

NOTE



All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters. Unless otherwise specified, dimensions have a tolerance of ± 0.13 and angles have a tolerance of $\pm 2^\circ$. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirement for application of PC/104 and PC/104-Plus Connectors. These connectors are available with press-fit and solder contact versions, stacking and non-stacking configurations, and with or without integral standoffs. These connectors are also available in keyed and unkeyed versions. Breakaway screwlock/standoffs may be removed from the connector housing and placed on the opposite side of the printed circuit (pc) board. The PC/104 connectors are designed on a 2.54 mm centerline while the PC/104-Plus has a centerline of 2.0 mm.

When corresponding with TE Connectivity (TE) Personnel, use the terminology provided in this specification to help facilitate your inquiry for information. Basic terms and features of components are provided in Figure 1.

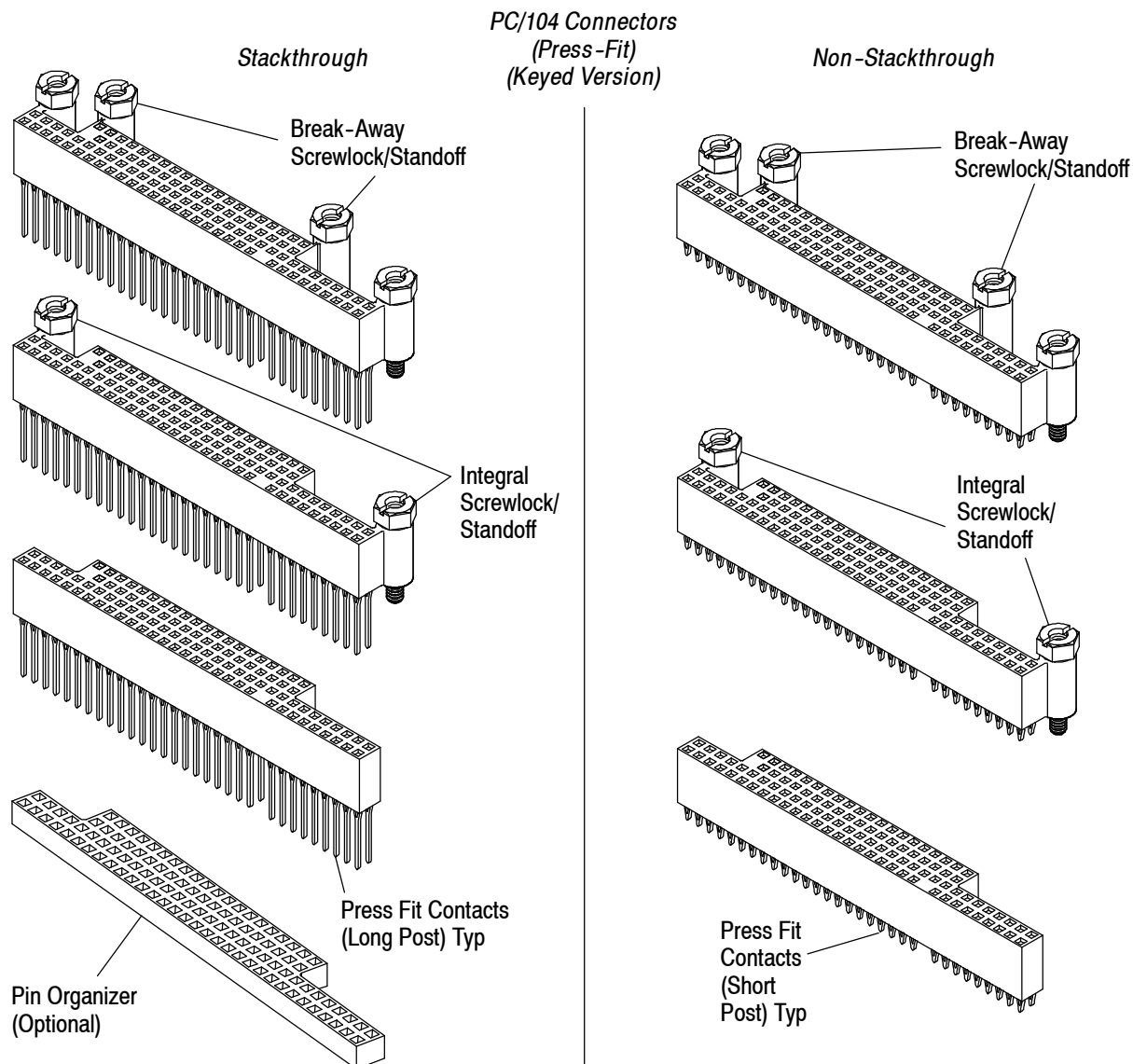
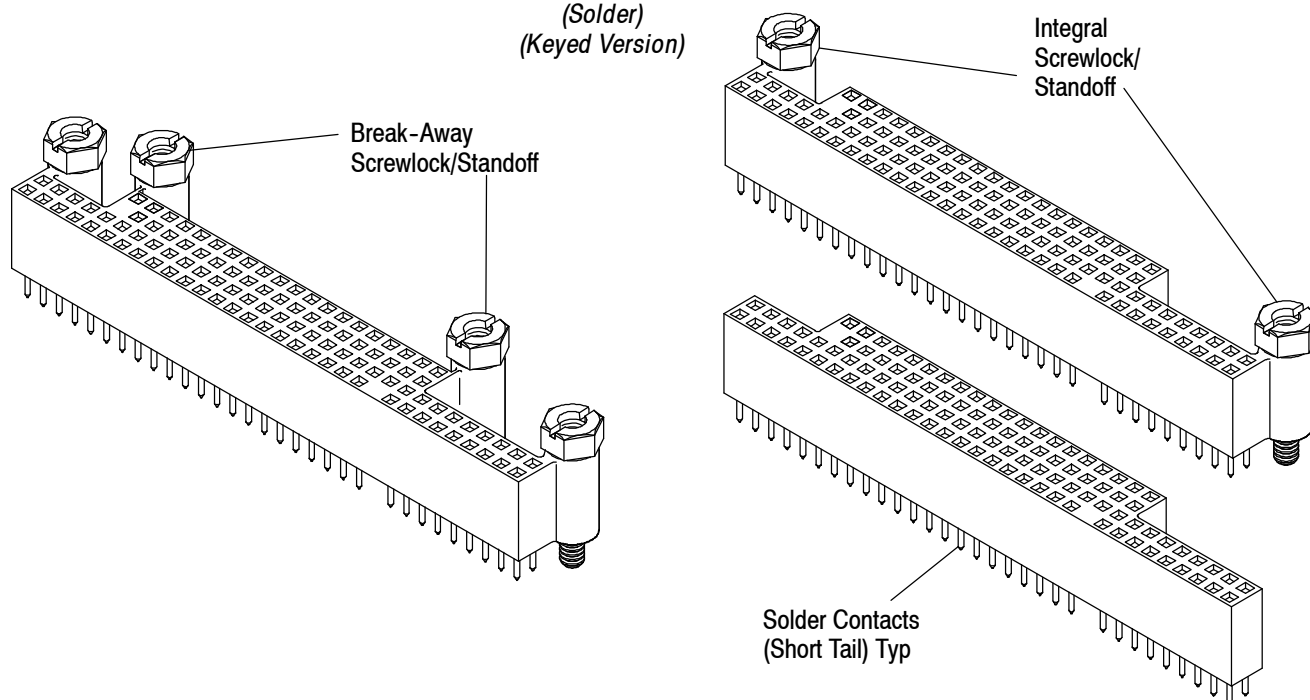


Figure 1 (cont'd)

*PC/104 Connectors
(Solder)
(Keyed Version)*



*PC/104-Plus Connectors
(Press-Fit) (Unkeyed Version)*

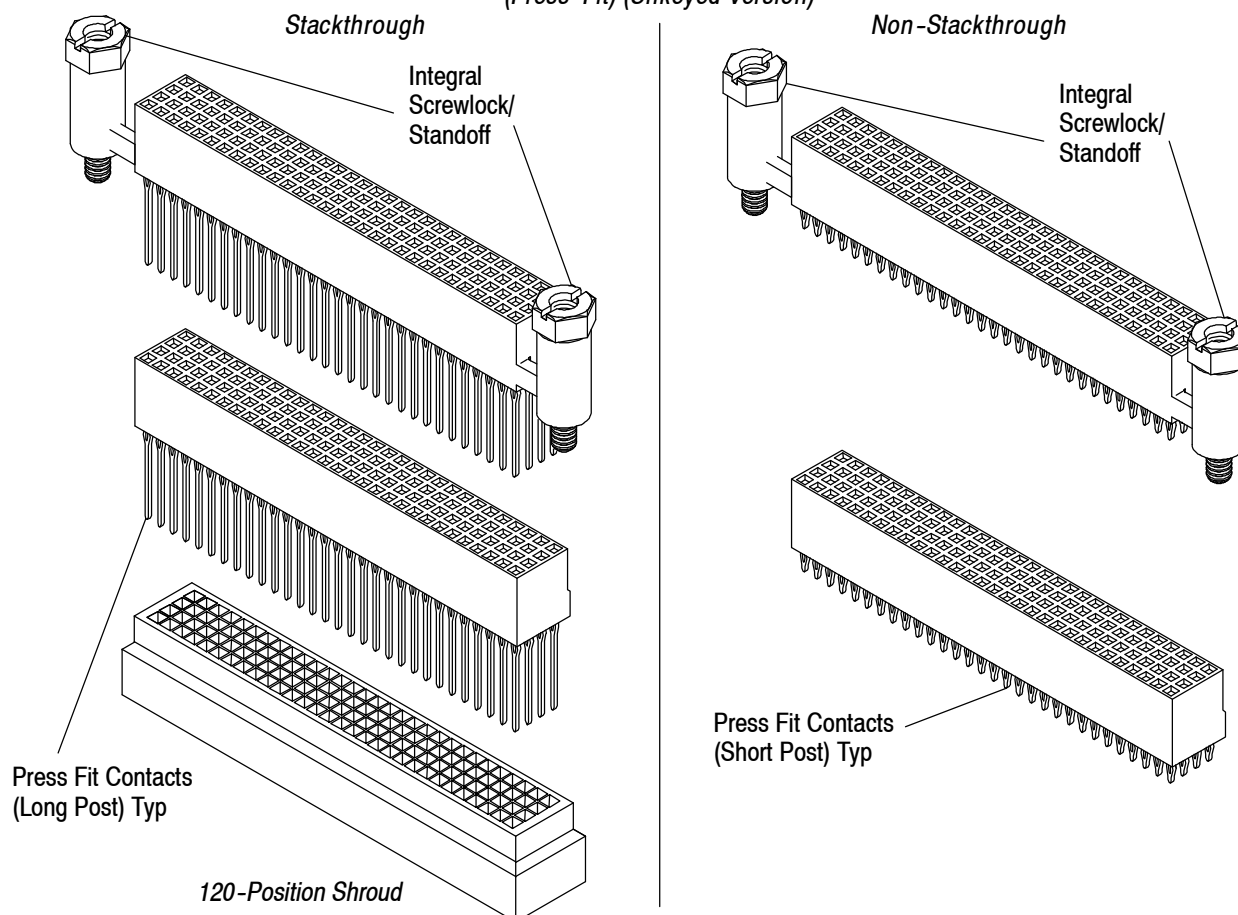


Figure 1 (cont'd)

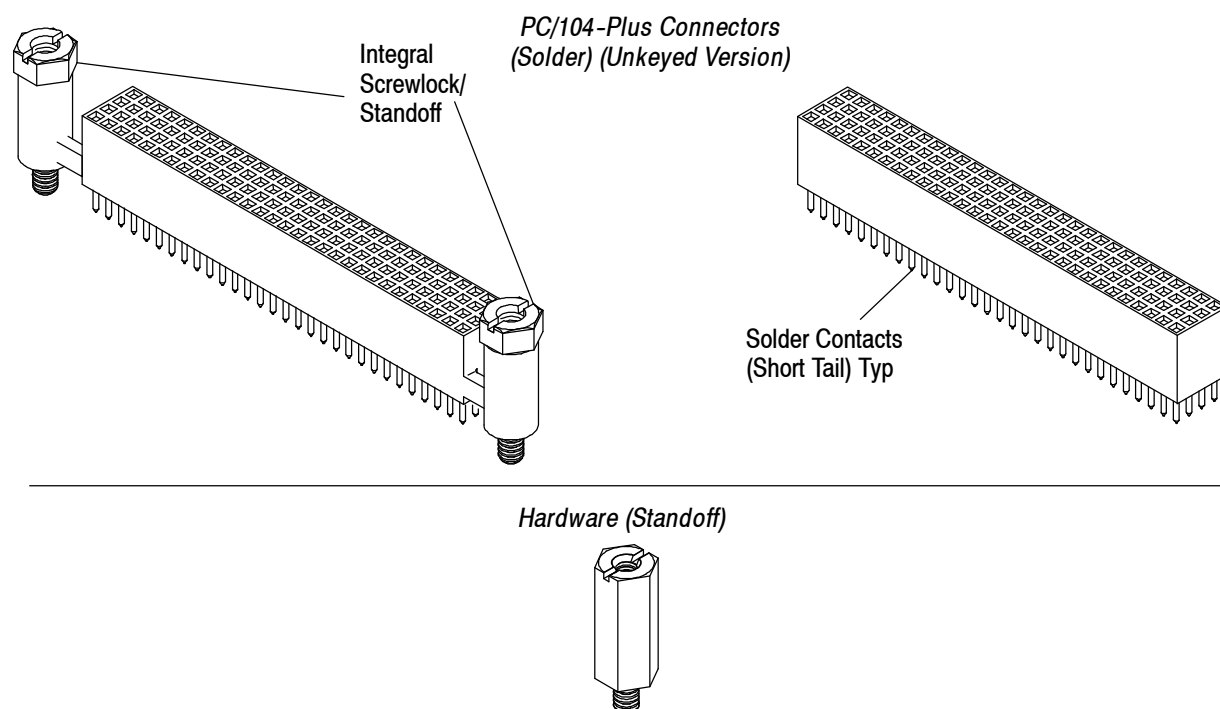


Figure 1 (end)

2. REFERENCE MATERIAL

2.1. Revision Summary

- Updated document to corporate requirements
- New logo

2.2. Customer Assistance

Reference Base Part Number 1375793 and Product Code E095 are representative numbers of PC/104 and PC/104-Plus 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 TE Representative or, after purchase, by calling the Tooling Assistance Center or Product Information 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 TE.

2.4. Specifications

Product Specification 108-1956 is available to provide test and performance results. Also, PC/104 and PC/104-Plus Specification is available for reference.

2.5. 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.

2.6. Instructional Material

The following list includes available instruction sheets (408-series) that provide assembly procedures for product, operation, maintenance and repair of tooling.

Document Number	Document Title
408-8502	Fixture Board Assembly 1424685-1 for PC/104 and PC/104-Plus Connectors
408-8503	Seating Tool Assembly 1424686-[] for PC/104 and PC/104-Plus Connectors
408-8504	Pneumatic Seating Tool Assembly 1424930-1
408-8505	Manual Seating Tool Assembly 1424931-1

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 connectors. 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

3.2. Product Material

All PC/104 and PC/104-Plus connector housings are molded of black high temperature, glass filled nylon. The PC/104 pin organizer and the PC/104-Plus shroud are made from black PBT polyester, the contacts are phosphor bronze plated with gold or gold/tin (stackthrough); or gold/tin-lead or gold/tin (non-stackthrough). The screwlocks are made from steel with clear chromate over zinc.

3.3. Connector and PC Board Spacing

Figure 2 shows a typical module stack.

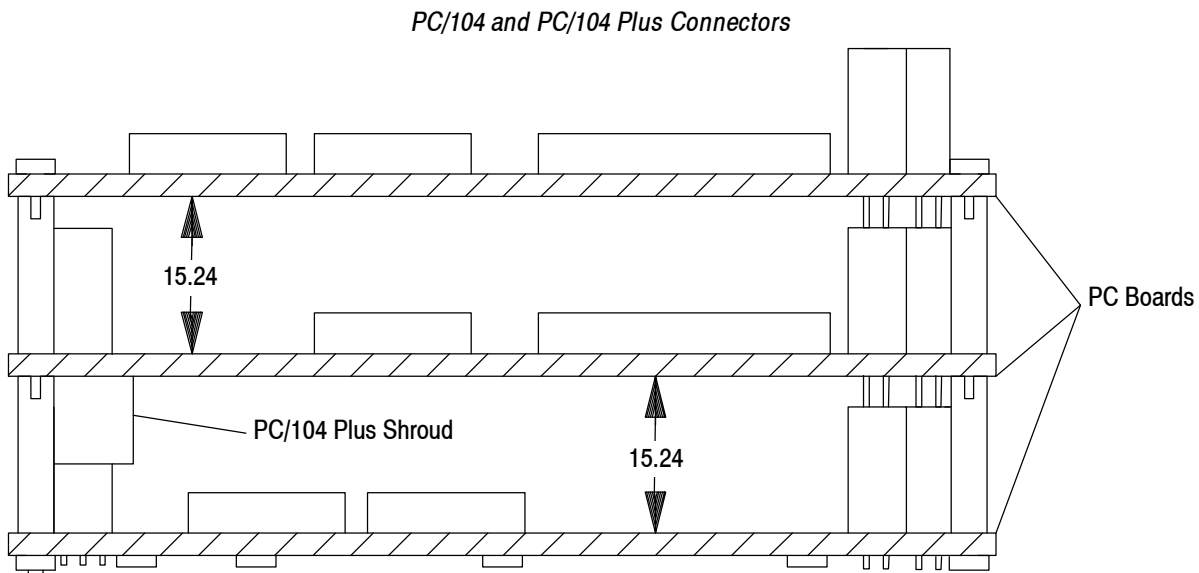


Figure 2

3.4. PC Board Requirements

A. Material

The pc board material shall be glass epoxy (FR-4, G-10).

B. PC Board Thickness

1. Non-stackthrough connectors with solder type contacts will accommodate 1.57 mm thick pc boards.
2. Non-stackthrough connectors with press-fit eye-of-needle (short post) type contacts are used with 1.57 mm thick pc boards.
3. Stackthrough connectors with press-fit eye-of-needle (long post) type contacts are used with 1.57 mm thick pc boards.

C. PC Board Circuit Pattern Layout

Figure 3 shows pc board layouts for placement of PC/104 and PC/104-Plus Connectors. The screwlock and contact holes in the pc board must be precisely located to ensure proper placement and optimum performance of the connector. The following dimensions must be observed when preparing a pc board for the connectors. The pc board layouts show the connector mating face of the pc board. Refer to Figure 4 for press-fit hole dimensions.

D. Tolerance

The maximum bow of the pc board shall be 0.08 mm over the length of the connector.

NOTE



Figure 3 represents a typical pc board layout for this product. For dimensions and hole pattern layout for specific product, obtain the appropriate customer drawing through your TE Representative or refer to the telephone numbers at the bottom of page 1.

PC/104 Connectors

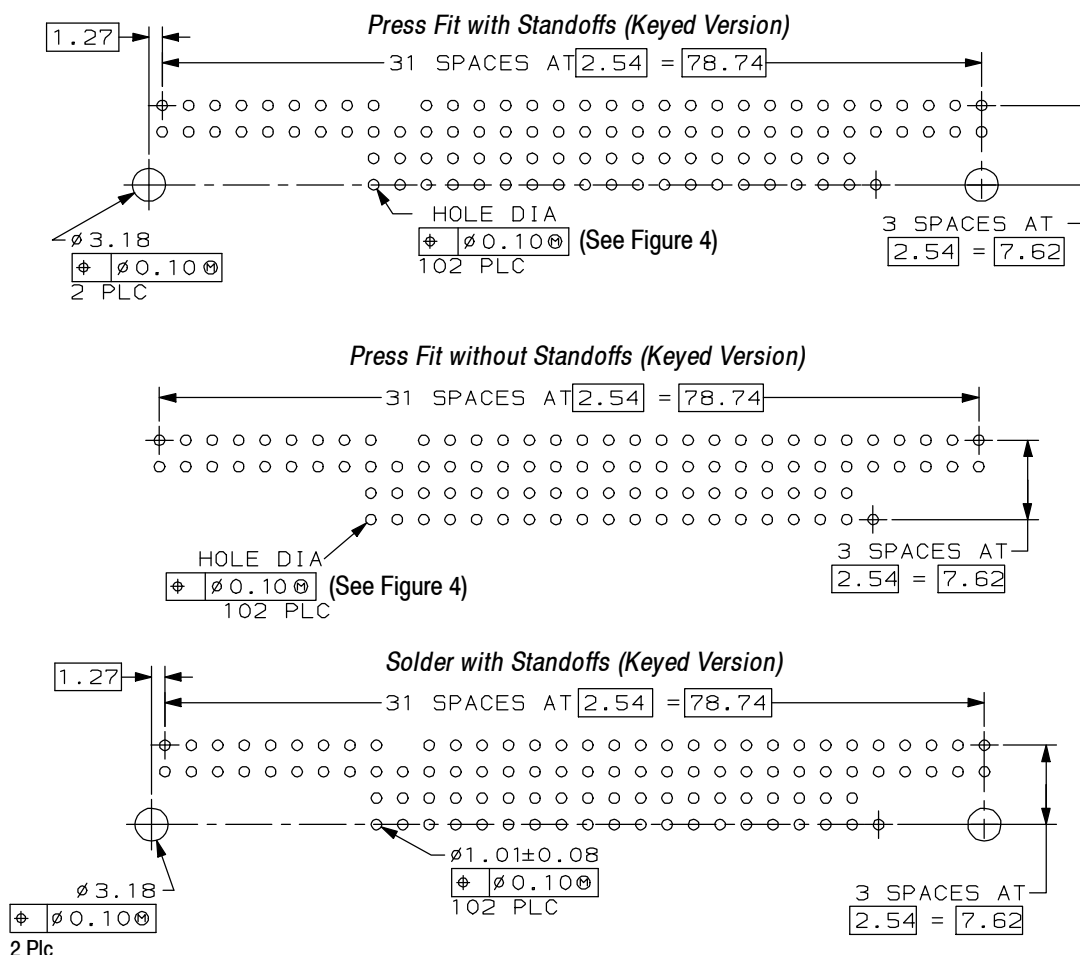
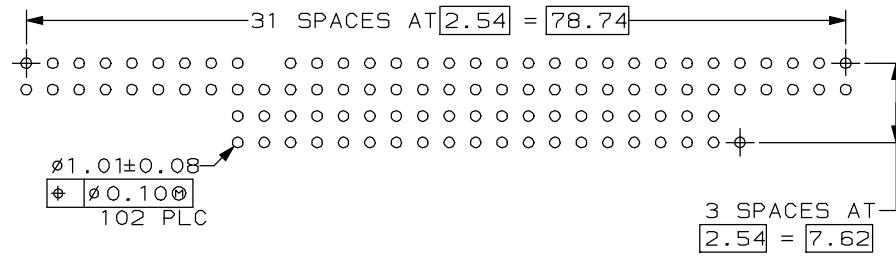


Figure 3 (cont'd)

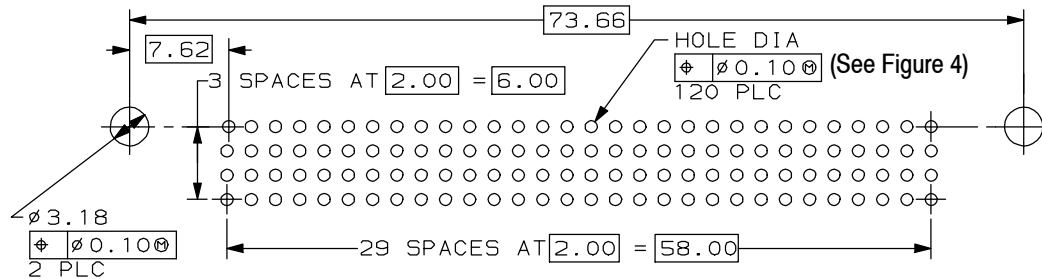
PC/104 Connectors

Solder without Standoffs (Keyed Version)

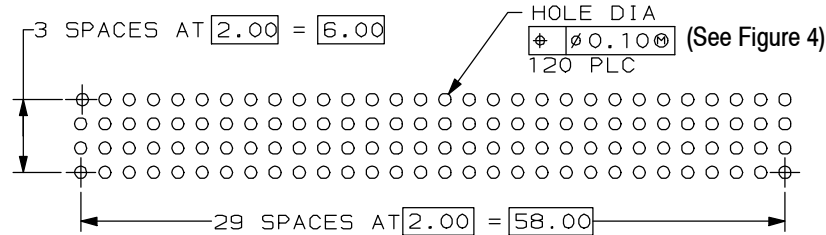


PC/104-Plus Connectors

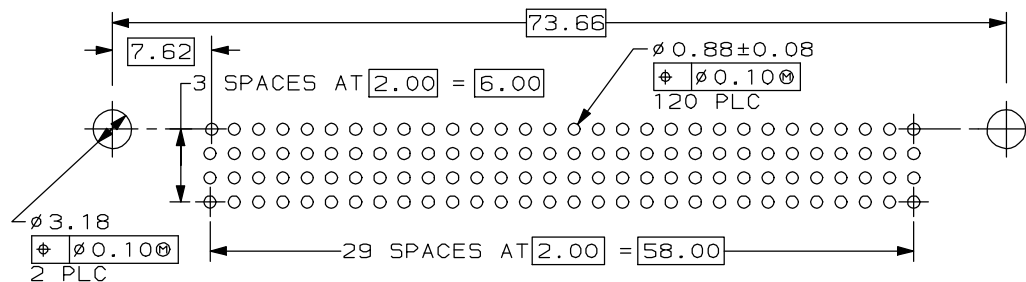
Press Fit with Standoffs



Press Fit without Standoffs



Solder with Standoffs



Solder without Standoffs

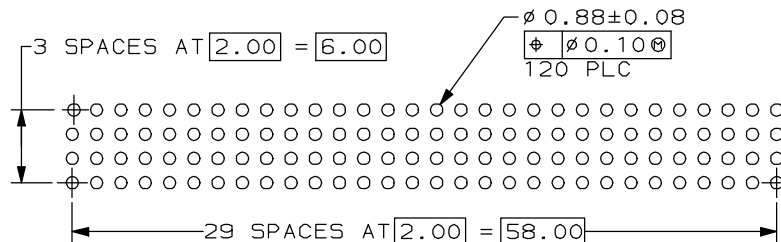
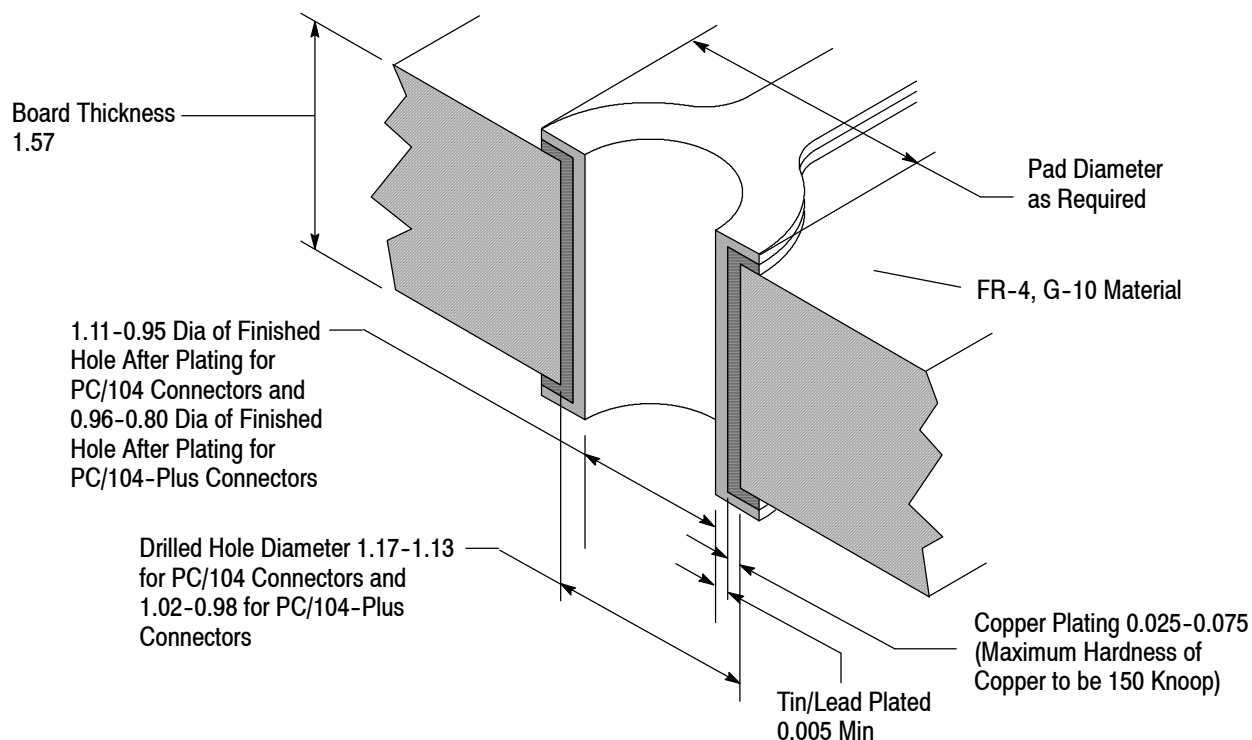


Figure 3 (end)

3.5. Contact Hole Configuration for Press-Fit Connectors

The contact holes in the pc boards must be drilled and plated through to specific dimensions. See Figure 4.

Tin-Lead Plated PC Board



Silver Immersion Plated PC Board

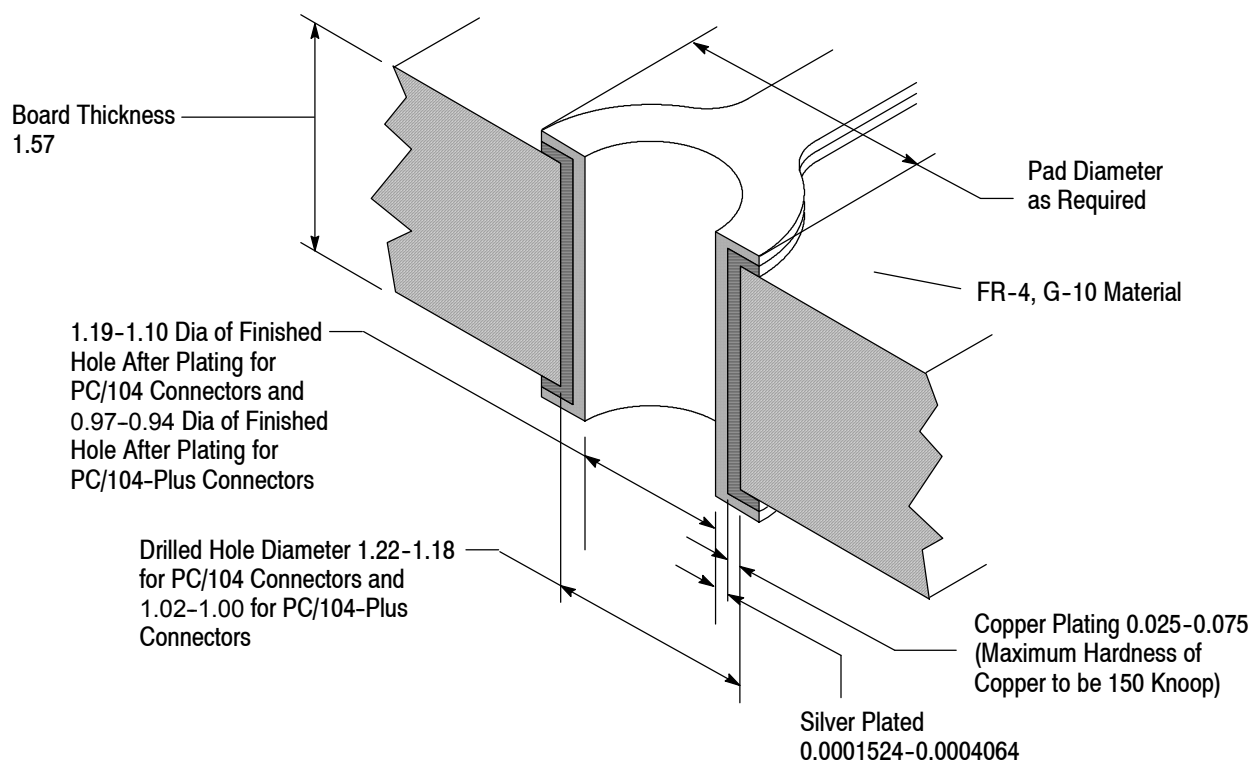


Figure 4 (cont'd)

Electroless Nickel Immersion Gold (ENIG) Plated PC Board

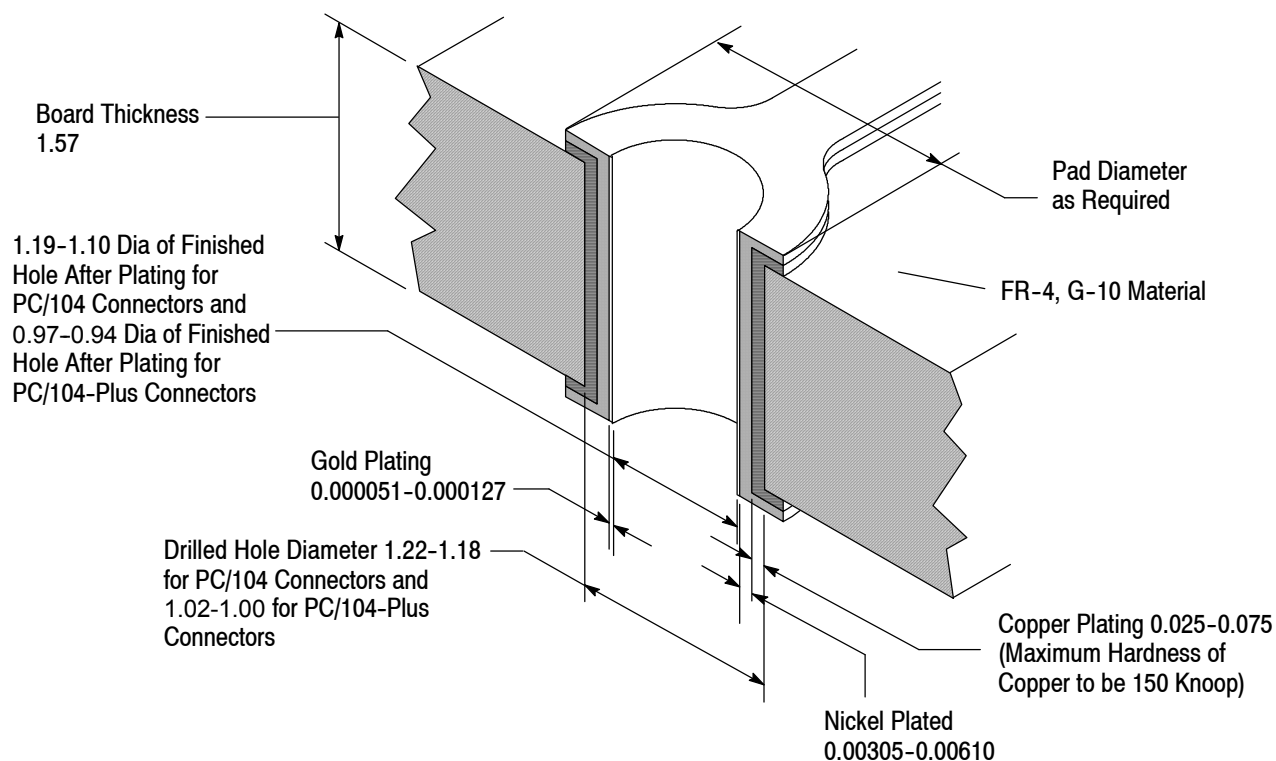


Figure 4 (end)

3.6. Special Handling

A. Initial Positioning

Prior to positioning PC/104 and PC/104-Plus Connectors, the pc board should be placed on an appropriate board support fixture. Connectors should be gripped by the housing only and not by the contacts. When placing a connector into a pc board, all contact pins should be aligned and inserted into the pc board simultaneously to prevent twisting or bending of the contacts.

B. Seating Connectors

Seating force must be applied evenly on the connectors to prevent deformation or other damage to the contacts and housings. When installing connectors with long or short post press-fit (eye-of-needle) contacts, the insertion force must be simultaneously applied to the connector with a force of approximately 80.1 N [18 lb] for PC/104 Connectors, and 53.4 N [12 lb] for PC/104-Plus Connectors, per contact over the length of the connector.

NOTE



After installation to the pc board, longtail press-fit connector posts should be aligned as noted on the customer drawing.

Solder connectors will remain securely on the pc board until passed through soldering providing that they are not jarred in any manner.

Tooling recommendations for press-fit connectors are covered in Section 5, TOOLING.

3.7. Soldering Solder-Type Connectors

Soldering, cleaning, and drying of solder-type connectors shall be according to the following guidelines.

A. Soldering Guidelines

NOTE

Manual 402-40 provides some guidelines for establishing soldering practices. Refer to Paragraph 2.5, Manuals.



B. Fluxing

The contact solder tail must be fluxed prior to soldering with a mildly active, rosin base flux. Selection of the flux will depend on the type of pc board and other components mounted on the board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. Call the Product Information 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 5.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
Type RMA (Mildly Activated)	Mild	Noncorrosive	186	611
Center (Activated)	Medium	May be Corrosive	1544, 1545, 1547	711, 809, 811

Figure 5

C. Techniques

It is recommended that the connector be soldered using wave or equivalent soldering technique provided the temperatures and exposure time are within the ranges specified in Figure 6. TE recommends using a Corpane Batch Vapor Phase (Model VVP 10 BU) and Vitronics IR (Model SMD 718) equipment.

SOLDERING PROCESS	TEMPERATURE		TIME (At Max Temp)
	CELSIUS	FAHRENHEIT	
WAVE SOLDERING	260●	500●	5 Seconds

●Wave Temperature

Figure 6

D. Connector Capacity

Connectors will withstand the maximum temperature time limits specified in Figure 6.

E. Reflow Parameters

Due to the many variables involved with the reflow process (ie, component density, orientation, etc), we recommend that the user conduct trial runs under actual manufacturing conditions to ensure product and process compatibility.

F. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder paste and flux for recommended cleaning solvents. The following is a listing of common cleaning solvents that will not affect the connectors. The connectors will be unaffected by any of these solvents for 5 minutes at 105°C [221°F]. See Figure 7.

Cleaners must be free of dissolved flux and other contaminants. We recommend 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.

CAUTION



Even when using “no clean” solder paste, it is imperative that the contact interface be kept clean of flux and residue, since it acts as an insulator. Flux may migrate under certain conditions with elevated temperatures and, therefore, cleaning is necessary even with “no clean” paste.

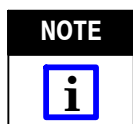
KESTER and ALPHA are trademarks of their respective owners.

CLEANER		TIME (Minutes)	TEMPERATURE (Maximum)
NAME	TYPE		
ALPHA 2110	Aqueous	1	132°C [270°F]
BIOACT EC-7	Solvent	5	100°C [212°F]
Butyl CARBITOL	Solvent	1	Ambient Room
Isopropyl Alcohol	Solvent	5	100°C [212°F]
KESTER 5778	Aqueous	5	100°C [212°F]
KESTER 5779	Aqueous	5	100°C [212°F]
LONCOTERGE 520	Aqueous	5	100°C [212°F]
LONCOTERGE 530	Aqueous	5	100°C [212°F]
Terpene Solvent	Solvent	5	100°C [212°F]

Figure 7



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 connectors; however, TE 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.

G. Drying

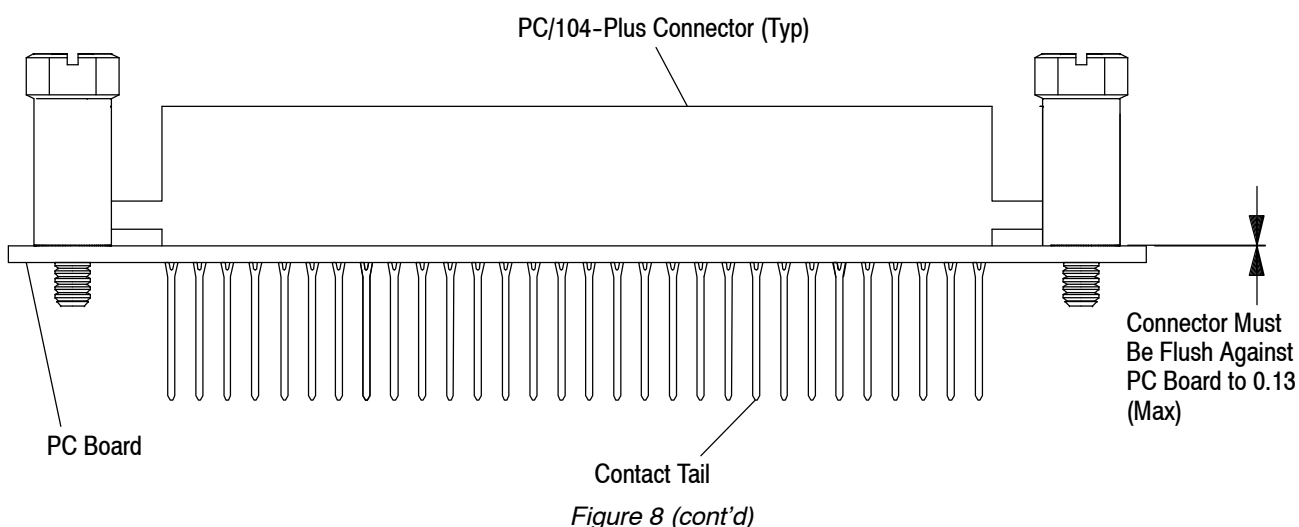
Air drying of cleaned connectors is recommended. Temperature for the connectors should not exceed -40 to 85°C [-40 to 185°F].



Excessive temperatures may cause housing degradation.

3.8. Checking Installed Connector

All solder joints should conform to those specified in Workmanship Specification 101-2. The connector must seat on the pc board to the dimension shown in Figure 8 (press-fit or soldered).



ALPHA, BIOACT, CARBITOL, KESTER, and LONCOTERGE are trademarks of their respective owners.

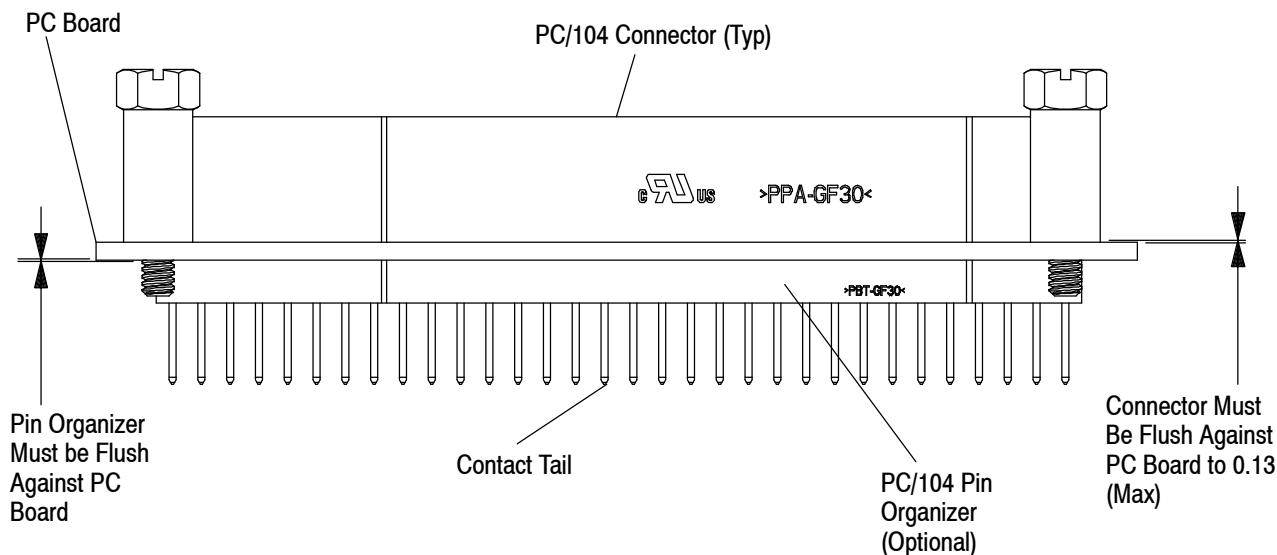


Figure 8 (end)

3.9. Repair

Damaged connectors must be removed, discarded, and replaced with new ones.

A. Soldered Contacts

Contacts may be removed from the pc board by standard desoldering methods.

B. Press-Fit Contacts

Contact posts may be pushed back through the pc board with a flat rock tool while properly supporting the pc board from the connector side. Long post contacts may require additional support to prevent them from leaning excessively when the push out force is applied.

3.10. Unmating Connectors

The connectors must be unmated by pulling them straight apart.



Rocking connectors excessively while unmating may cause damage to the contact posts.

4. QUALIFICATIONS

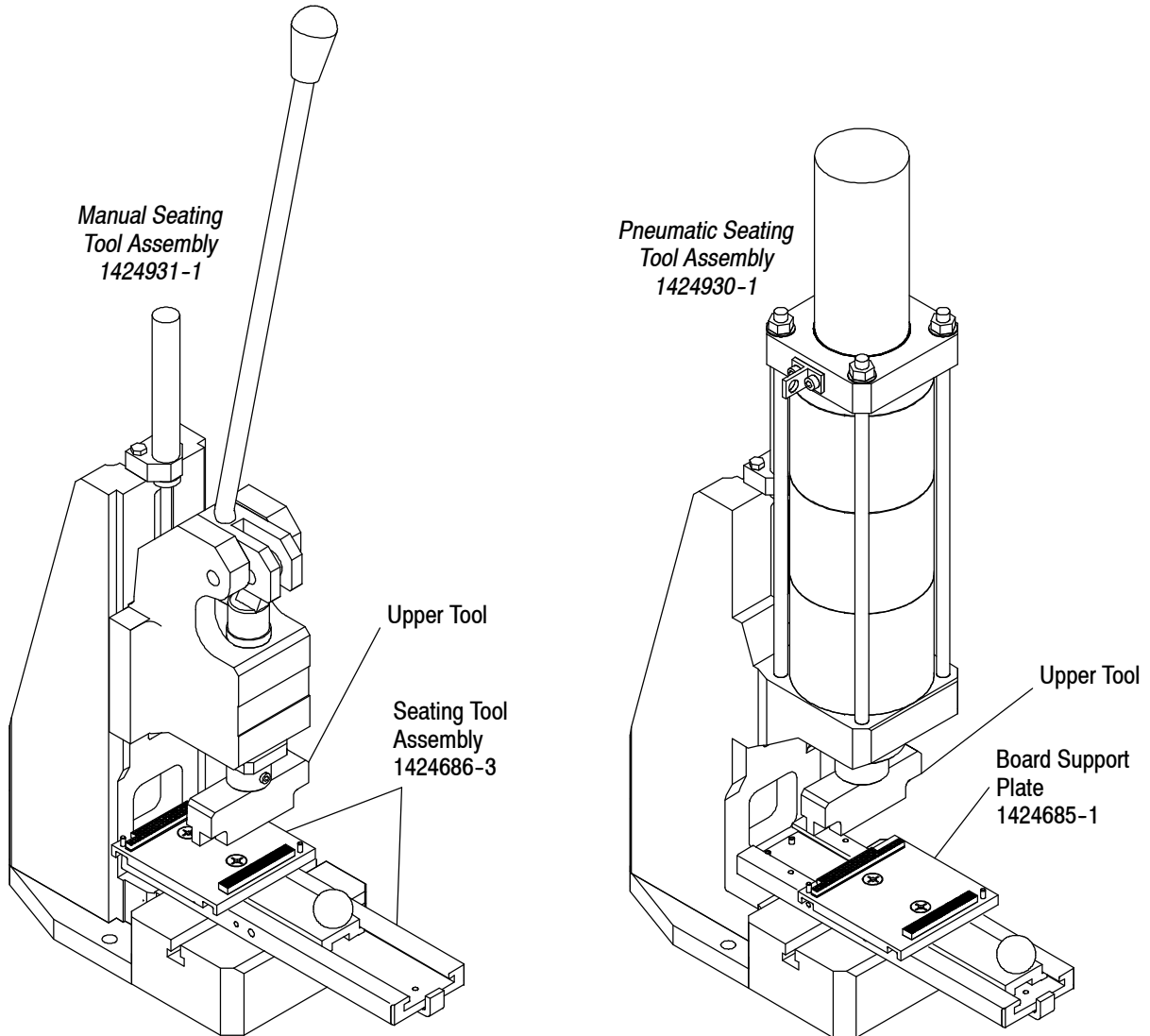
PC/104 and PC/104-Plus Connectors are Recognized by the Component Recognition Program by Underwriters Laboratories Inc. (UL) in Electrical File Number E28476, OIME 06975. They are also Certified by CSA International in File Number ECBT2, JT/3016T.

5. TOOLING

For pc board applications where solder is used, no special tooling is required for hand placement of these connectors on the pc board, however the following information should be considered. Tooling part numbers and instructional material packaged with the tooling are shown in Figure 9.

Application tooling provides the force required to insert the connector contacts into pc board holes. For low-volume production, commercial hand-operated arbor presses, such as Greenerd 3A or 3B manual frame assembly are available. TE supplies tooling combinations and board supports for these type of manual frame assemblies. TE also provides complete tooling packages which include a manual or pneumatic frame assembly. See Figure 9.

NOTE: Other power units that use seating tools for this product line may be available through TE. Machines that may accommodate your production needs are bench machines BMEP-3T and BMEP-5T; stand alone machines MEP-6T and MEP-12T; and a fully automated machine available, AEP-12T. Contact the Tooling Assistance Center (TAC) phone number at the bottom of page 1 for information on these Automation Services Group (ASG) machines.



PRODUCT	PART NUMBER (DOCUMENT)	DESCRIPTION	COMMENTS
PC/104 and PC/104-Plus Connectors	1424685-1 (408-8502)	Board Support Plate	Customer Supplied Press and Upper Tool
	1424686-3 (408-8503)	Seating Tool Assembly	
	1424930-1 (408-8504)	Seating Tool Assembly and Upper Tool with Pneumatic Press	Press Provided with Tool Package
	1424931-1 (408-8505)	Seating Tool Assembly and Upper Tool with Manual Press	

Figure 9

6. VISUAL AID

Figure 10 shows a typical application of PC/104 and PC/104-Plus Connector. 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.

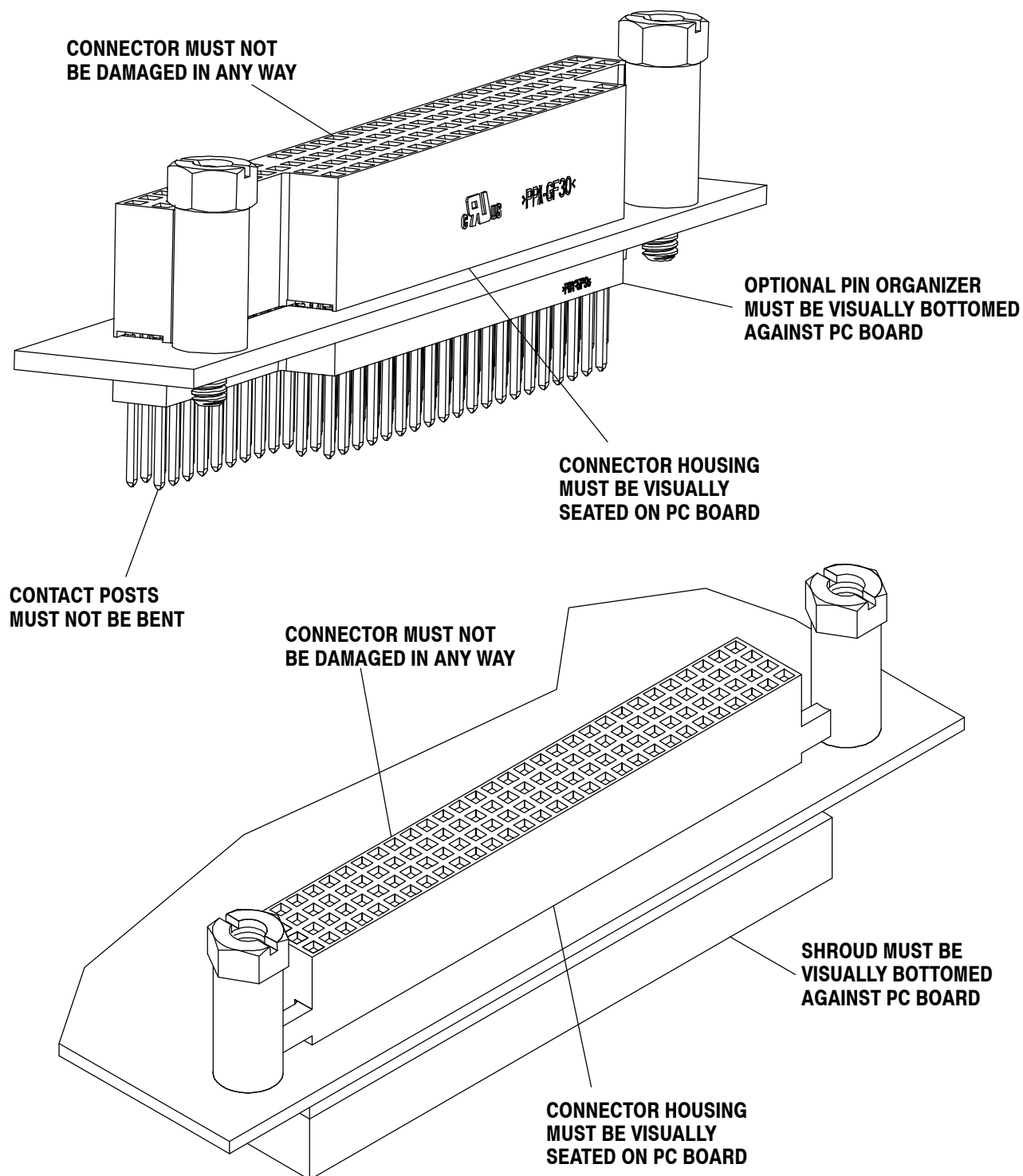


FIGURE 10. VISUAL AID