

REV	REASON	BOX HEADER ASSEMBLIES AND RECEPTACLE CONNECTORS WITH CONTACTS ON .075 AND .100 INCH CENTERLINES	ENGINEERING RELEASE DATE
A	EC M-3118		8-27-93
			APPROVAL
			GREG GRIFFITH / DAVID MILLER

1. INTRODUCTION

This specification covers the requirements for application of AMP* .075 and .100 Box Pin Header Assembly and Receptacle Connector Components which are designed for printed circuit (pc) board and panel mount applications. Headers and receptacles are available with various contact positions and pc board mounting patterns. All are designed to be installed by hand.

Each header and receptacle has mounting holes that will accept commercially available hardware such as rivets, screws, bolts and nuts, or specially designed AMP hardware. See Figure 1 for typical product features that will be referred to throughout this text. The illustrations present a composite of available mounting options and typical headers and receptacles. They do not depict actual applications or all header and receptacle styles.

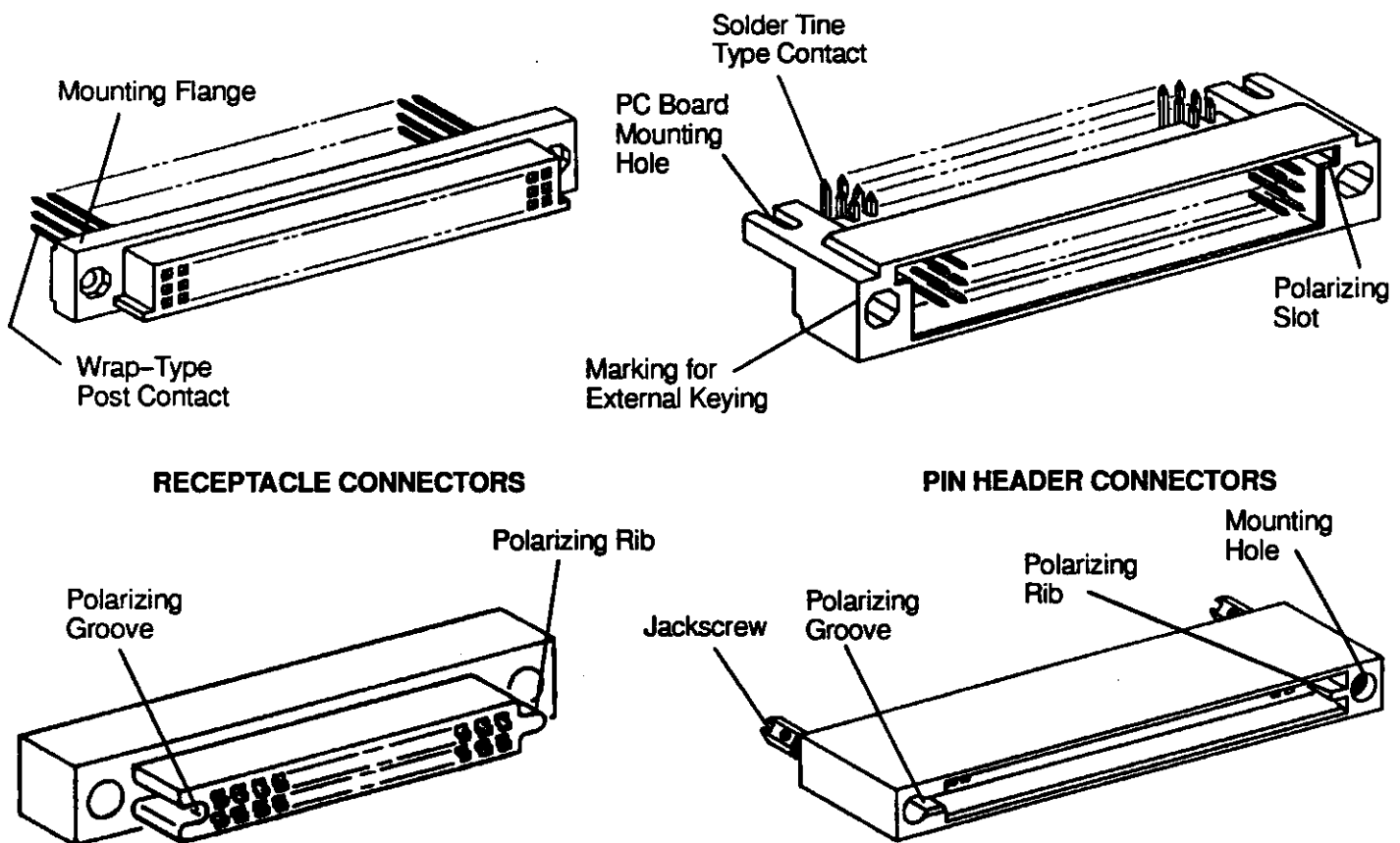


Fig. 1. Product Features

Pin headers assemblies and receptacle connectors are available for pc board and panel mount applications. They are available with a variety of contact tail arrangements to meet various application requirements. Each is available with one of four types of contact tails: (1) solder tines, (2) wrap-type posts, (3) solder eyelets, and (4) crimp wire barrels (.100 headers and receptacles only). Wrap-type posts are available as .010 x .020 posts for solder or single wire application, and .025 x .025 posts for up to 3 wire applications. The crimp-type pin and receptacle contacts are designed for crimping of individual wires.

Straight-through contacts can be removed and replaced from unsealed connectors. Right-angle contacts are permanently retained in the housing — damage to these contacts will require replacement of the header or receptacle. To avoid damage of any contact tails, we recommend that the headers and receptacles remain in their packaging container until ready for use. See Figure 2 for available contact styles.

NOTE

All dimensions in this specification are in inches and have a decimal tolerance of $\pm .005$ in. and an angle tolerance of $\pm 2^\circ$ unless otherwise specified. Metric equivalents (mm) can be obtained by multiplying the given dimension by 25.4.

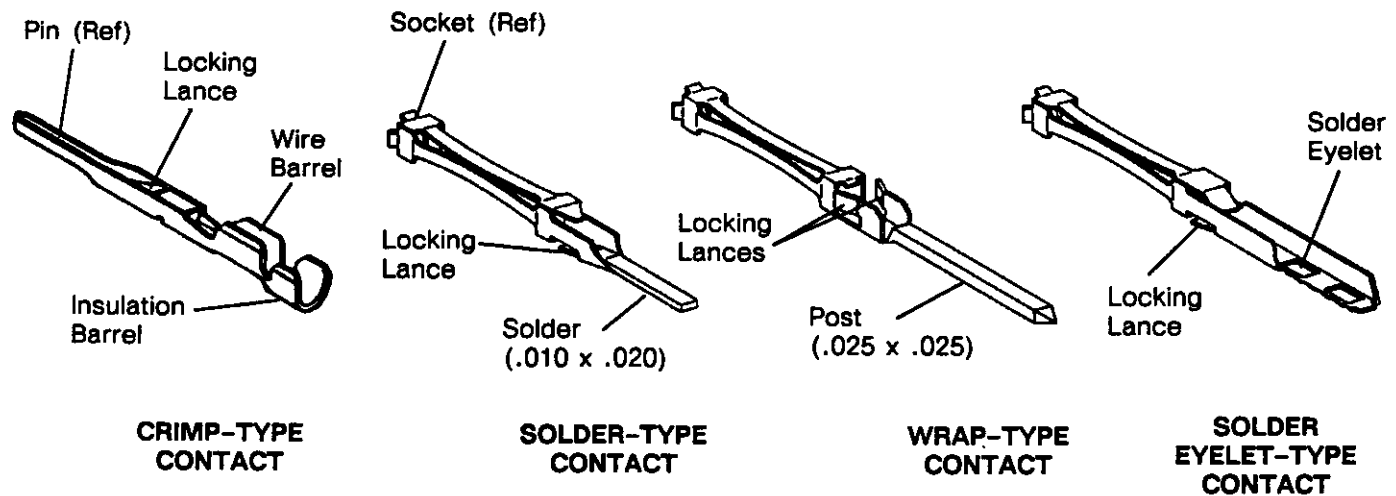


Fig. 2. Contact Types

2.1. Customer Assistance

Reference Part Number 531838 and Product Code 5365 are representative numbers that identify the AMP Box, .075 and .100 Header Assemblies and Receptacle Connectors. These numbers are used in the AMP network of customer service to access tooling and product application information. This service is provided by your local AMP representative (Field Sales Engineer, Field Application Engineer, etc) or, after purchase, by calling the CUSTOMER HOTLINE number at the top of page 1.

2.2. Engineering Drawings

Customer Drawings for specific products are available from the responsible AMP Engineering Department via the service network. The information contained in the Customer Drawings takes priority if there is a conflict with this specification or with any other technical documentation supplied by AMP Incorporated.

2.3. Product Specifications

AMP Product Specification 108-9003 provides performance tests for these terminals.

2.4. Instructional Material

AMP Instruction Sheets (IS) 6623, 6624, 6626, 6627, 6660, 7328, 7335, 7803, 7820, 7869, 9344, and 9506 provide assembly and repair procedures for specific headers and connectors, and IS 7480 provides hand tool crimping procedures for loose piece crimp-type contacts. Applicator Instructions AI 8040 and Customer Manual CM 5128 are available for instructions on applicator and machine operation procedures for crimping continuous strip contacts.

AMP Corporate Bulletin No. 52 is available upon request and can be used as a guide in soldering. This bulletin provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is attached to the bulletin as a guide for information on soldering problems.

3. REQUIREMENTS

3.1. PC Board Mounting

A. Thickness

Header designs are available to accommodate pc board thicknesses of .096 maximum. Receptacle designs are available to accommodate greater pc board thicknesses. For additional information, contact AMP Engineering through the Customer Hotline at the top of page 1.

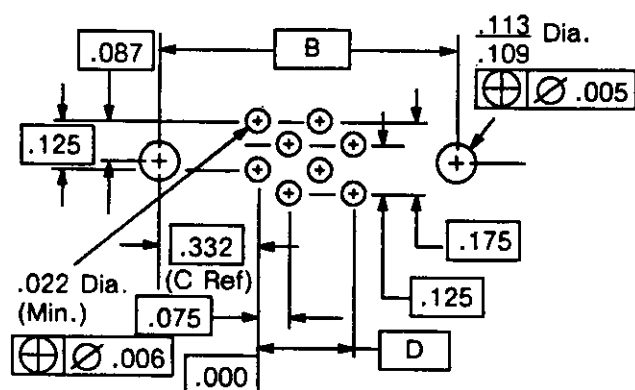
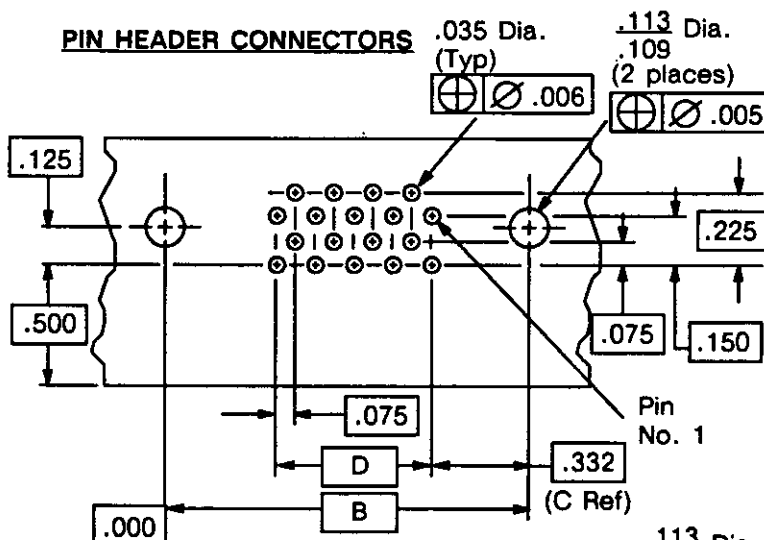
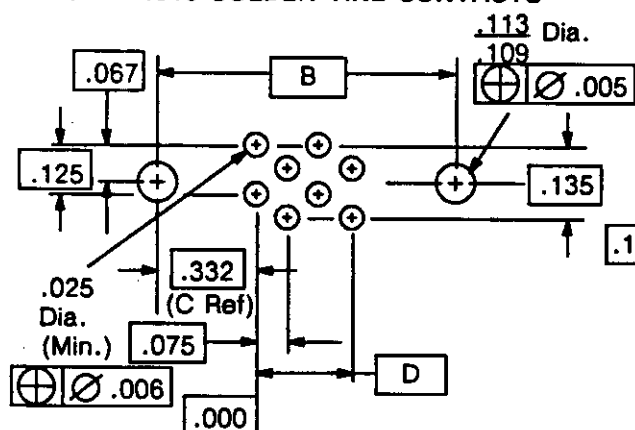
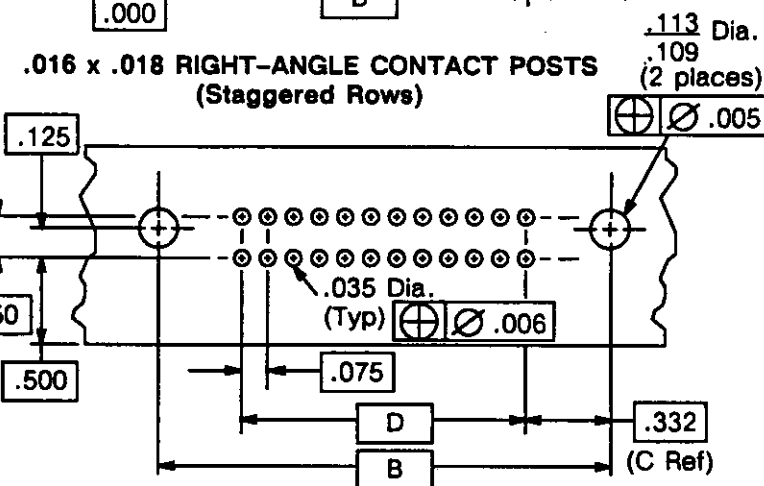
B. Layout

The .075 centerline headers and receptacles are available with two and four rows of contact tails. The .100 centerline headers and receptacles are available with two, three, or four rows of contact tails. All solder tail contacts require precisely located holes. See Figure 3 for .075 contact centerline spacing, and Figures 4 and 5 for .100 contact centerline spacing.

NOTE

The letters used in the layouts coincide with our customer drawing layouts to avoid confusion when working with both layouts. The letter "A", representing overall length on the customer drawing, was not used on this document.

NOTE: ALL LAYOUTS SHOWN ARE THE COMPONENT SIDE OF THE PC BOARD

RECEPTACLE CONNECTORS**PIN HEADER CONNECTORS****.014 x .019 SOLDER TINE CONTACTS****.016 x .018 RIGHT-ANGLE CONTACT POSTS (Staggered Rows)****.010 x .020 POSTED CONTACTS****.016 x .018 CONTACT POSTS (Two In-line Rows)**

Refer to specific layout above and the following formulas for dimensions B and D.

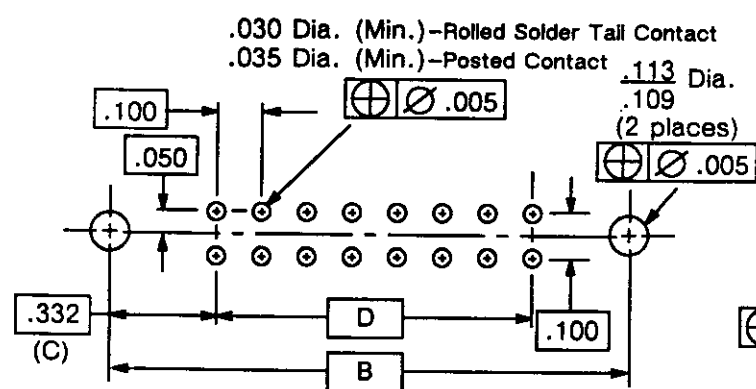
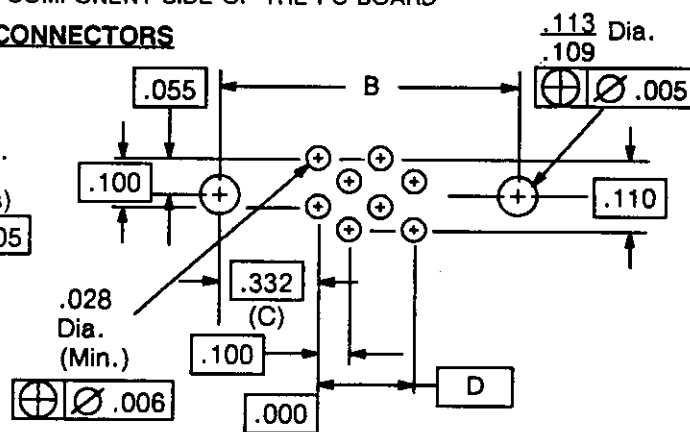
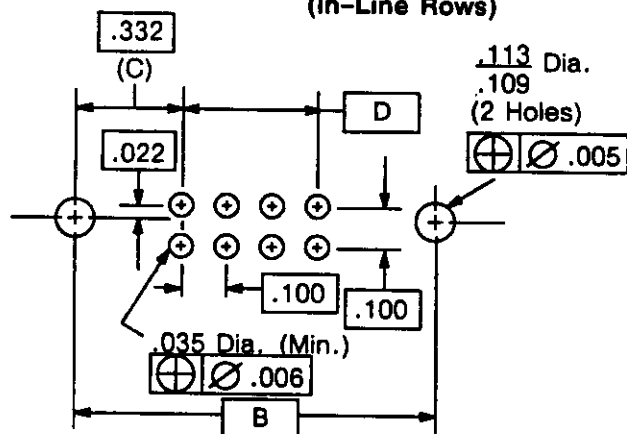
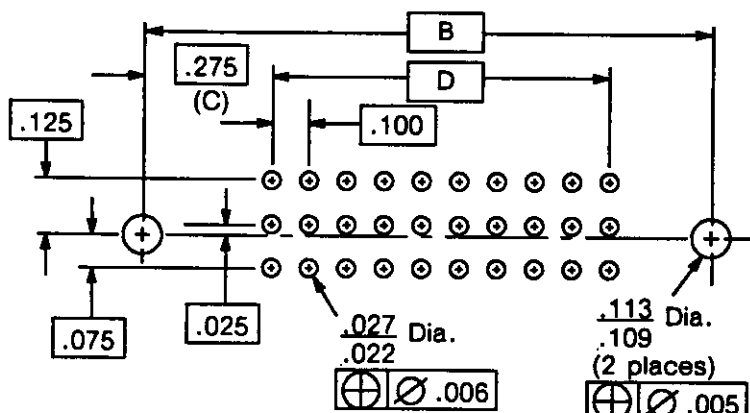
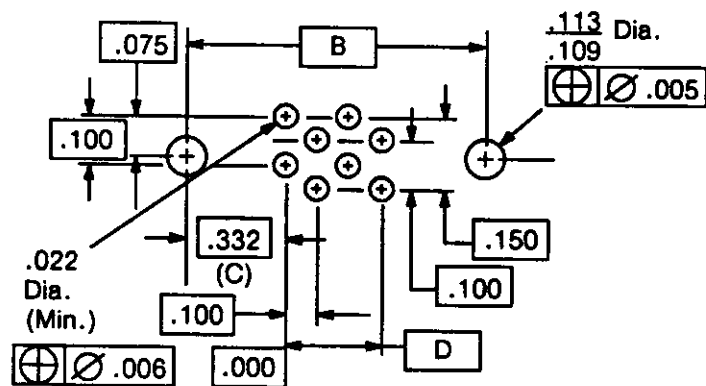
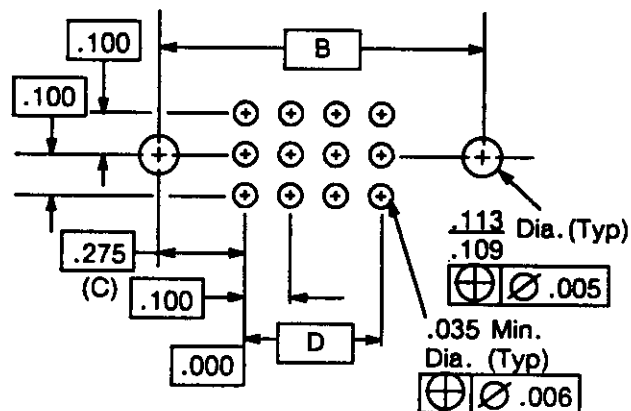
B = Dimension "D" plus two times Dimension "C" (.332).

C = Dimension from end position to mounting hole.

D = The number of in-row positions, minus one position, times .075.

Fig. 3. .075 Pin Header and Receptacle Connector Layouts

NOTE: ALL LAYOUTS SHOWN ARE THE COMPONENT SIDE OF THE PC BOARD

RECEPTACLE CONNECTORS**.025 x .025 STRAIGHT POST CONTACTS
(In-Line Rows)****.010 x .020 POSTED CONTACTS
(Staggered Rows)****RIGHT ANGLE .025 x .025 POSTED CONTACTS
(In-Line Rows)****SOLDER CHANNEL CONTACTS
(In-Line Rows)****.014 x .019 CHANNEL CONTACTS
(Staggered Rows)****WRAP-TYPE POSTED CONTACTS
(In-Line Rows)**

Refer to specific layout above and the following formulas for dimensions B and D.

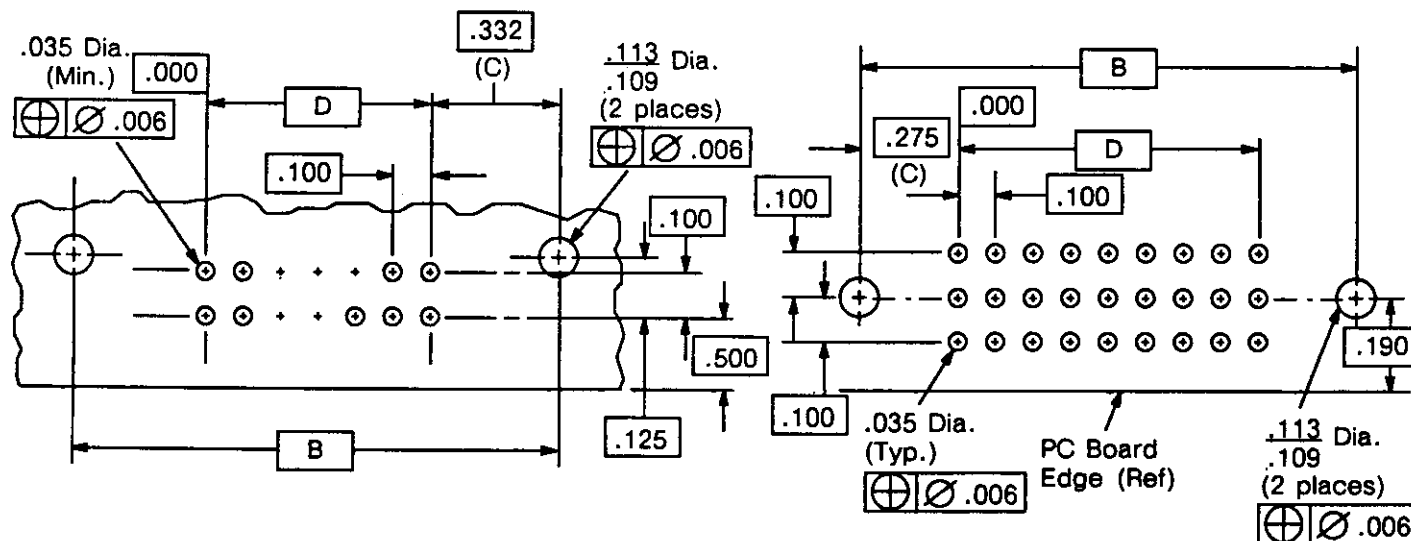
B = Dimension "D" plus two times dimension "C".

C = Dimension from end position to mounting hole.

D = The number of in-row positions, minus one position, times .100.

Fig. 4. .100 Receptacle Connector Layout

NOTE: ALL LAYOUTS SHOWN ARE THE COMPONENT SIDE OF THE PC BOARD

PIN HEADER CONNECTORS**RIGHT-ANGLE FLOW SOLDER CONTACTS
(Two In-Line Rows)****RIGHT-ANGLE FLOW SOLDER CONTACTS
(Three In-Line Rows)**

Refer to specific layout above and the following formulas for dimensions B and D.

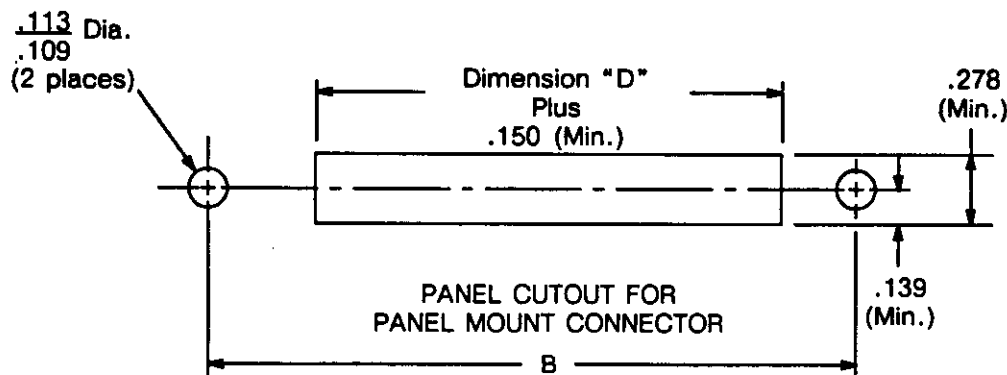
B = Dimension "D" plus two times dimension "C".

C = Dimension from end position to mounting hole.

D = The number of in-row positions, minus one position, times .100.

Fig. 5. .100 Pin Header Layouts**3.2. Panel Mounting**

Front panel mounting is recommended to provide mating and unmating. Figure 6 provides panel cutout dimensions.



Refer to specific connector pc board (Fig. 3, 4, or 5) for dimensions B and D.

Fig. 6. Panel Cutout

3.3. Limitations

Refer to the AMP Product Specification listed in Paragraph 2.3, for testing procedures and any limitations that may apply to these headers and receptacles.

3.4. Polarization and Keying

Each header and receptacle has a polarizing design that ensures proper orientation for mating. When more than one header and receptacle of the same configuration is used in an area, they can be keyed to prevent mis-mating. Keying sleeves are available for internal keying of .100 headers and receptacles with staggered contact positions. Keying kits are available for external keying of headers and receptacles with octagonal keying cavities. See Figure 7.

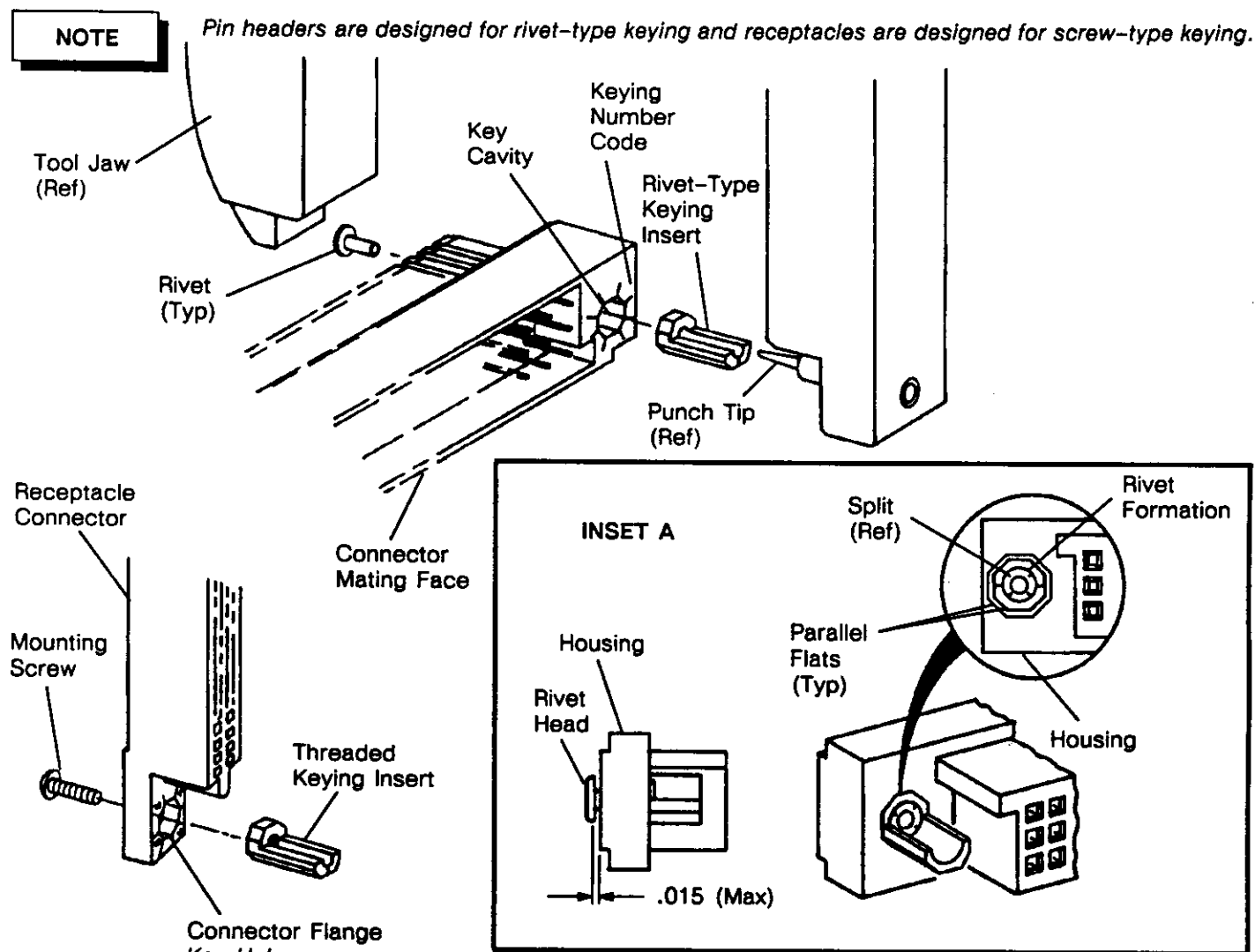


Fig. 7. Polarization and Keying

Keys must be installed properly to ensure mating of the headers and receptacles. See Inset A, Figure 7.

1. The rivet formation may have a maximum of four splits. None of the split lengths should exceed 50% of the formation length.
2. The flat sides of the key must be parallel to the flat sides in the housing.
3. The space between the rivet head and housing may not exceed .015.

3.5. Hardware (See Figure 8)

A. Commercially Available Hardware

Commercially available 2-56 screws, lockwashers, and nuts are recommended for securing headers and receptacles to pc boards.

B. Jackscrew Assemblies

A variety of AMP Fixed and Turnable Jackscrew Assemblies have been designed to accommodate the various styles of headers and receptacles. These assemblies provide a means of locking mated free-hanging and panel mount headers and receptacles. Some typical components are shown in Figure 8. Refer to the instruction sheets packaged with the jackscrews for assembly procedure.

NOTE

Jackscrews can not be used when external keying is used.

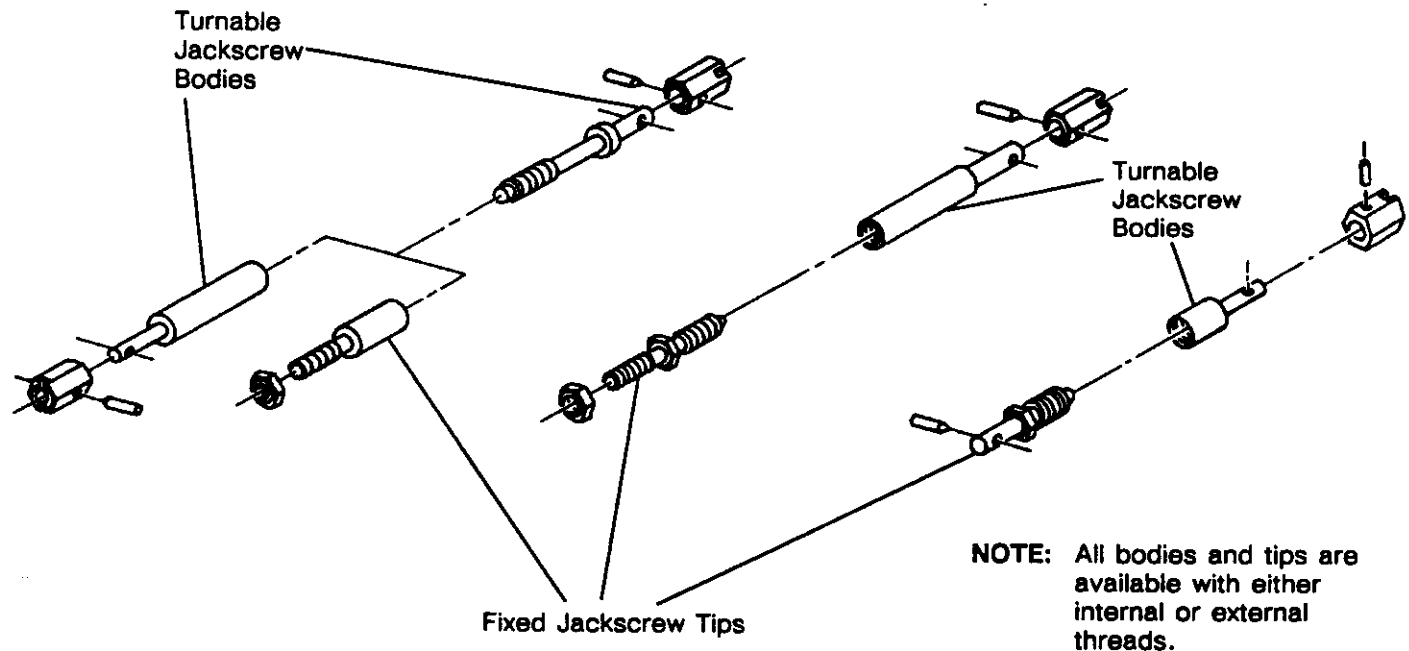


Fig. 8. Hardware

3.6. Contact Extraction

Headers and receptacles with damaged straight-through contacts can be repaired by removing the damaged contact and replacing it with a new one. Right-angle contacts are permanently retained in the housing — damage to a contact will necessitate the replacement of the header or receptacle.

A. Solder and Wrap-Type Contacts

Socket contacts are released from the back of the contact cavity and pin contacts are released from the front of the contact cavity. Refer to Paragraph 5 for tooling information.

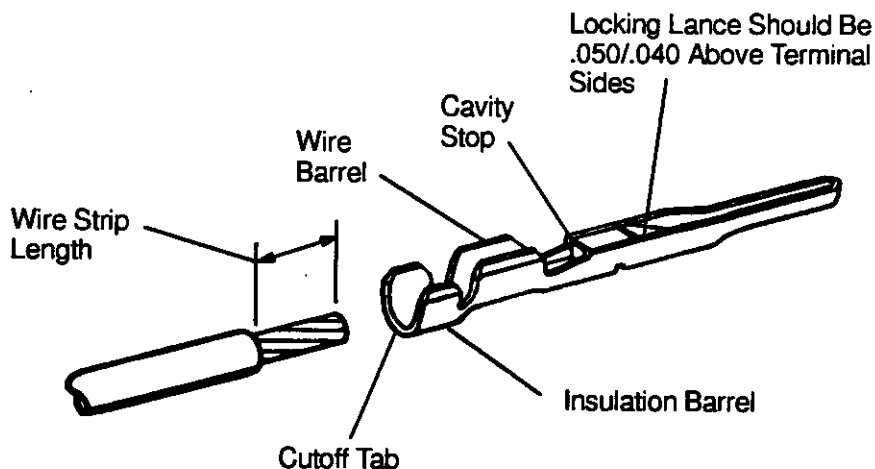
B. Crimp-Type Contacts

Pin and socket contacts are released and removed through the back of the connector.

3.7. Crimp-Type Contacts (For .100 centerline receptacle connectors only)

A. Selection

Crimp contacts are designed for stranded wires of the sizes and insulation ranges provided in Figure 9. The table provides the wire strip length, and the crimp height and crimp width ranges for hand tool and heavy duty applicator automatic machine application.



CONTACT AND WIRE RANGE (AWG)	WIRE			WIRE BARREL CRIMP HEIGHT AND WIDTH				CRIMPED WIRE TENSILE STRENGTH POUNDS
	SIZE (AWG)	DIAMETER (MAX)	STRIP LENGTH	HEAVY DUTY MINIATURE APPLICATOR 466625-3		HAND CRIMPING TOOL 90346-1 ±.002		
				HEIGHT	WIDTH	HEIGHT	WIDTH	
530750 22 - 26	22	.046 TO .054	.140	.036	.042	.030	.042	11
	24	.040 TO .048	.140	.034	.042	.030	.042	7
	26	.035 TO .043	.140	.030	.042	.030	.042	4

Fig. 9. Crimp Information

B. Contact Locking Lance and Cavity Stop

The highest point of the contact locking lance should be as indicated in Figure 9 to ensure that it will engage the recess inside the contact cavity. The cavity stop should also be level with the sides to prevent over-insertion into the contact cavity. Inspection of several uncrimped contacts will provide the required visual appearance before and after crimping.

C. Contact Crimp and Tensile Strength

The crimp applied to the wire barrel portion of a contact is the most compressed area and is the most critical to assure optimum performance and tensile strength of a termination. The effective length shall be .085 minimum (excluding bellmouths) over the length of the wire barrel. See Figure 9.

The wire barrel will be crimped in the AMP "F" Crimp configuration where the ends of the wire barrel are turned inward and the insulation barrel will be crimped to the AMP "O" Crimp configuration where the ends of the insulation barrel will butt against each other. Both the wire barrel and the insulation barrel will have a developed crimp width of .042.

D. Contact Cutoff Tab

Cutoff tab length shall not exceed .010 and cutoff burr shall not exceed .003.

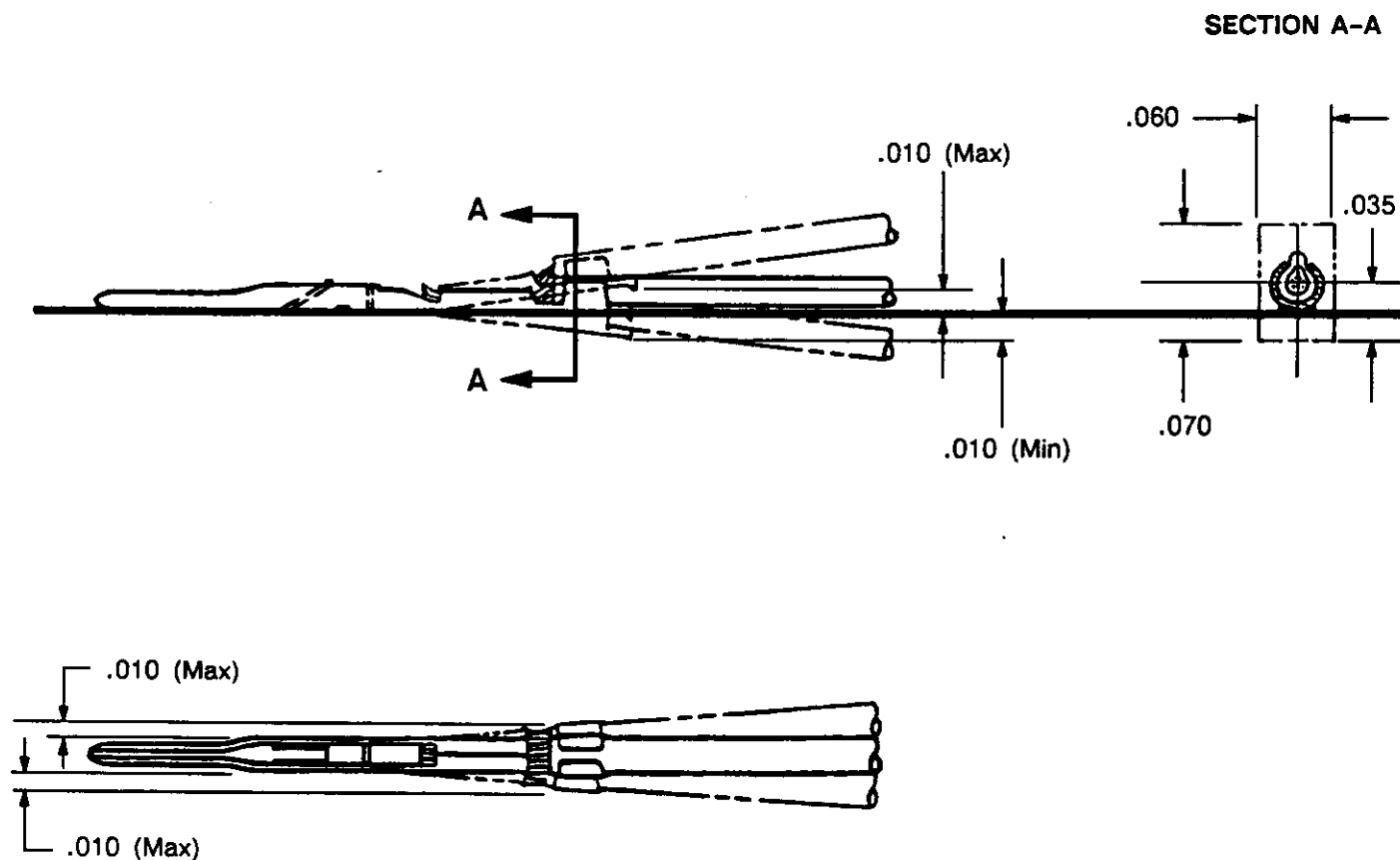


Fig. 10. Crimped Contact

E. Bellmouth

A rear bellmouth will appear due to extrusion of the contact metal during termination. It may be .005 minimum with a height of .015 maximum.

F. Wire Barrel Seam

The wire barrel shall be completely closed with no protruding wire strands. Crimp flash along the sides of the wire barrel that are caused by the crimp pressure and allowable tolerances in the tool shall not exceed .005.

G. Conductor Location

The conductor of the wire may be flush to .015 protrusion from the front of the wire barrel. Both insulation and conductor should be visible in the transition area between the insulation and wire barrel. No insulation may be crimped in the wire barrel.

H. Vertical and Horizontal Straightness

Contacts must be straight and aligned within tolerances shown in Figure 10.

I. Twist or Roll

The vertical center of the crimp barrels should be in alignment with the vertical center of the mating end of the contact and the horizontal center should be .035 above the contact base line. See Figure 10.

3.8. Soldering

A. Solder Eyelet Contacts

The contacts are designed for single wire or multiple wire terminations with soldering of each wire being done by a hand soldering technique. When only a single wire is used in a single contact, the wire conductor should be placed lengthwise in the contact channel and soldered into position. When multiple wires are to be attached to a single contact, the wires should be bent to the correct position BEFORE placing the conductors in the solder eyelet. See Figure 11.

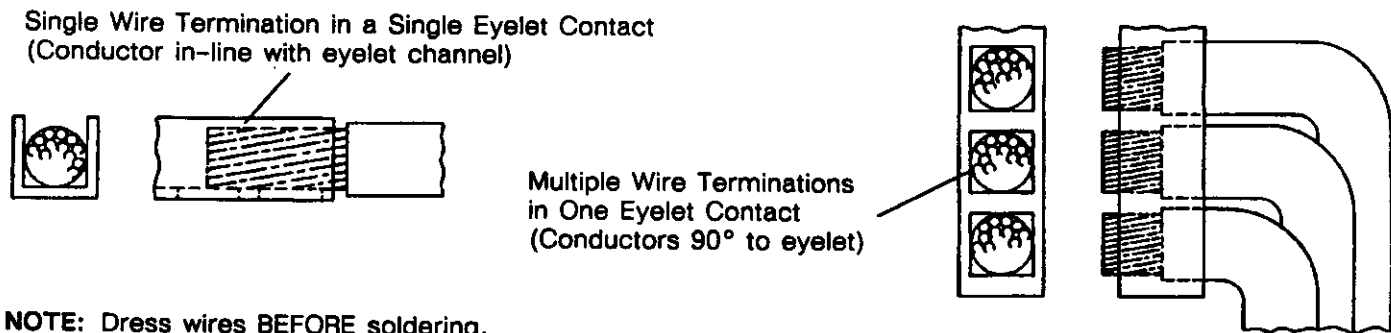


Fig. 11. Solder Eyelet Terminations

B. Solder Tine Contacts

Headers and receptacles with solder tine contacts can be mounted and secured to a pc board by hand, wave, or flow soldering techniques.

NOTE

Right-angle pin headers with three rows of contacts have a shroud that extends beyond the board edge as indicated in Figure 12. The exposed portion must be protected from the solder when wave soldering is used. We recommend one of two methods that utilizes Teflon† based material.

1. Application of Teflon backed adhesive tape (KAPTON No. 5413, made by 3M Company) over the mating face and the exposed area of the housing prior to soldering.
2. Use of the AMP Cover 445207-1 will protect surfaces exposed to infrared preheat and solder wave elements. Advantages of this method are: (1) ease of installation, and (2) repeated use.

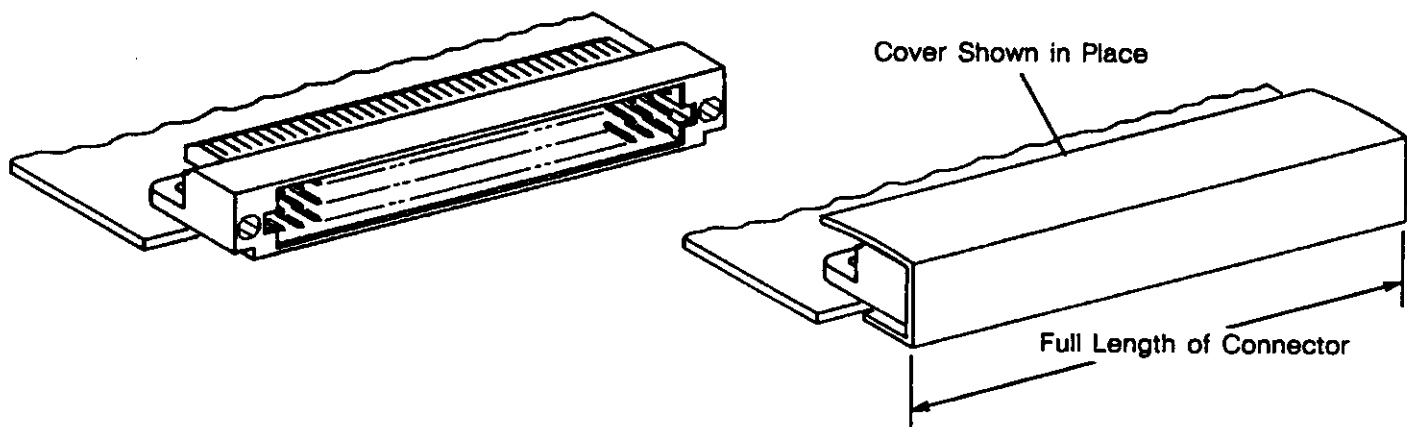


Fig. 12. Isolating Contacts and Housing During Soldering

† Trademark of DuPont

C. Flux Selection

Solder tails and pc board attaching hardware must be fluxed prior to soldering. Selection of the proper flux will depend on the type of pc board and other components that may be mounted on the board. Additionally, the choice of flux will have to be compatible with the flow solder line, manufacturing, and safety requirements.

D. Cleaning

Removal of fluxes, residues, and activators is mandatory. Cleaning procedures will depend on the type of flux used on the solder line. The following cleaning compounds and chemicals may be used to clean the headers and receptacles without adverse affect to the housings and contacts.

1,1,1-Trichlorethane
Dow Prelete●
Allied Genesolv■

Freon TMS†
Freon TA†
Freon TE†

Freon TF†
Alcohol

- Designation of Dow Chemical Company
- Designation of Allied-Signal, Inc.
- † Designation DuPont

DANGER

Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer on the material safety data sheet.

NOTE

If you have a particular solvent that is not listed, consult an AMP Representative before using it with these headers and receptacles.

E. Drying

When drying cleaned components and pc boards, make certain the temperature limitations of -55° to 125° C are not exceeded.

F. Soldering Guidelines

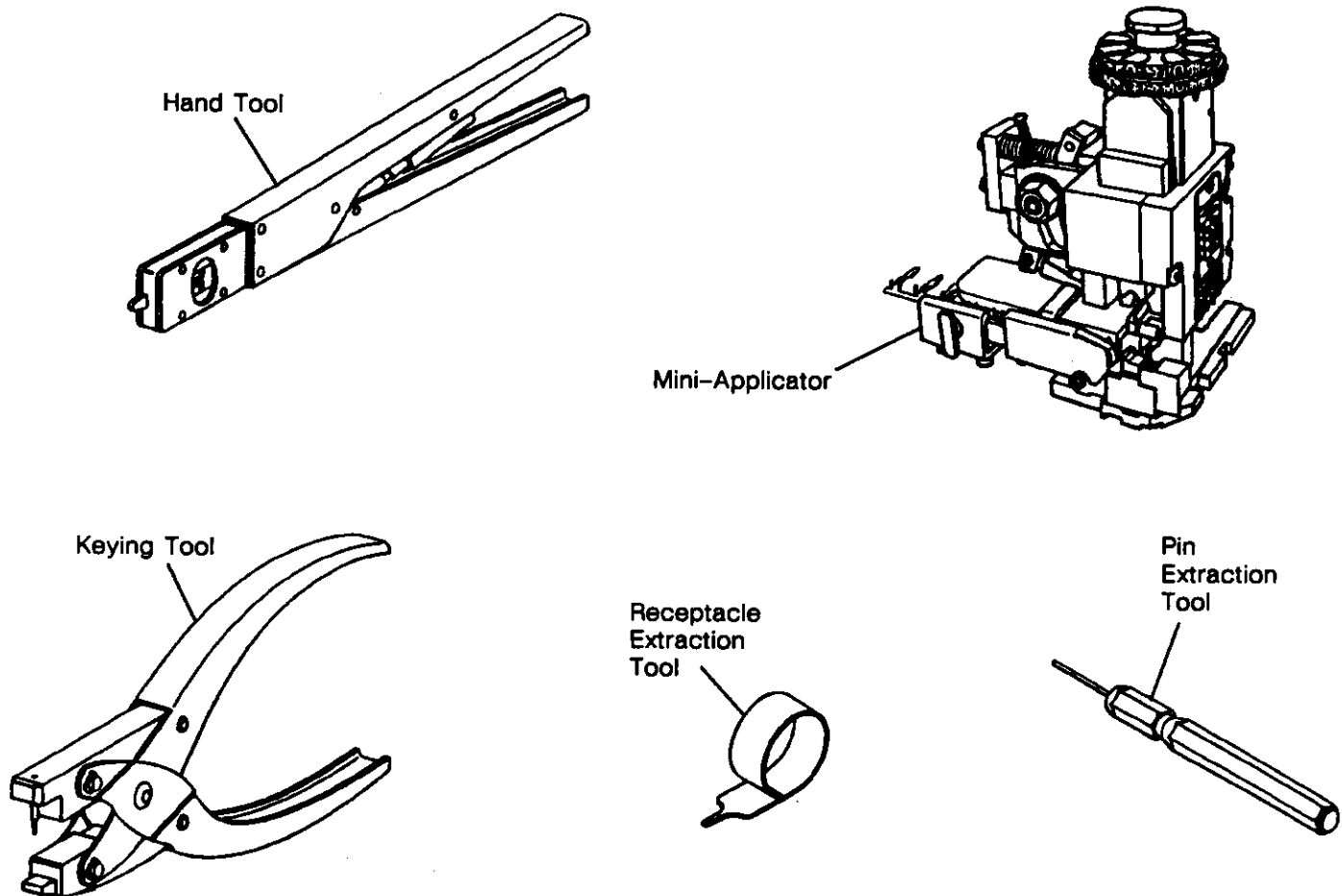
Refer to Paragraph 2.4. for instruction material that is available for establishing soldering guidelines.

4. QUALIFYING SUPPORT

AMP Box Header Assemblies and Receptacle Connectors that are marked with the number M55302 are qualified to Military Specification M55302.

5. TOOLING

AMP Hand Crimping Tools and Mini-Applicators are available for applying crimp-type contacts. Keying Tools are available for applying rivet keys, and Extraction Tools are available for removing straight-through contacts. Instructions Sheets (IS) or Applicator Instructions (AI) describing tool operation are packaged with the tool. See Figure 13.



HAND TOOL AND APPLICATOR		
CONTACT WIRE SIZE (AWG)	HAND TOOL	MINIATURE APPLICATOR
26 thru 22	90346-1 (IS 7820)	466625-3 (AI 8040)

RIVET KEYING TOOLS		
CONNECTOR CONFIGURATION	TOOL NUMBER	IS NUMBER
3-Row .100●	91117-4	6627
2-Row .075 & .100	91117-1	7803
3-Row .075 & .100	91117-3	6626

EXTRACTION TOOLS	
CONTACT TYPE	TOOL NUMBER
PIN	91156-1 (IS 6660)
RECEPTACLE	91035-1 (IS 7328)

● For guide pin keying inserts only.

Fig. 13. Tooling

6. VISUAL AID

Figure 14 shows a typical crimp termination and typical installations for AMP Box .075 and .100 Headers and Receptacles. The illustrations describe in general terms the conditions that the production personnel should check to ensure a suitable installation. For dimensional inspection of the connectors, refer to the preceding pages of this application specification.

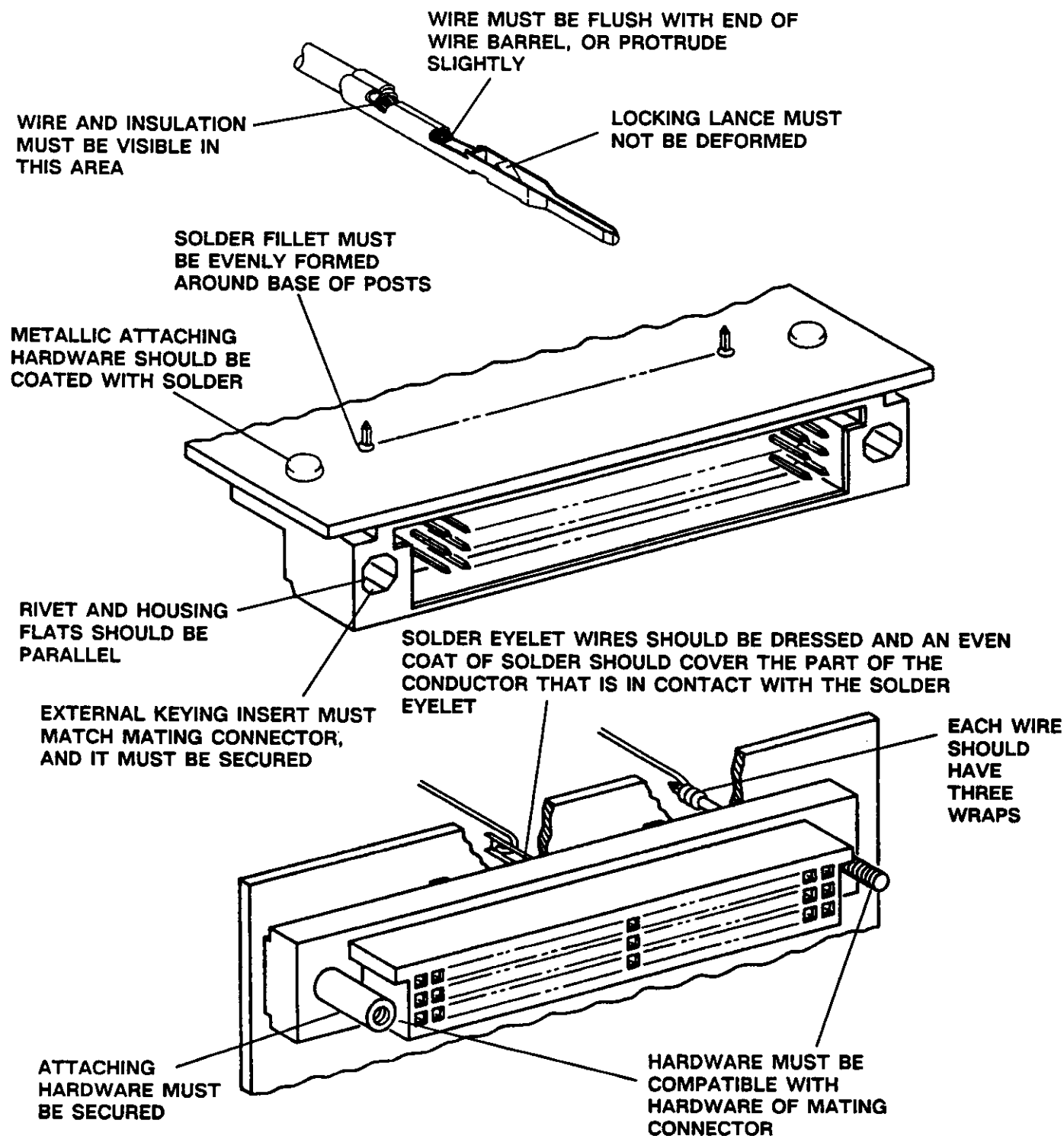


FIG. 14. VISUAL AID