a press capable of producing 222 N [50 lb-force] per contact tail. See Figure 20.

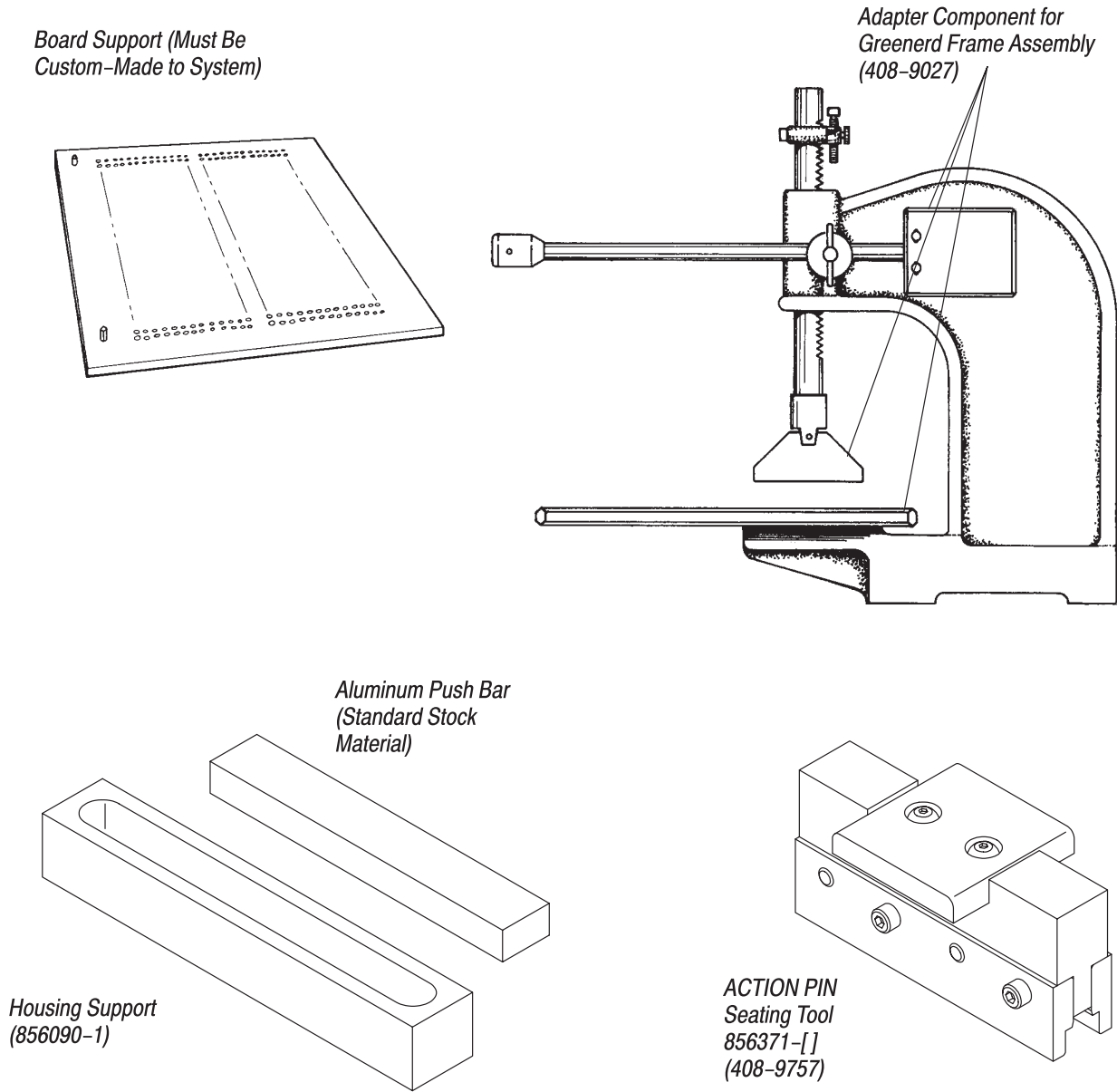
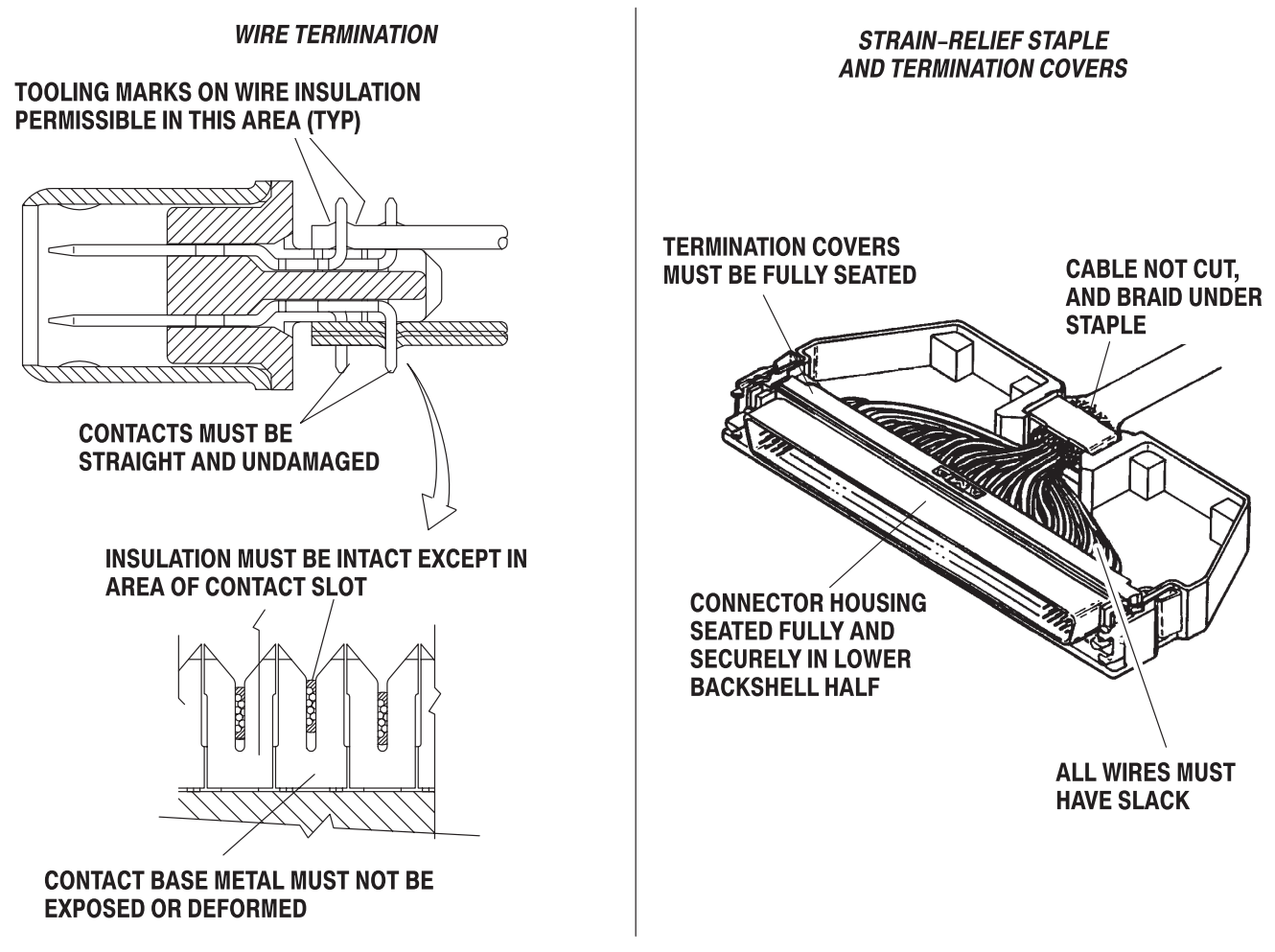


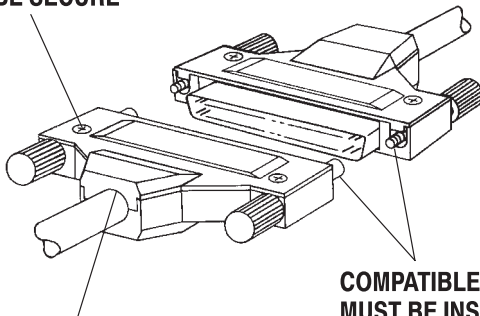
Figure 20

**6. VISUAL AID**

Figure 21 is to be used by production personnel to ensure a properly applied product. The views shown suggest requirements for all similar applications. Applications NOT visually correct should be inspected using the information in the main body of this document and in the instructional materials shipped with the product or tooling.



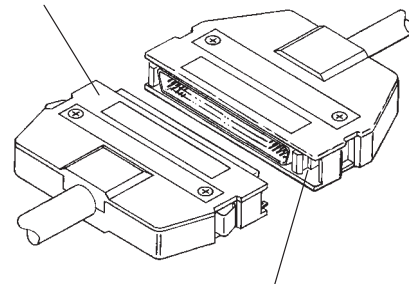
**ATTACHING SCREWS MUST BE SECURE**



**NO BRAID STRANDS SHOULD PROTRUDE**

**COMPATIBLE JACKSCREWS MUST BE INSTALLED IN MATING CONNECTORS**

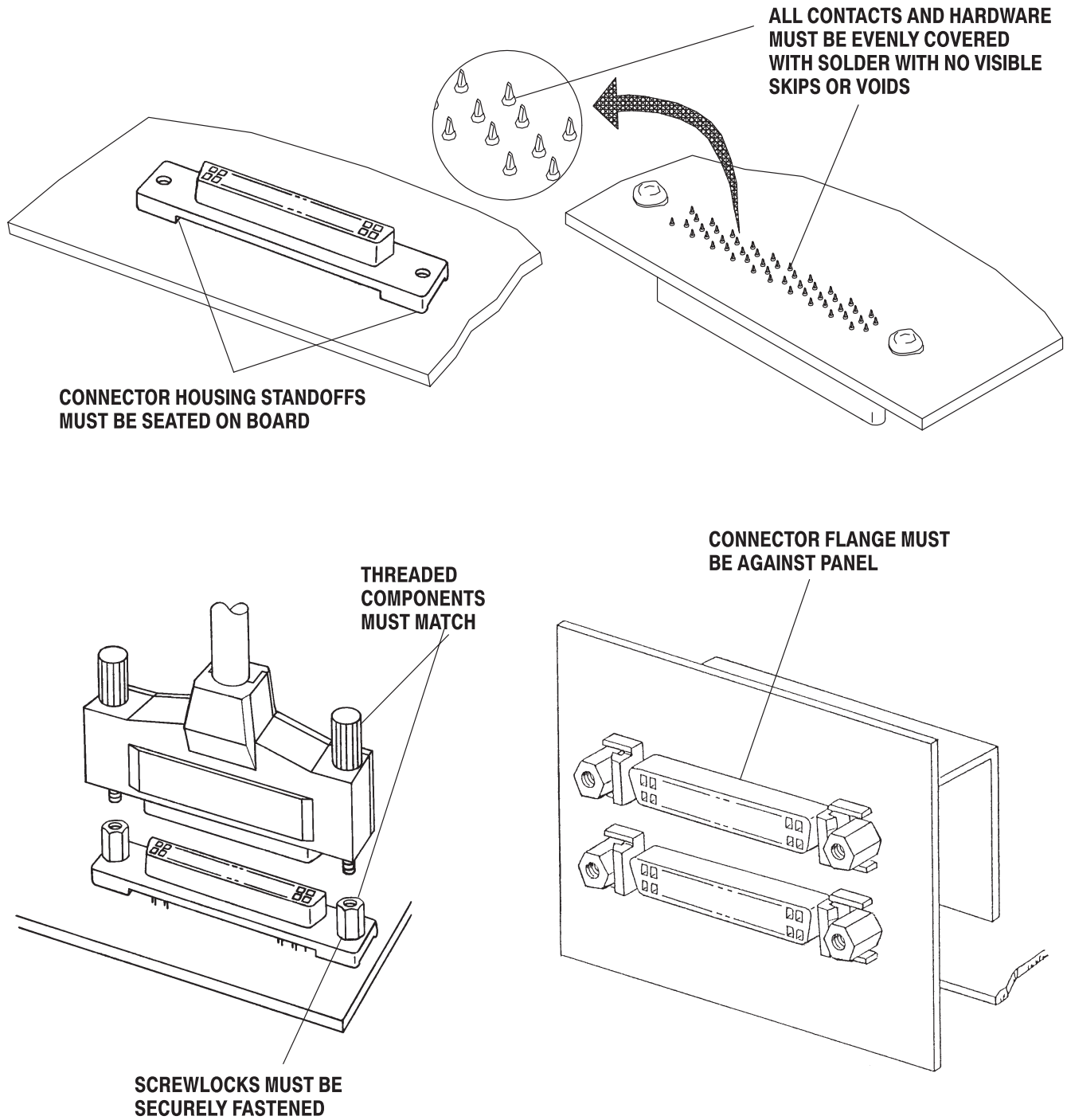
**LATCH LOCKING TIPS MUST BE TURNED INWARD**



**LATCH BLOCK GRIPPER MUST BE TURNED OUTWARD**

**FIGURE 21. VISUAL AID (cont'd)**

**PRINTED CIRCUIT BOARD APPLICATIONS**



**FIGURE 21. VISUAL AID (end)**