



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 mm 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 the Mini-Pak HD Power Connector. The connector consist of a signal section and a power section. The signal section consist of 72 (9x8) 2 mm Hm contacts and posts. The power section consist of 24 (2x12) Universal Power Module Contacts. The interface to the back plane is through compliant tails. The interface to the daughter card is through either compliant tails or solder tails.

When corresponding with TE Connectivity personnel, use the terminology provided in this specification to facilitate your inquiries for information. Basic terms and features of this product are provided in Figure 1.

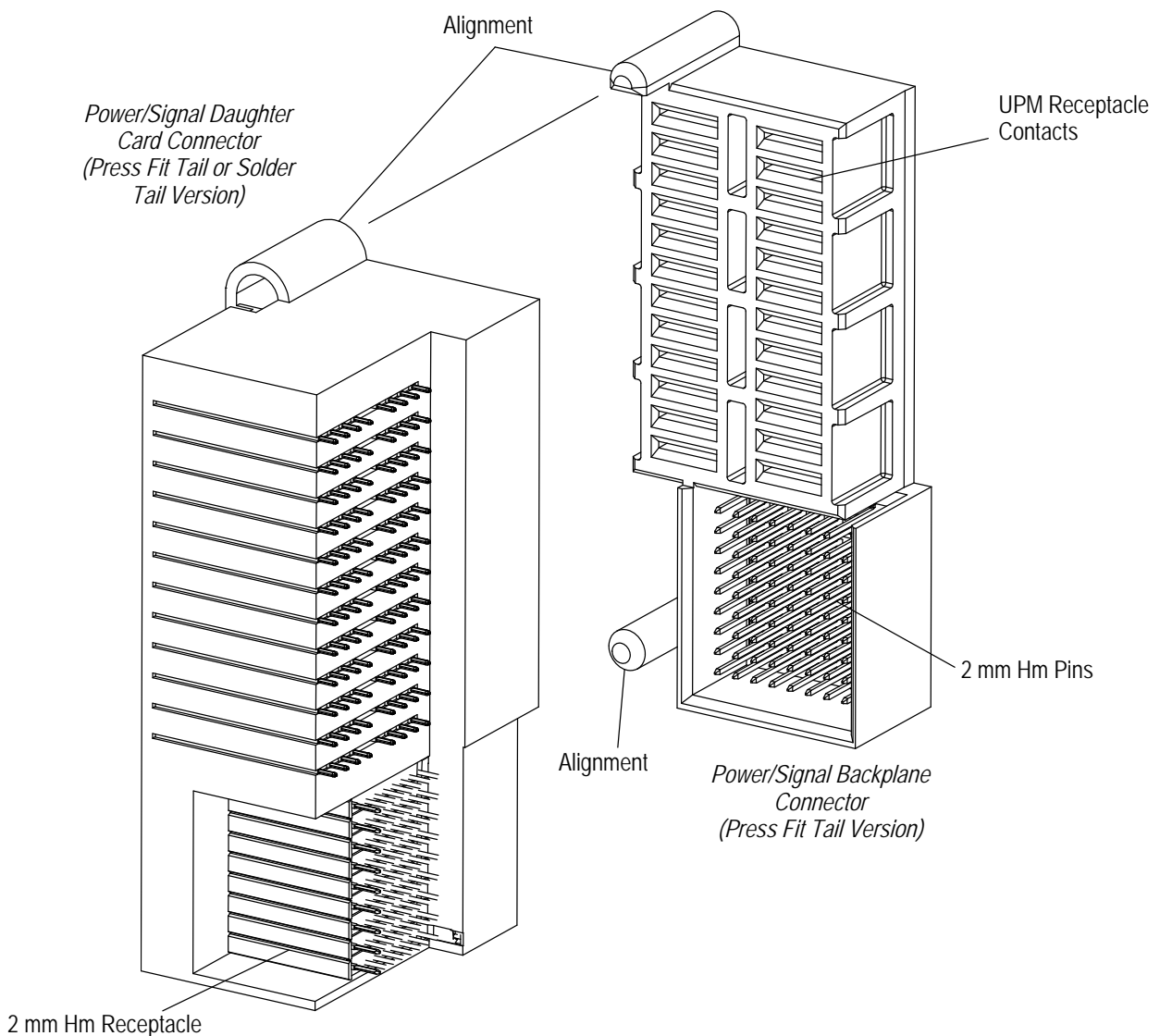


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

Revisions to this application specification include:

- New logo

2.2. Customer Assistance

Reference Product Base Part Numbers 1469920, 1469921, 1469922, and Product Code K844 are representative numbers of the Mini-Pak HD Power Connector. Use of these numbers will identify the product line and help you to obtain product and tooling information. Such information can be obtained through a local TE representative, by visiting our website at www.te.com, or by calling PRODUCT INFORMATION or the TOOLING ASSISTANCE CENTER at the numbers at the bottom of page 1.

2.3. Drawings

Customer Drawings for each connector 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 technical documentation supplied by TE.

2.4. 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.

2.5. Specifications

Design Objective 108-2253 provides expected product performance and test information.

2.6. Instructional Material

The following list includes available customer manuals (409-series) that provide setup, operation, and maintenance of machines.

409-5567	10/20-Ton H-Frame Power Unit 803880-6
409-5626	SM-3 Machines 814700-[]

3. REQUIREMENTS

3.1. Storage

A. Ultraviolet Light

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

B. Shelf Life

The connectors should remain in the shipping containers until ready for use to prevent deformation of the contact solder tines or other damage to the connectors. The connectors should be used on a first in, first out basis to avoid storage contamination.

C. Chemical Exposure

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

Alkalies	Ammonia	Citrates	Phosphates	Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur	Nitrites	Tartrates

3.2. Connector Features

A. Materials

All Mini-Pak HD Power Connector Housings are constructed of high-temperature thermoplastic. The signal and power contacts are made of a copper alloy and plated at the contact interface with gold or gold flash over palladium-nickel. All contacts have a nickel underplate and tin-lead tines.

B. Guides

The pin headers have alignment slots with a guide-in that helps position the pin contacts prior to engagement of the circuits. See Figure 1.

3.3. Alignment

Proper alignment is essential to ensure full engagement of mating connectors, and to ensure that contacts are not bent or otherwise damaged during mating and unmating. For tolerance limitations, see Figure 2.

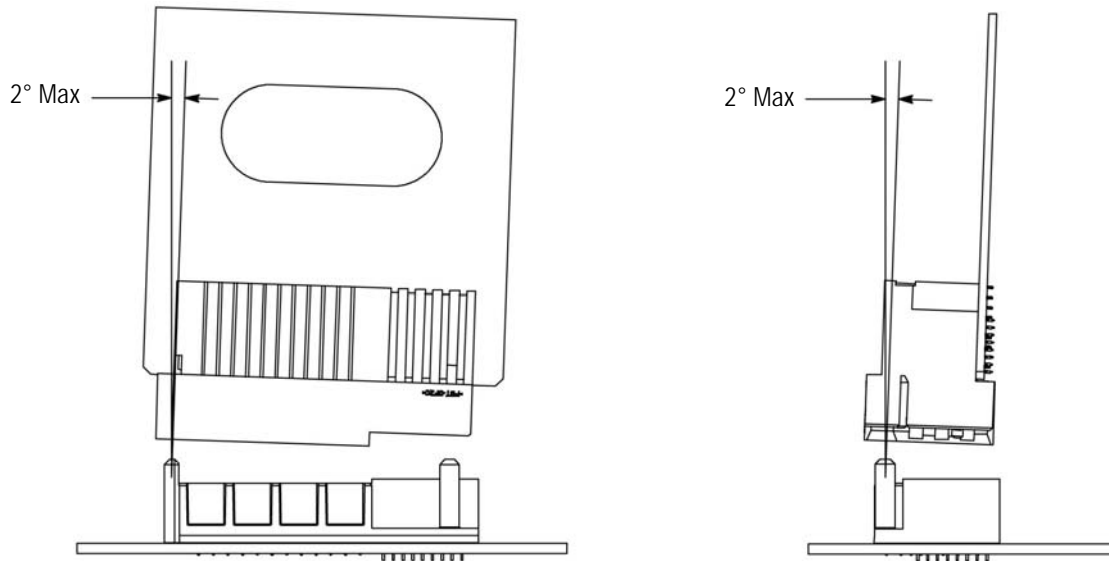


Figure 2

3.4. Mating Dimension

Full mating of connectors is necessary to ensure a good connection. The dimension from the surface of the pc board to which the pin header is mounted and the first row of contacts in the receptacle must be as shown in Figure 3.

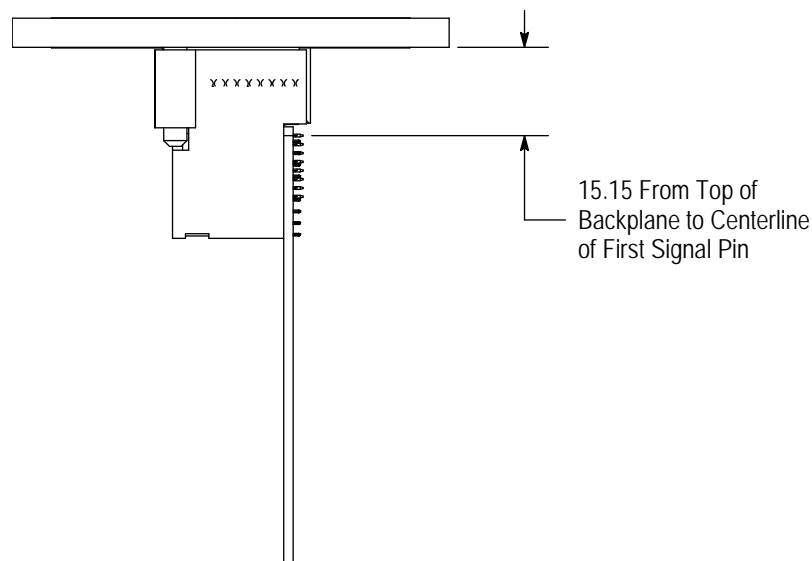


Figure 3

3.5. PC Board Requirements

A. PC Board Thickness

Right-angle connectors with compliant pins or solder tails require a pc board with a minimum thickness of 1.44 mm. Those with solder tines will accommodate any pc board thickness that allows the tine to protrude a minimum of 1.00 mm from the bottom surface of the pc board. Vertical connectors with compliant pin contacts require a pc board with a minimum thickness of 2.40 mm.

B. PC Board Circuit Pattern Layout

The pc board layout patterns for placement of Mini-Pak HD Power Connectors are provided in Figure 4.

NOTE



For applications requiring the minimum installation force for the connector, the pc board through-hole size should favor the high end of the allowable tolerance. For applications using IR or vapor phase soldering techniques in conjunction with solder paste, through-hole size should favor the low end of the allowable tolerance to ensure optimum solder fill.

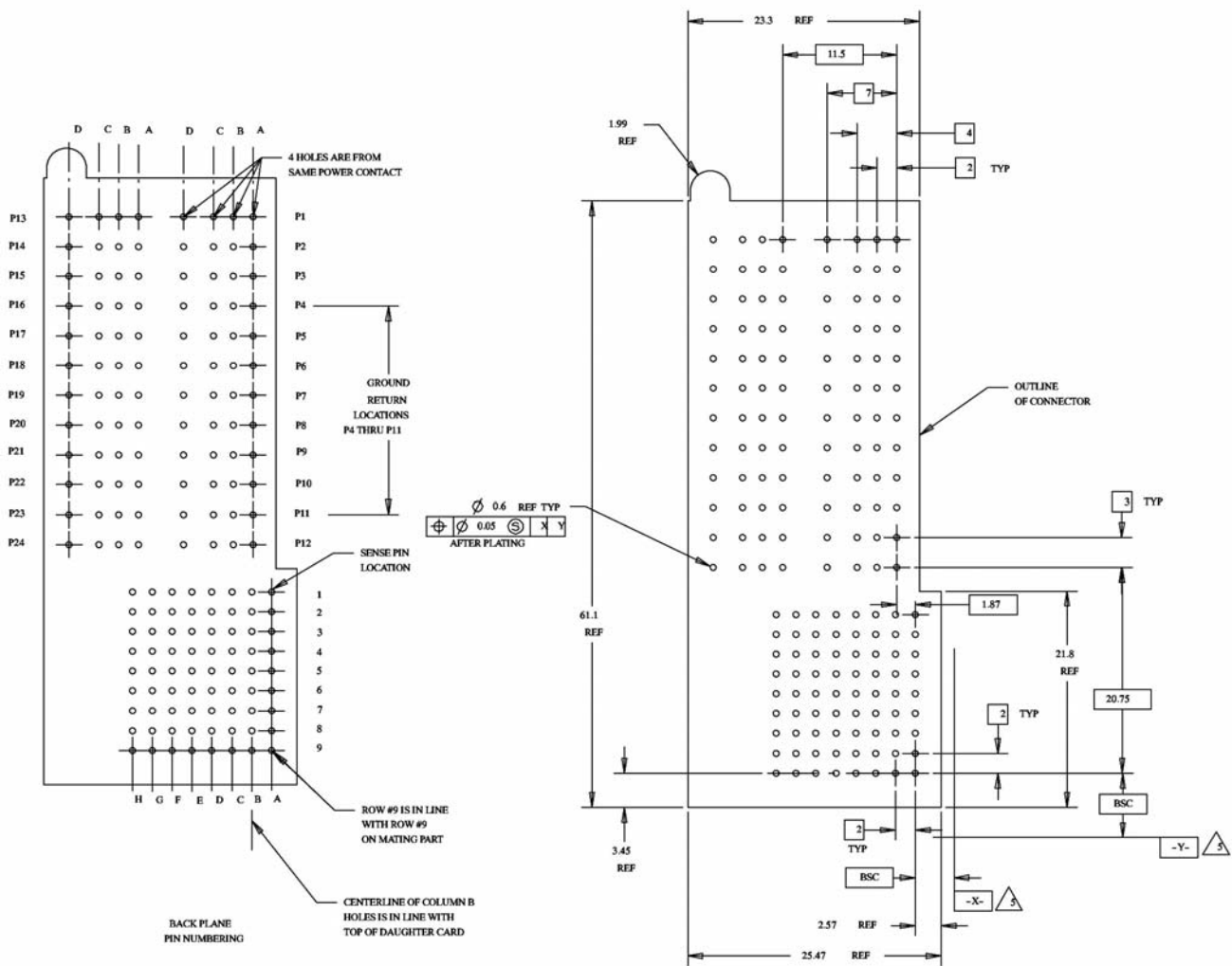


Figure 4 (Cont'd)

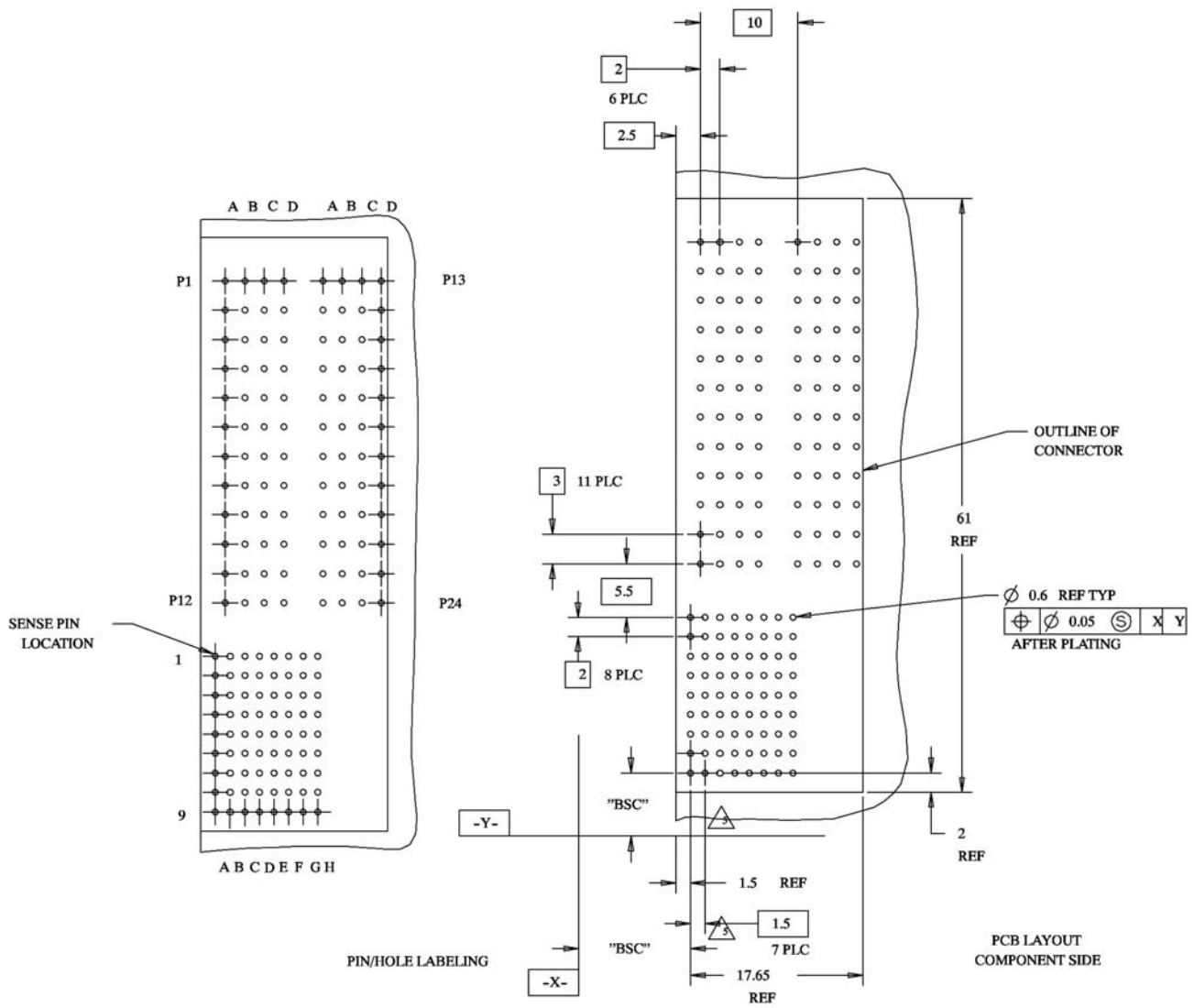


Figure 4 (End)

C. Contact Hole Configuration

The contact holes in the pc board for all connectors must be prepared to the dimensions specified in Figure 5.

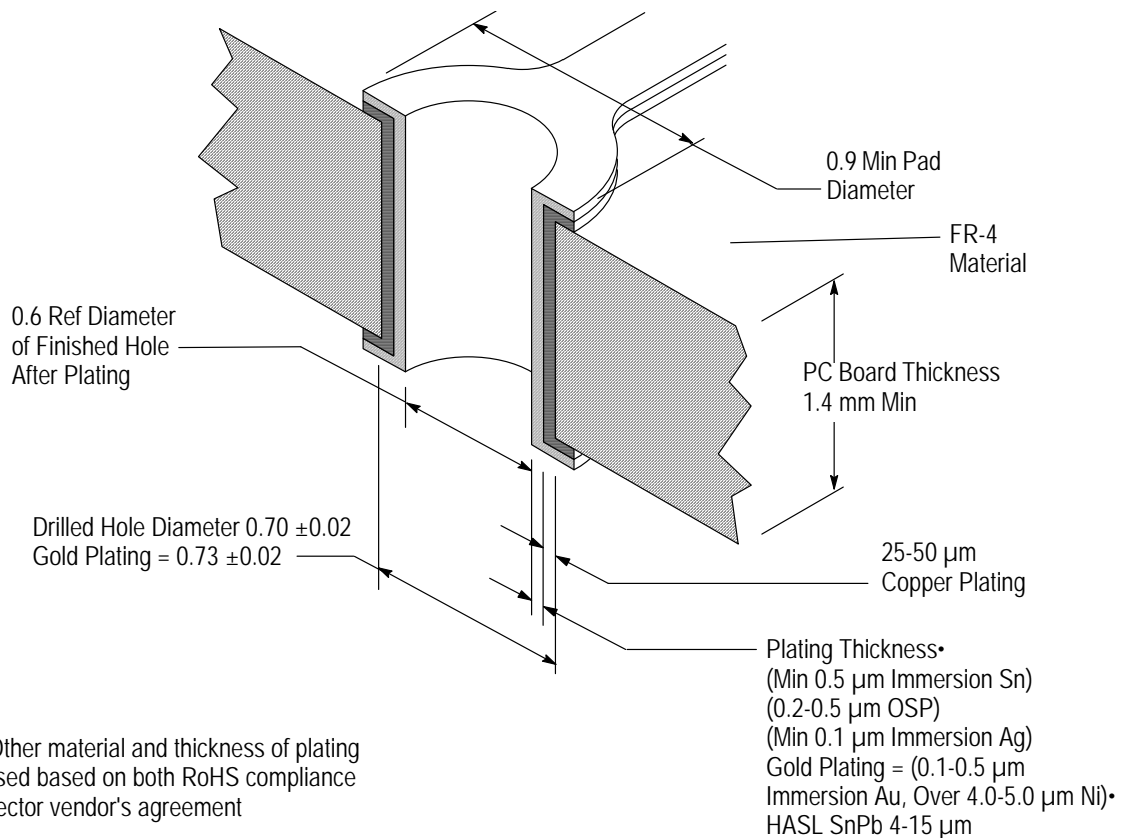


Figure 5

3.6. Special Handling

A. Initial Positioning

Prior to positioning a connector, 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. If using robotic equipment, a total equipment accuracy of ± 0.13 mm, including the gripper and fixture tolerance and equipment repeatability, is required.

B. Seating Connectors

Seating force must be applied evenly on the connectors to prevent deformation or other damage to the contacts and housings. The standoffs must be within 0.13 mm of the pc board (after insertion or soldering). Refer to Paragraph 3.8.

When installing vertical pin header connectors with compliant pins, the insertion force must be simultaneously applied to the shoulder of each contact on the inside floor surface of the connector. When installing right-angle connectors with compliant contact pins, the insertion force must be evenly applied to the back/top surface of the connector housing (see Figure 1) with a force of approximately 67 N [15 lb-force] per pin.

When installing right-angle connectors with solder tines, the insertion force must be evenly applied to the back/top surface of the connector housing (See Figure 1) with a force of approximately 40 N [9 lb-force] per each 12 mm of length of the connector. Connectors will remain securely on the pc board until passed through soldering providing that they are not jarred in any manner. Tooling recommendations are covered in Section 5.

3.7. Soldering

Connectors with solder tines must be soldered to the pc board.

A. Flux Selection

The solder tines must be fluxed prior to soldering with a rosin base flux. Selection of the proper flux will depend on the type of pc board and other components mounted on the pc board. The flux must be compatible with the wave solder line, and all manufacturing and safety requirements.



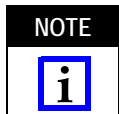
To avoid personal injury, strict attention must be given to the recommendations of the solvent manufacturer regarding toxicity and other safety requirements. Request the Material Safety Data Sheet (MSDS) from the supplier.

B. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. A list of common cleaning solvents that will not affect the connectors for the time and temperature specified is provided in Figure 6.

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		
KESTER 5779	Aqueous		
LONCOTERGE 520	Aqueous		
LONCOTERGE 530	Aqueous		
Terpene	Solvent		

Figure 6



If you have a particular solvent that is not listed, contact PRODUCT INFORMATION at the number at the bottom of page 1.

C. Drying

When drying cleaned assemblies and pc boards, do not exceed the temperature limitations of -55° to 125°C [-67° to 257°F]. Excessive temperatures may cause housing degradation.

D. Soldering Guidelines

Refer to Paragraph 2.4 for reference documentation that is available for establishing soldering guidelines.

3.8. Inspection

A. Solder Fillets

All solder fillets should comply to the Workmanship Standard 101-21. For a typical fillet for these connectors, refer to Figure 7.

B. Housing Stand-Offs

The connector housing standoffs must be seated within the dimension shown in Figure 7 of the pc board (after insertion or soldering).

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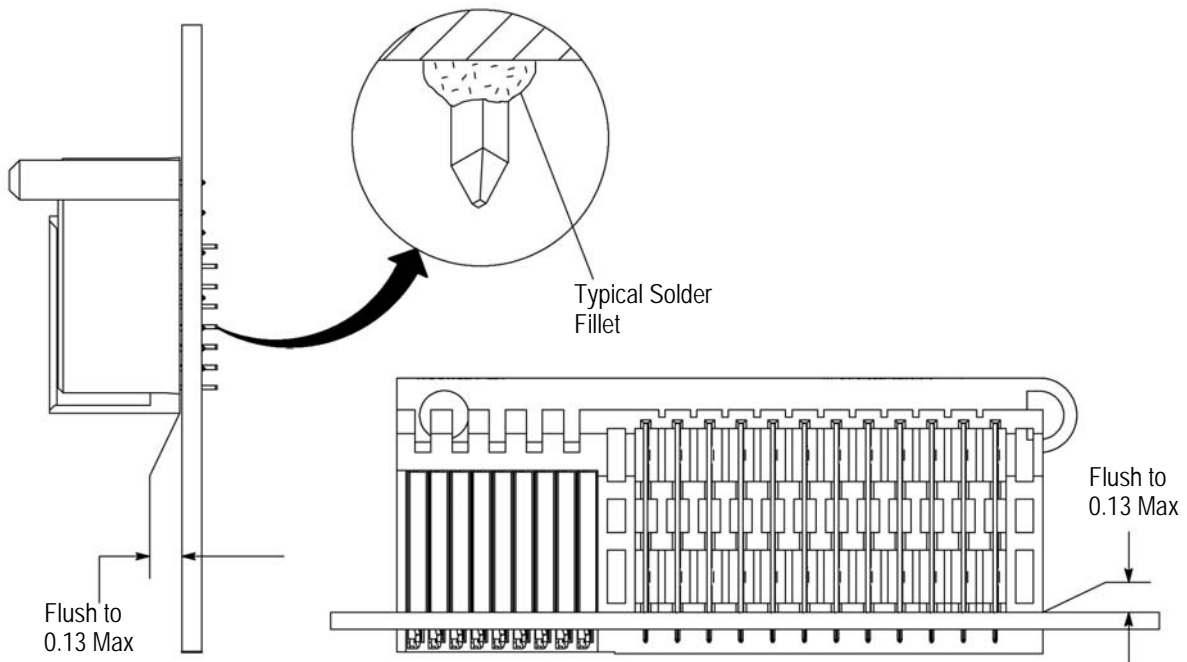


Figure 7

3.9. Repair

Damaged contacts can not be removed from receptacle housing connectors. The entire connector will have to be removed and replaced with a new one.

A. Receptacles with Solder Tines

Before removing the connectors from the pc board, remove solder from all solder tines by heating them and removing the solder fillet. Do NOT apply heat to the pc board, otherwise you could damage plated-through holes. After solder is removed, grip the center of the housing with a pair of pliers and pull the connector straight away from the pc board. Clean the holes of any residual solder. Insert a new connector and solder it using standard hand soldering technique. See Figure 8.

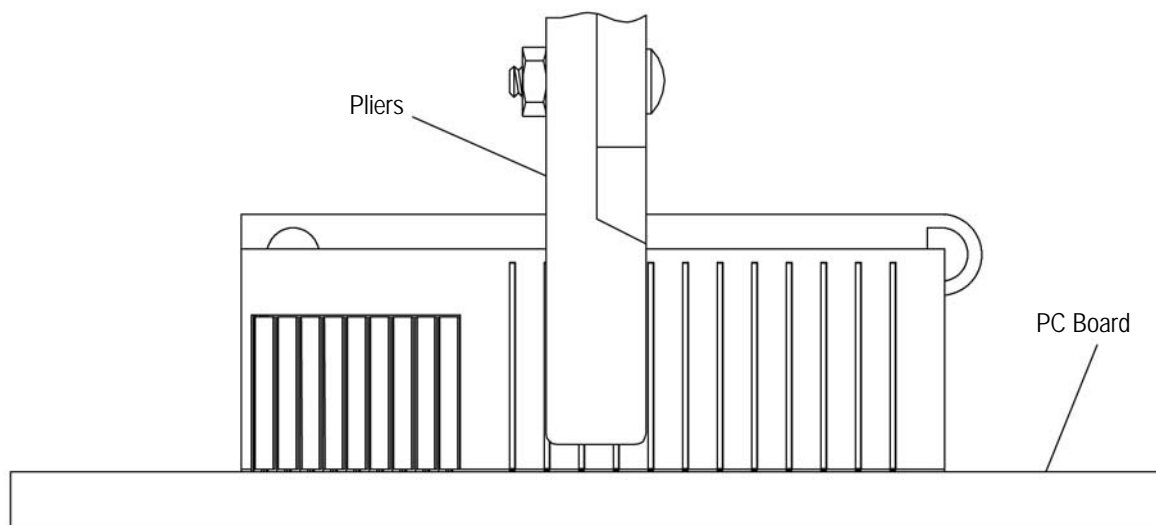


Figure 8

B. Connectors with Compliant Pins

Place the connector in a housing support that has a slot wide enough and deep enough to receive the full length of the housing and contacts. Make sure the tool support will not interfere with any other components on the pc board. Apply an even force simultaneously to all compliant pins with a push bar and press capable of applying 100 N [22 lb-force] per pin. See Figure 9.

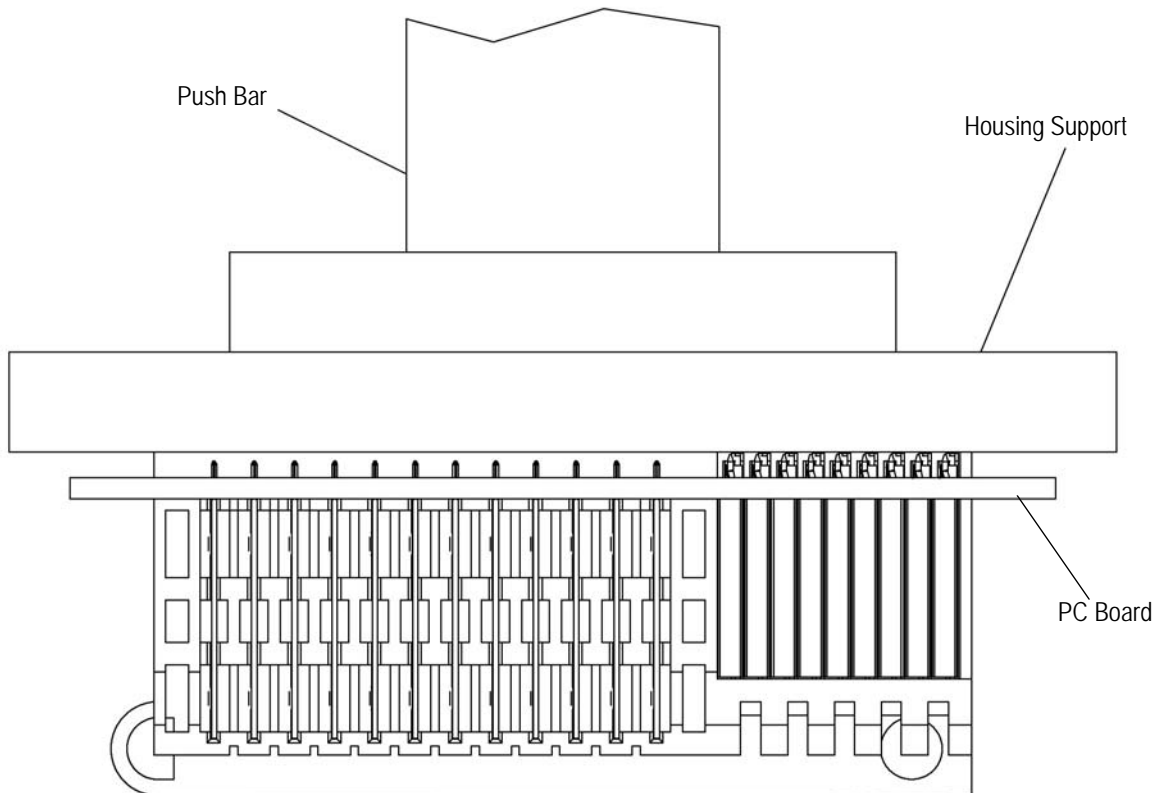


Figure 9

4. QUALIFICATION

These connectors meet Institute of Electrical and Electronic Engineers (IEEE), Electronic Industries Association (EIA), and International Electrotechnical Commission (IEC) specifications for pc boards. Mini-Pak HD Connectors are Component Recognized by Underwriters Laboratories Inc. (UL) in File No. E28476 and Certified by CSA International in File No. LR7189.

5. TOOLING

TE has existing tooling and tooling concepts for applying these connectors. Part numbers of available tools and the applicable instructional material for each is provided in Figure 10.

- **Robotic Equipment**

Robotic equipment for placement of connectors on a pc board must have a true position accuracy of 0.13 mm to ensure proper location and insertion of the contact pins. This includes gripper and fixture tolerances as well as equipment repeatability. It must use the connector datum surface to ensure reliable connector placement. If you need assistance in setting up prototype or production line equipment, contact TE Tooling Engineering through your local TE Representative or call the Tooling Assistance Center number at the bottom of page 1.

- **Seating Tool**

Seating tools are designed to push evenly on the shoulders of the vertical pin contact and force the compliant pins into the pc board. See Figure 10.

• **PC Board Support**

A pc board support must be used to prevent bowing of the pc board during insertion of the connectors. It should have a flat surface with holes or a channel large enough to receive the pins during installation.

NOTE



The tooling referenced in Figure 10 may be used for both compliant pin and solder type connectors.

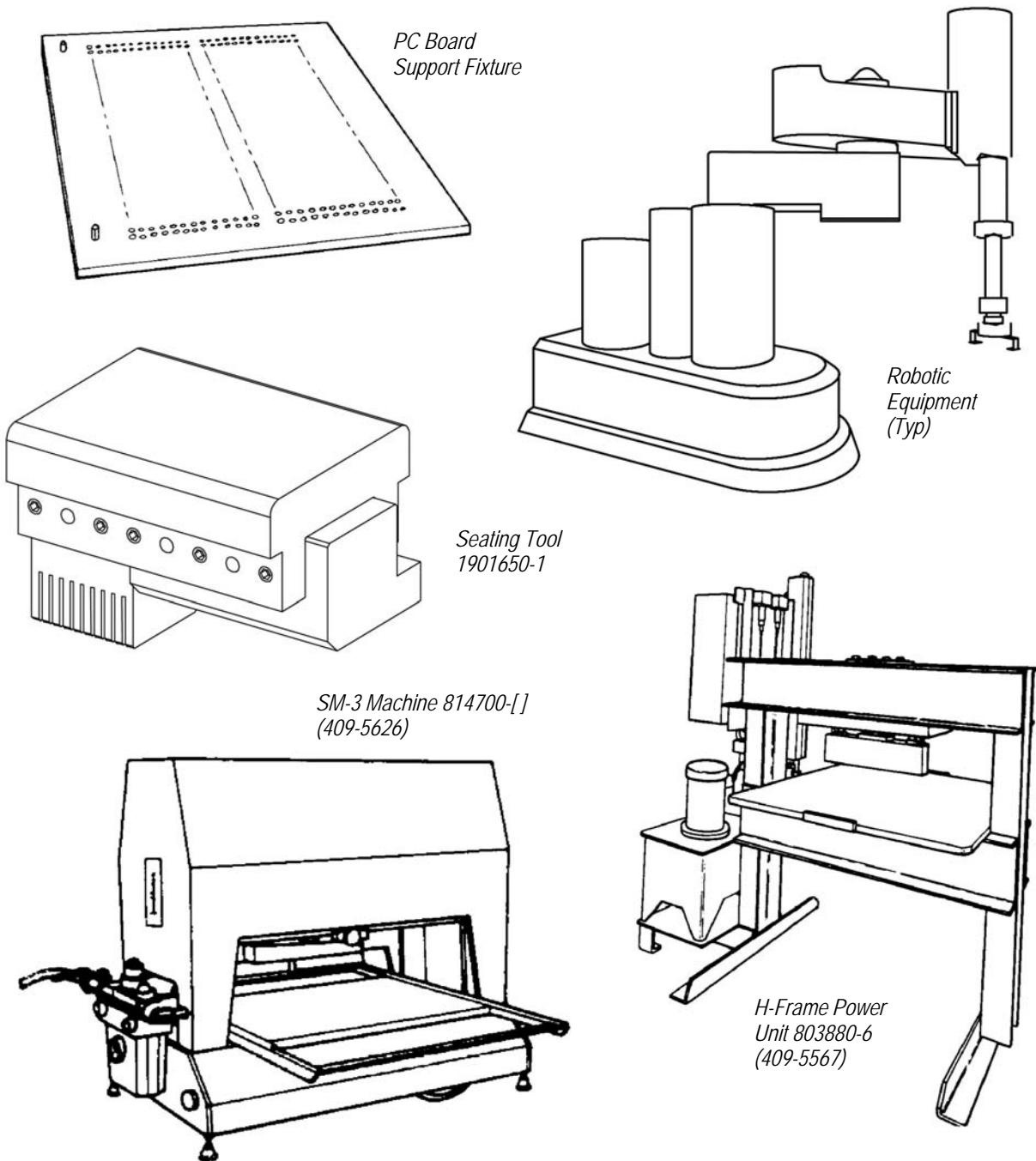


Figure 10

6. VISUAL AID

The illustration below shows a typical application of this product. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.

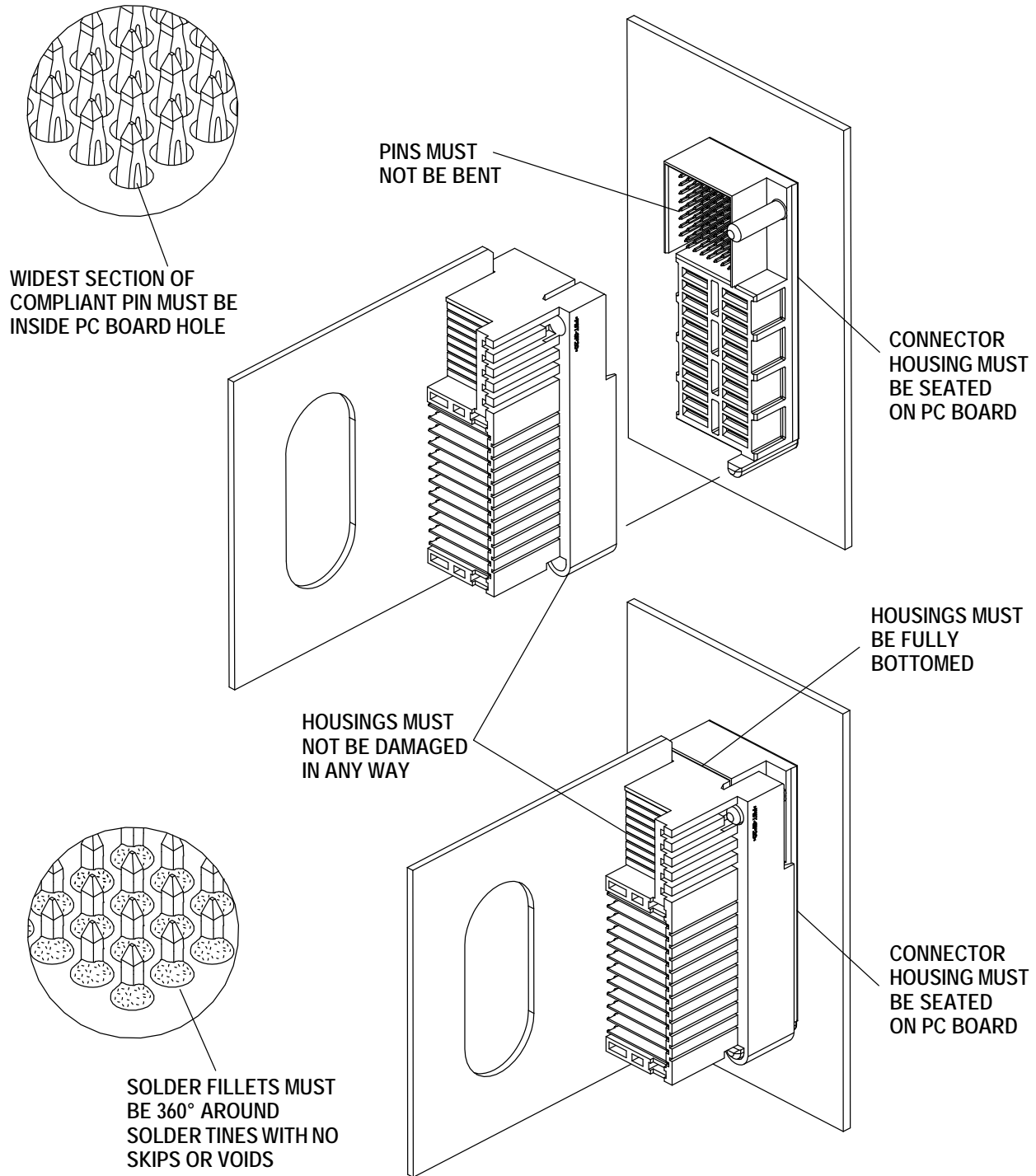


FIGURE 11. VISUAL AID