



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 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 SMT BUCHANAN WireMate Two Piece Poke-In Series Header onto printed circuit (pc) board, and, mating with BUCHANAN WireMate Two Piece Poke-In Series Connector. Application onto a pc board is accomplished using standard SMT processing and reflowed lead-free solder paste. Headers are available in variants of two circuits up to eight circuits, with circuit pitches of 5mm or 8mm.

The header is provided in tape and reel packaging per EIA-481, and ready for installation onto a pc board. Flat top surfaces on the housing allow for vacuum pick-and-place application. The plastic housing is molded of high temperature resistant thermoplastic that withstands lead-free solder reflow temperatures.

Blade-style contacts are made of copper alloy and have tin plate finish with a nickel underplate. The tin plate finish readily solders to lead-free solder paste, and provides durable performance when mating to corresponding BUCHANAN WireMate Two Piece Poke-In Series Connector. The blade-style contacts have a large solder footprint, resulting in highly reliable retention onto a pc board.

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

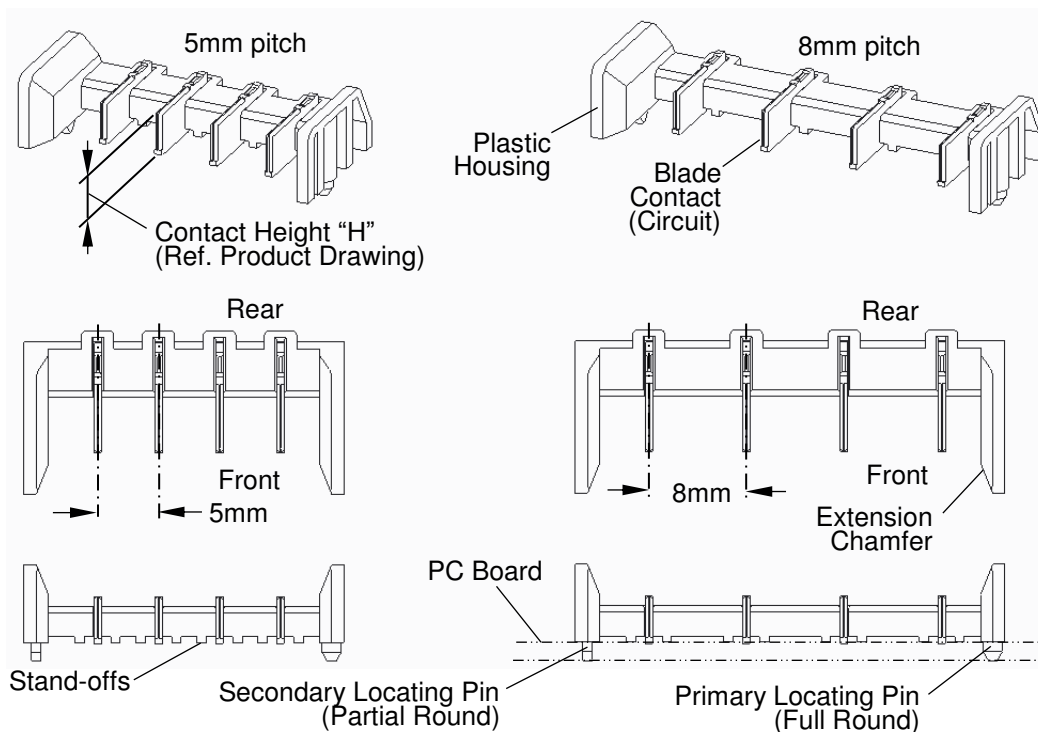


FIGURE 1



2. REFERENCE MATERIAL

2.1. Revision Summary

- New Release

2.2. Customer Assistance

Reference Product Base Part Numbers 2318770-[], 2318136-[], and Product Code L974 are representative of the SMT BUCHANAN WireMate Two Piece Poke-In Series Headers. 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 this page.

2.3. Drawings

Customer Drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the Customer Drawings and this specification or with any other technical documentation supplied, the information contained in the Customer Drawings takes priority.

2.4. Manuals

Manual [402-40](#) (Solderability and Soldering) 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

Product Specification 108-133105 provides product performance and test information for the corresponding BUCHANAN WireMate Two Piece Poke-In Series Connector products. Workmanship Specification IPC-A-610 provides solderability requirements and evaluation methods.

3. REQUIREMENTS

3.1. Safety

Do not stack product shipping containers so high that the containers buckle or deform.

3.2. Limitations

The connectors are designed to operate in a temperature range of -40° to 105°C [-40° to 221°F].

3.3. Material

The housing is made of UL 94V-0 rated thermoplastic. The contacts are made of copper alloy, under-plated with nickel, and plated overall with tin.

3.4. Storage

A. Ultraviolet Light

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

B. Shelf Life

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

C. Chemical Exposure

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

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

4. PC BOARD

A. Material and Thickness

Common pc board materials may be used such as glass epoxy (FR-4 or G-10), aluminum-clad pc boards and flex circuits. The pc board thickness may vary to suit the end use thickness. However, for pc board thickness less than 1.5 mm, the header locating pins will protrude beyond one side of the pc board.

B. Tolerance

Maximum allowable bow of the pc board shall be 0.10 mm over the length of the connector.

C. Solderability

The pc board pads must be solderable per IPC/EIA J-STD-003 and all other requirements for surface mount contacts specified in this document

D. Locating Holes

Holes must be placed in the pc board as shown in Figure 2. The holes serve to locate the header by aligning with corresponding pins on the header housing.

E. Layout

The pc board layout must be designed using the dimensions provided on the product drawing for the specific connector. The recommended pc board layout is shown in Figure 2.

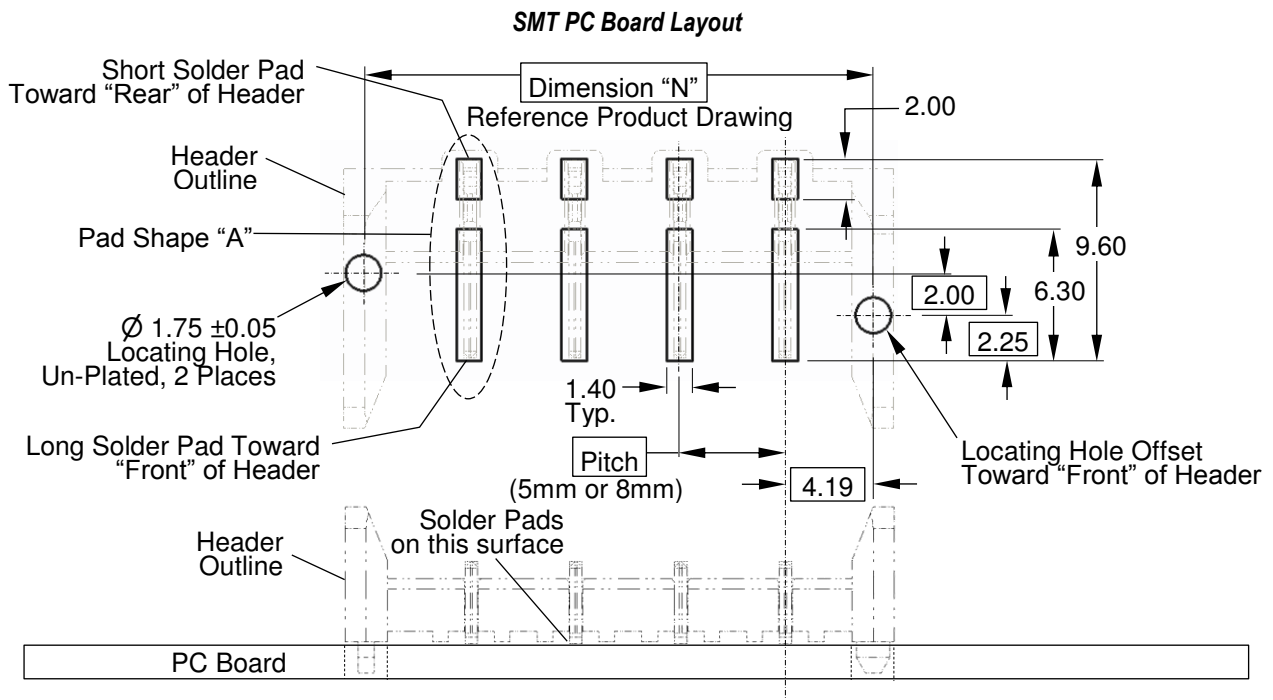


FIGURE 2 (CONT'D)



NOTE

Dimensions in Figure 2 define nominal pad size, or, pad areas exposed through solder mask.

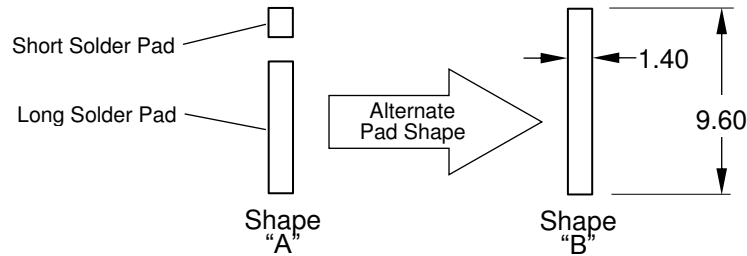


FIGURE 2

5. SOLDER PASTE

Solder paste is to be applied to the pc board pads prior to placing the header on the pc board.

5.1. Solder Paste Characteristics

- Alloy type shall be SAC 305; Sn 96.5/Ag 3.0/Cu 0.5.
- Flux component of the paste shall be rosin, mildly active (RMA), no-clean type.
- Paste will be at least 80% solids by volume.
- Mesh designation -200 to +325 (74 to 44 square micron openings, respectively).
- Minimum viscosity of screen print shall be 5x10% cp (centipoise).
- Minimum viscosity of stencil print shall be 7.5x10% cp (centipoise).

5.2. Solder Paste Volume



NOTE

Solder paste volumes are required as follows (calculated per 50% solids content). Paste volume may vary depending on the composition.

Solder volume for each SMT Releasable Poke-In Connector contact must be according to the following:

- Pad shape "A" = 2.53 mm³ per contact (total, "short" pad + "long" pad)
- Pad shape "B" = 2.81 mm³ per contact

6. STENCIL

The stencil aperture shall be determined by the circuit pad size and stencil thickness. It may be any shape so long as it prevents solder bridging from one pad to another. Generally, the thinner stencil will require larger aperture sizes to maintain the given volume of solder paste. See Figure 3.



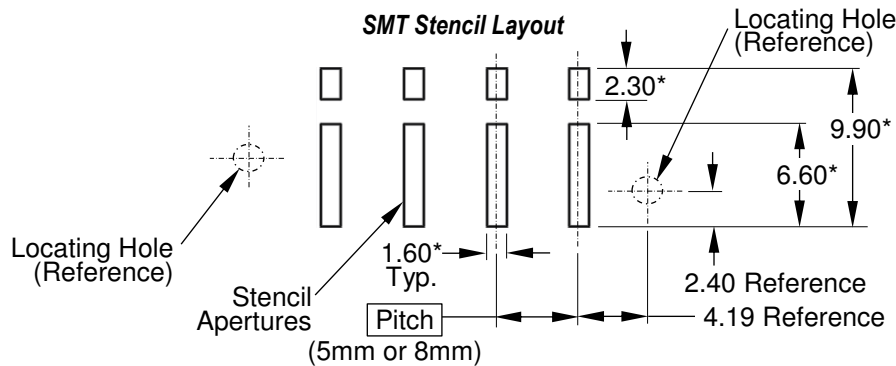
NOTE

The stencil layout illustrated applies to the header placement side of the pc board, unless otherwise noted. For any other variations, refer to the pc board mounting configurations on the appropriate customer drawing to determine modifications necessary to the solder stencils in Figure 3.



NOTE

All circuit traces in the solder deposit area which are not to be soldered must be covered by solder mask. Exposed traces could cause bridging and create a short, or wick solder away from the solder tines, producing a weak solder joint.



*Stencil Apertures Sizes Based On 0.18 mm [0.007 In.] Thick Stencil.

FIGURE 3

7. SOLDER MASK

Solder mask is recommended between all pads when soldering connectors with surface mount contacts to minimize solder bridging between pads. The mask must not exceed the height of the pad by more than 0.05 mm. If a trace is run between adjacent pads on the solder side of the pc board, a solder mask must be applied over the trace to prevent bridging and wicking of solder away from the contact solder tines. Those most suitable are Liquid Photo Imageable and Dry Film.



CAUTION

Parts of the connector may rest on top of the solder mask. An excessively high mask may allow too much space between the contact and pad for a good solder joint. A solder joint under these conditions, would be weak, and, not provide the rated long-term performance for the header.

8. SMT HEADER PLACEMENT

BUCHANAN WireMate Two Piece Poke-In Series Headers are packaged in tape and reel per EIA-481. Robotic/gripper and/or vacuum placement requires total equipment accuracy of 0.25 mm to locate the header for insertion. This includes gripper and fixture tolerances, as well as equipment repeatability. Insertion location will be programmed by a simple pantograph/template system or software package.

The header locates on a pc board by aligning pins on the header housing with corresponding holes in the pc board. The header locating pins are chamfered at the tips to bring the header into precise alignment with the pc board locating holes. 2 pins are provided on the housing for reliably locating the header onto the pc board. Optimally, the header contacts should be centered on the pc board pads. However, the final location of the contacts, with respect to the pc board pads, is determined by the header locating pins installing into the pc board locating holes (ref. Figure 4).

After applying solder paste to the pc board pads, the header is placed onto a pc board as follows:

1. Orient the header to the pc board locating holes and solder pads (ref. Figure 2). The "front" of the header should be aligned in the direction of the "long" solder pads (shape "A").
2. Closely align the header locating pins with the corresponding locating holes in the pc board.
3. Lower the header onto the pc board. The chamfers on the tips of the header locating pins will enter the pc board locating holes and adjust the header position to align precisely with the locating holes.
4. Continue to lower the header onto the pc board until the header contacts rest on the pc board solder pads.



CAUTION

Headers should be handled only by the plastic housing to avoid deformation, contamination, or damage to the solderable contacts.

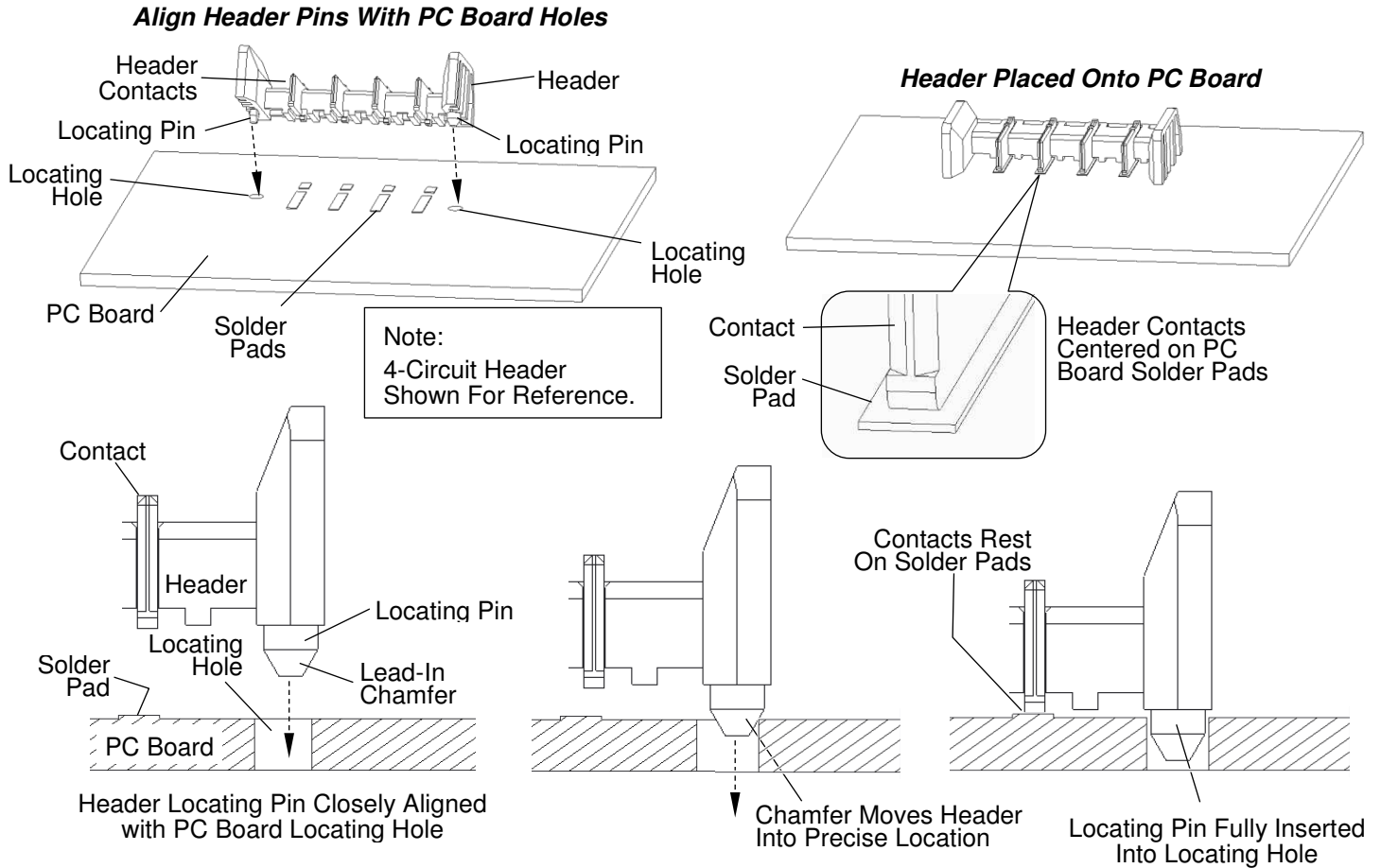


FIGURE 4

9. SOLDERING

The connectors should be soldered using vapor phase reflow (VPR), double-sided non-focused infrared (IR), forced hot-air convection, or equivalent soldering techniques. All solder joints should conform to the Workmanship Specification IPC-A-610 and IPC J-STD-001.

9.1. Process

Observe guidelines and procedures when soldering contacts. Solder, clean, and dry all leads to contacts according to the following. Due to many variables involved with the reflow process (i.e., component density, orientation, etc.), it is recommended that trial runs be conducted under actual manufacturing conditions to ensure product and process compatibility. These headers will withstand the temperature and exposure time specified in Figure 5.

SOLDERING PROCESS	TEMPERATURE (Max)	TIME (At Max Temperature)
IR	220°C [428°F]	3 Minutes

FIGURE 5

9.2. Reflow Profile

The lead-free reflow temperatures profile is shown in Figure 6.

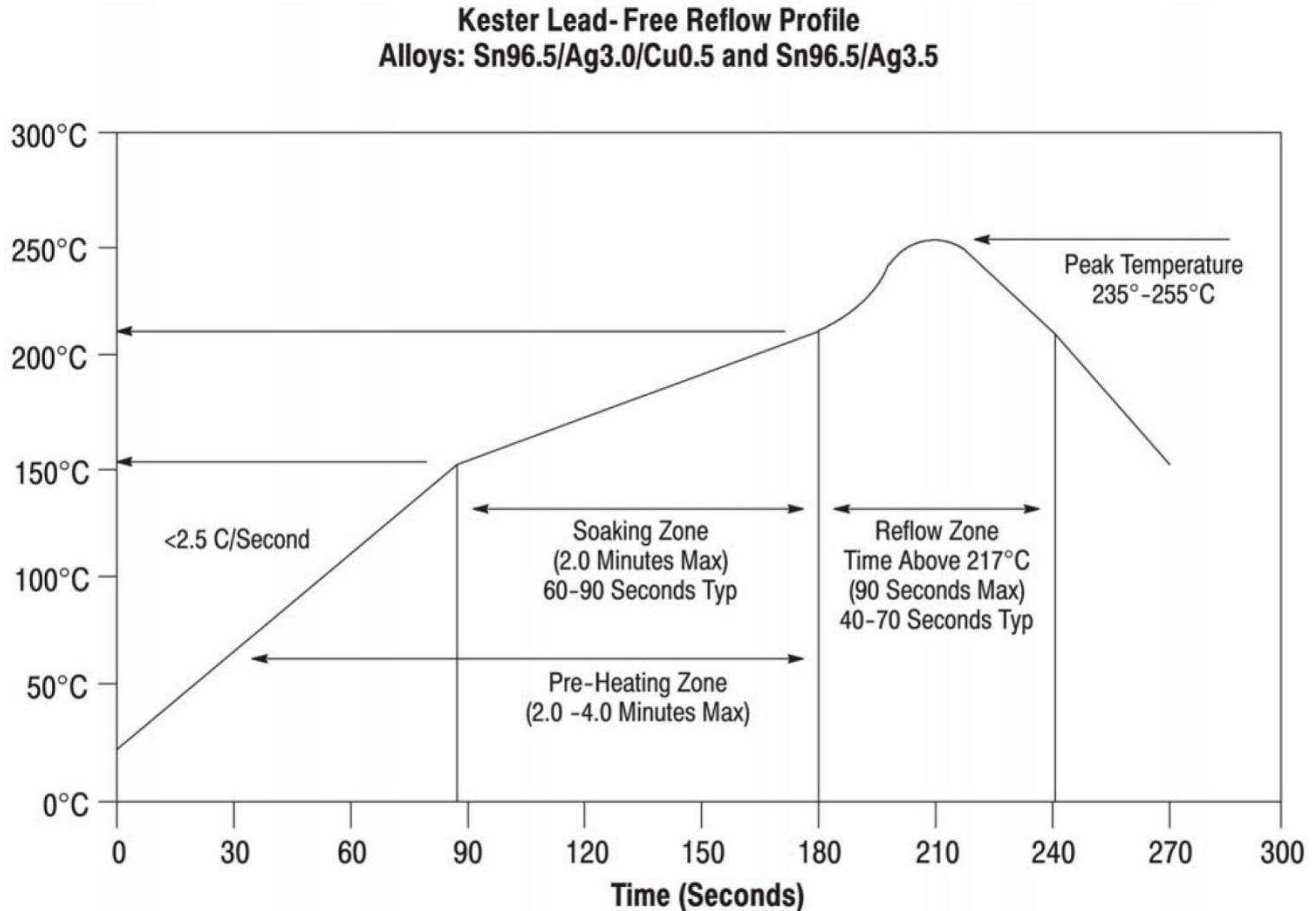


FIGURE 6

9.3. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with supplier of the solder and flux for recommended cleaning solvents. Common cleaning solvents that will not affect the connectors or assemblies for the times and temperatures provided without any adverse effects on the connector assembly are listed in Figure 7.



DANGER

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 effect 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.



CAUTION

If you have a particular solvent that is not listed, contact TE Tooling Assistance Center or Product Information at the number on the bottom of page 1.

CLEANER		TIME (Minutes)	TEMPERATURE (Max)
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		

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

FIGURE 7

9.4. Drying



CAUTION

Excessive temperatures may cause housing and plating degradation.

When drying cleaned assemblies and pc boards, temperatures to which the headers are subject should not exceed 220°C [492°F] for more than 3 minutes.

9.5. Checking Installed Header

All solder joints should comply with relevant workmanship standards of IPC-A-610. For typical fillets for surface mount requirements, refer to Figure 8.

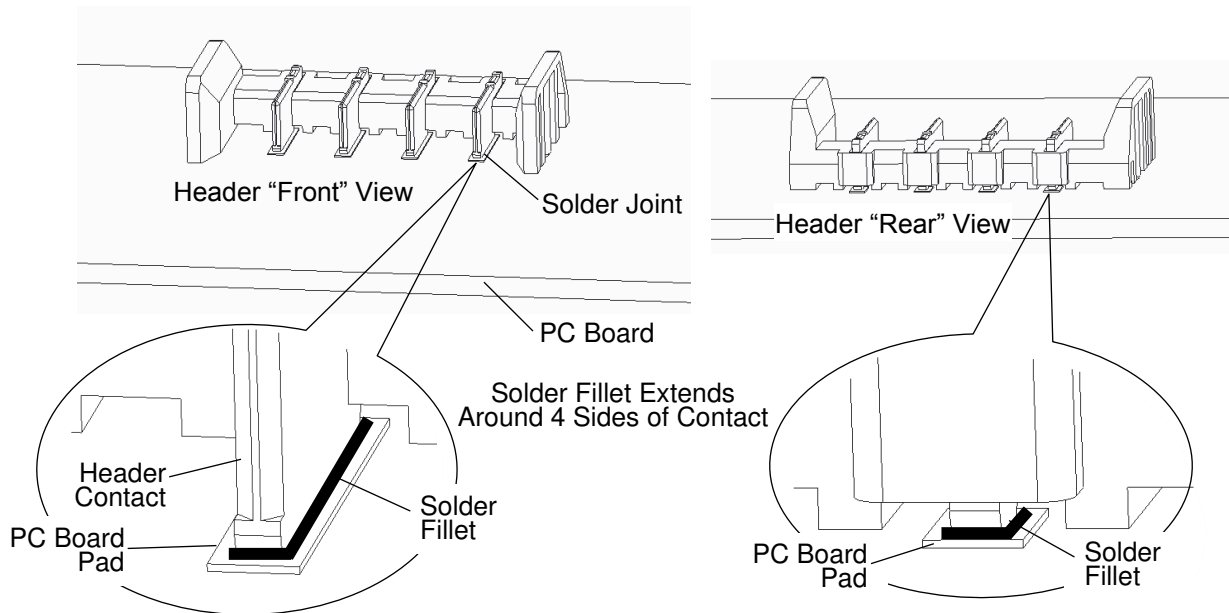


FIGURE 8

9.6. Replacement and Repair

The contacts and housings are not repairable.



CAUTION

DO NOT use damaged or defective contacts or housings.

10. QUALIFICATIONS

BUCHANAN Wiremate 2 piece poke in connector system is Component Recognized by Underwriters Laboratories, Inc. in File E60677 volume 20.

11. TOOLING

11.1. Robotic Equipment

The robotic equipment must have a true position accuracy tolerance of 0.25 mm to properly locate the headers. This includes gripper and fixture tolerances as well as equipment repeatability.



NOTE

For connectors with surface mount contacts, automatic machine placement is recommended instead of manual placement.

11.2. PC Board Support

For automatic machine placement, a pc board support must be used to prevent bowing of the pc board during the placement of connectors. It should have flat surfaces with holes or a channel large enough and deep enough to receive any protruding components. The pc board support must be customer made.

12. HEADER MATING

The BUCHANAN WireMate Two Piece Poke-In Series Header mates to a corresponding BUCHANAN WireMate Two Piece Poke-In Series Connector by inserting the header blade contacts into receptacles in the connector. The connector receptacles are designed to allow the header mating direction to be parallel, or, perpendicular to the connector mounting surface (ref. Figure 9), as well as “rotational” mating in the parallel orientation (ref. Figure 11).

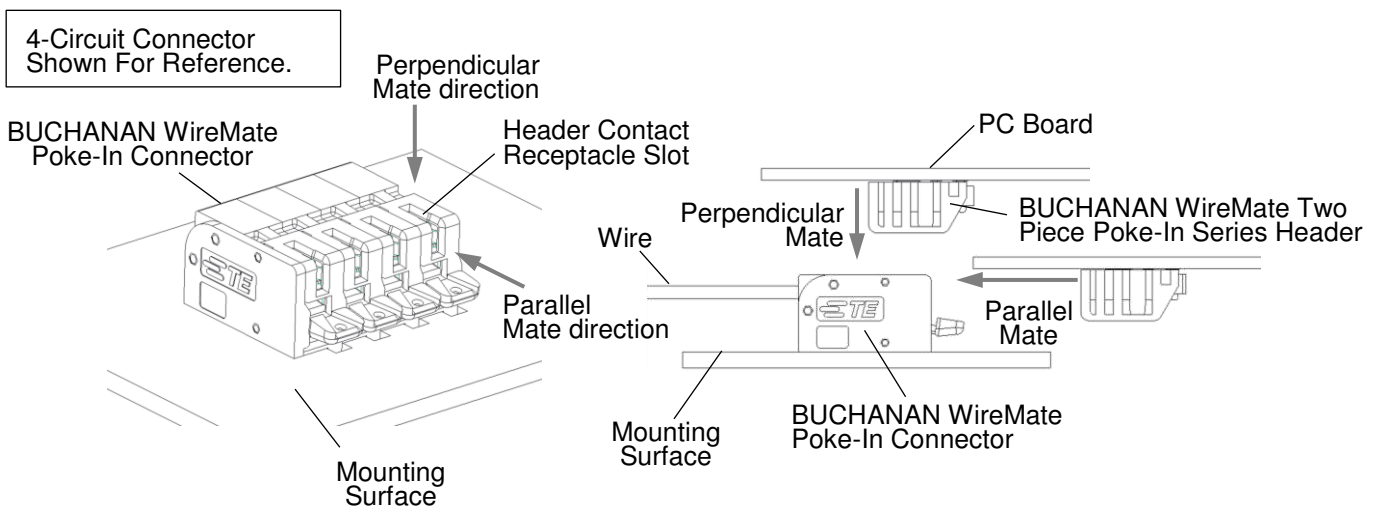


FIGURE 9



NOTE

Before mating the BUCHANAN WireMate Header to a corresponding BUCHANAN WireMate Poke-In Connector, observe the following requirements/recommendations:

- A. The connector must have the same number of circuits as the header.
- B. The header and connector circuits must have the same pitch; 8mm or 5mm.
- C. The header must be soldered to PC Board as instructed in previous paragraphs.
- D. The connector must be fully installed onto its' mounting surface (ref. Application Specification 114-133105).
- E. When the header is mated to the connector, access to the connector may be limited. Therefore, all wires should be applied to the connector before mating the header.

12.1. Perpendicular/Parallel Header Mating Direction

The BUCHANAN WireMate Header mating procedure is the same for parallel and perpendicular mating directions, as follows (ref. Figure 10):

1. Orient the pc board so the BUCHANAN WireMate Header “extension chamfer” features and contacts are directed towards the BUCHANAN WireMate Poke-In Connector receptacle slots.
2. Advance the pc board toward the connector until the header “extension chamfer” features engage the connector housing. As the pc board advances further, the header “extension chamfer” features adjust the position of the header to provide close alignment of the header contacts to corresponding connector receptacle slots.
3. Continue advancing the pc board until the header contacts engage the connector receptacle slots. Chamfers on the leading edge of the contacts and on the edges of the receptacle slots adjust the position of the header to provide precise alignment of the header contacts to the receptacle slots.
4. As the pc board continues advancing, increasing mating force will be noticed as the header contacts engage the connector contacts spring receptacles. Continue applying mating force to insert each header contact into its' corresponding connector receptacle.
5. As the pc board continues advancing, an abrupt increase in mating force will occur when the header contacts are at their maximum insertion depth. Reference Figure 10 for allowable mating distances in parallel and perpendicular directions.

BUCHANAN WireMate Header/Connector Mating Sequence

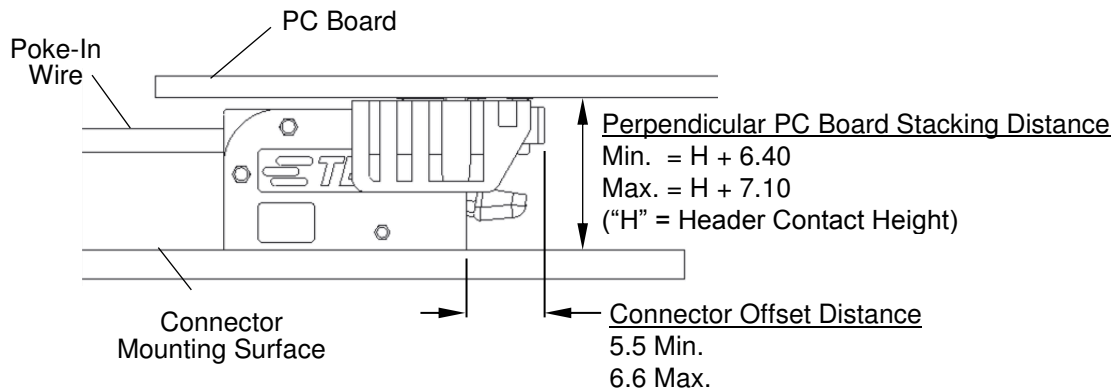
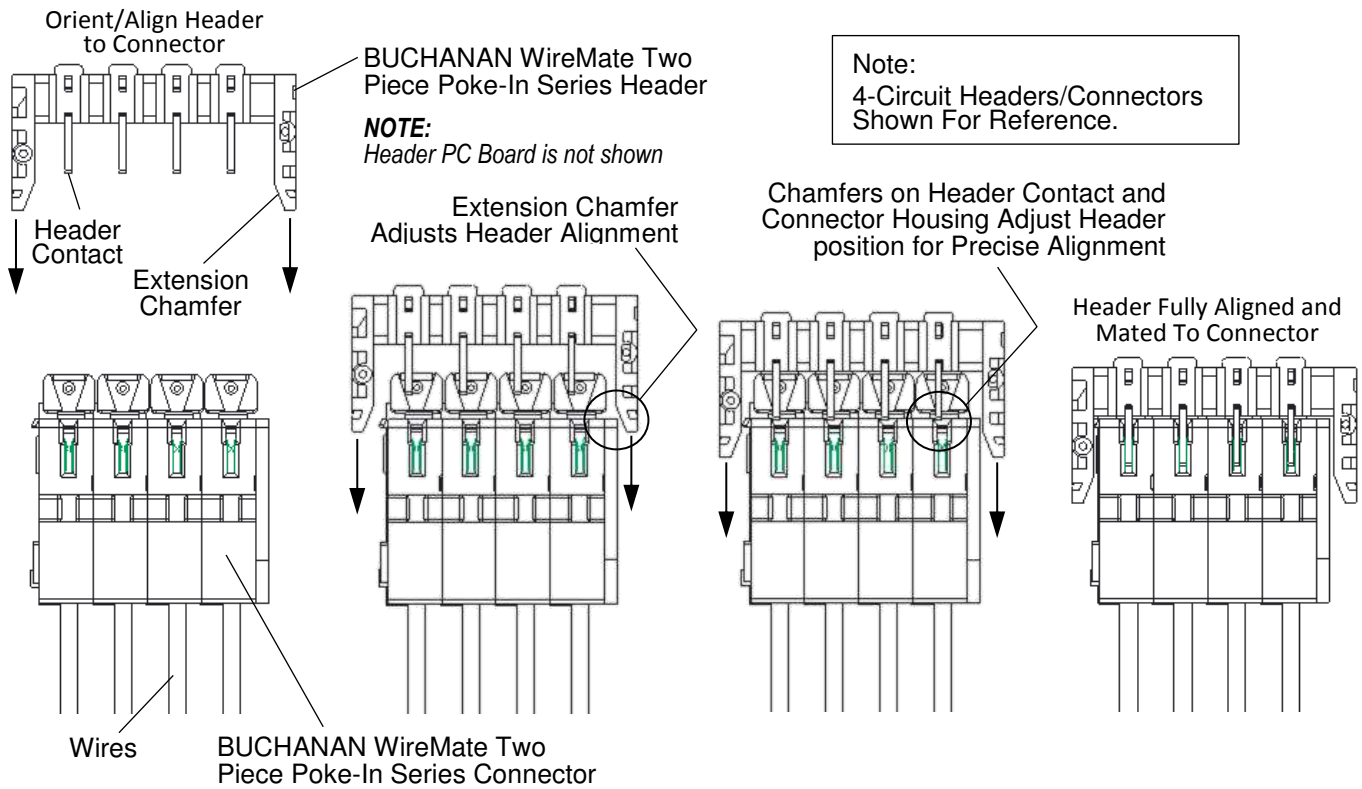


FIGURE 10

12.2. Parallel “Rotation” Header Mating

The BUCHANAN WireMate Poke-In Connector and Header designs allow the header to mate to the connector by “rotational” translation of the pc board, as shown in Figure 11. To ensure the header aligns properly with the connector during rotation, the header pc board movement must be constrained as follows:

- A. The pc board movement is parallel to the connector mounting surface as in Figure 9.
- B. The “Perpendicular PC Board Stacking Distance” must be within the limits specified in Figure 10.
- C. The header center of rotation must be located according to dimensions provided in Figure 11.

With the pc board constrained as described above, the pc board can be rotated (CW or CCW) to mate the header to the connector as shown in Figure 11.

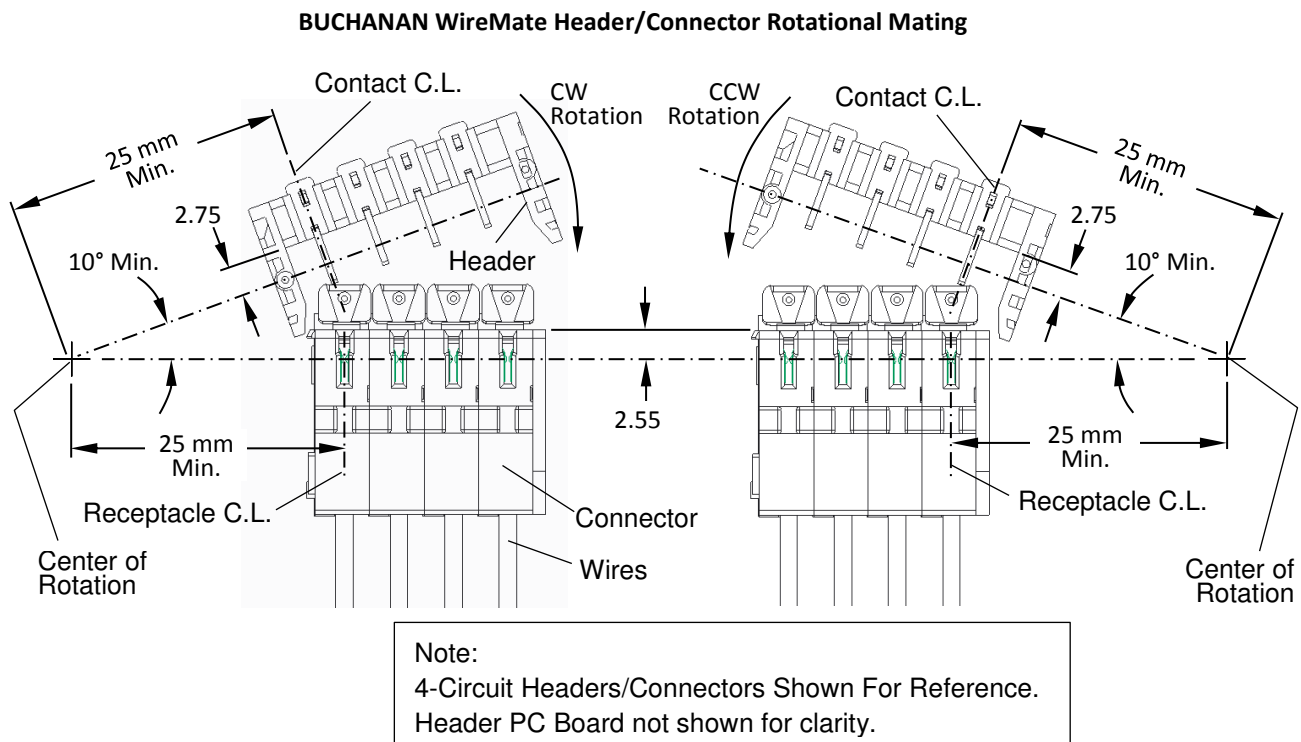
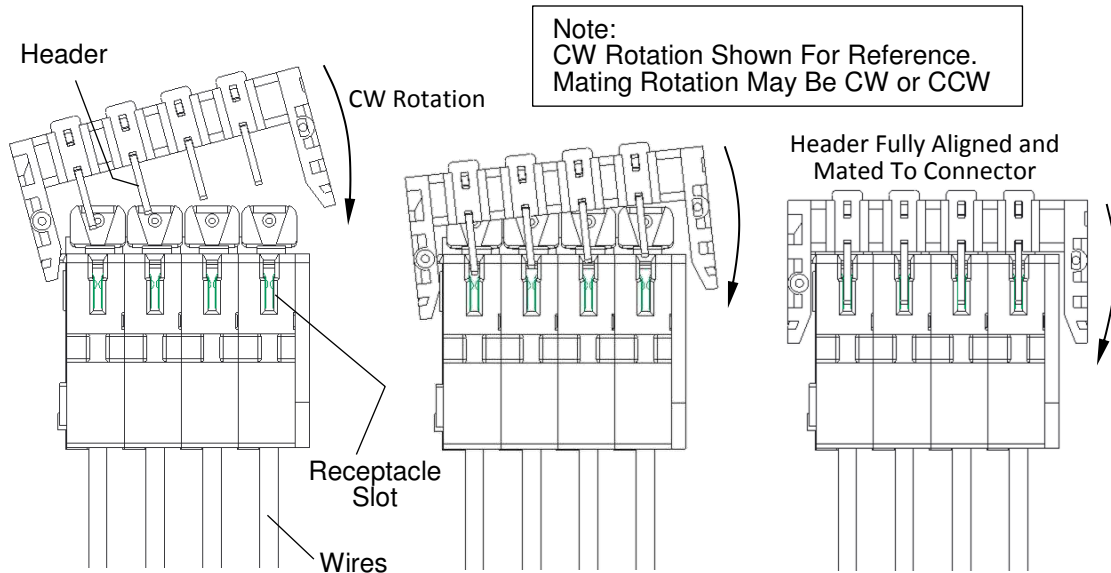


FIGURE 11 (CONT'D)



Header Contacts Progressively Enter Connector Receptacle As Header Rotates Into Fully Mated Position

FIGURE 11

12.3. VISUAL AID

The illustration in Figure 12 shows a typical application of BUCHANAN WireMate Two Piece Poke-In Series Header. 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.

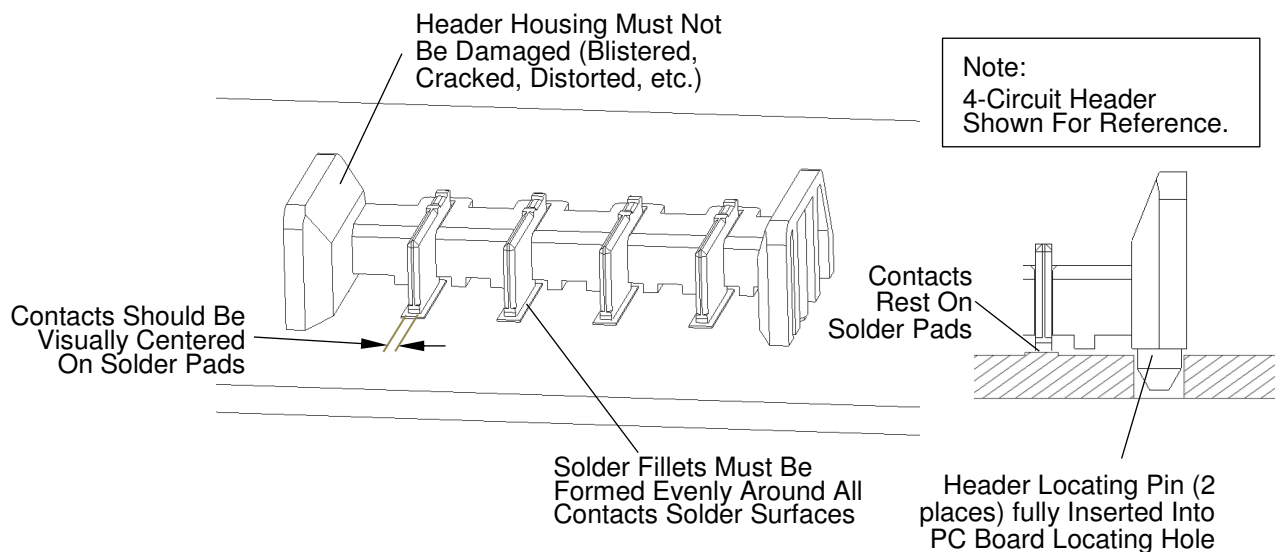


FIGURE 12