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 ±2°. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of the Vertical Screwless Wire Connector for printed circuit (pc) boards. These connectors will accept solid wires from size 16 to 18 AWG and size 18 AWG bonded wire per ASTM B470 Type 1. The connectors contain contacts on 3.5 mm centerlines that are staggered for high voltage operation. These connectors are applied to a pc board manually.

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.

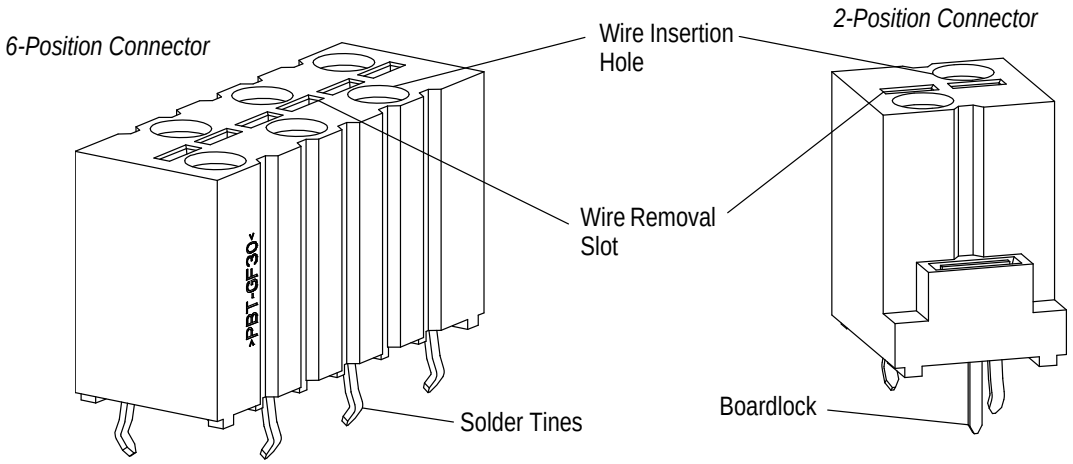


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

Revisions to this application specification include:

- Updated document to corporate requirements
- New logo

2.2. Customer Assistance

Reference Product Base Part Number 1811957 and Product Code H095 are representative of Vertical Screwless wire Connectors. 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 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 technical documentation supplied by TE.

2.4. Specifications

Product Specification 108-2059 provides product performance requirements and test information.

2.5. Manuals

Manual 402-40 is available upon request and can be used as a guide in soldering. 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 a guide for information on soldering problems.

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. The connectors should be used on a first in, first out basis.

3.2. Special Characteristics

Vertical Screwless Wire Connectors have an operating temperature range of -30 to 80°C [-22 to 176°F].

3.3. Material

The housings are made from UL 94 V-O rated PBT and the contacts are made from copper alloy with a tin-lead over nickel underplate finish.

3.4. Wire Selection and Preparation

A. Type

The wire size range for these connectors is 16 through 18 AWG solid wire, or 18 AWG bonded wire per ASTM B470, Type 1.

B. Preparation

Insulation strip length, as well as the maximum insulation diameter are provided in Figure 2.

CAUTION
Do not nick, scrape, or cut the wire conductor during the stripping operation.

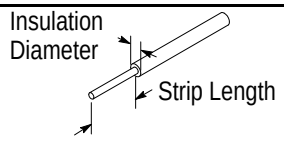
WIRE SIZE RANGE, AWG	STRIP LENGTH	INSULATION DIA (MAX)	
18-16	10.53-8.53	2.16	

Figure 2

3.5. PC Boards

A. Material and Thickness

The pc board material shall be glass epoxy (FR-4, G-10). The connectors have been designed to accommodate a pc board thickness range of 1.4 to 1.8 mm. Contact the Product Information Center or the Tooling Assistance Center at the number listed at the bottom of page 1 for suitability of other board materials and thicknesses.

B. Tolerance

The maximum bow of the pc board shall be 0.03 mm over the length of the connector.

C. Layout

The mounting and contact holes in the pc board must be precisely located to ensure proper placement and optimum performance of the connector. See Figure 3.

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.

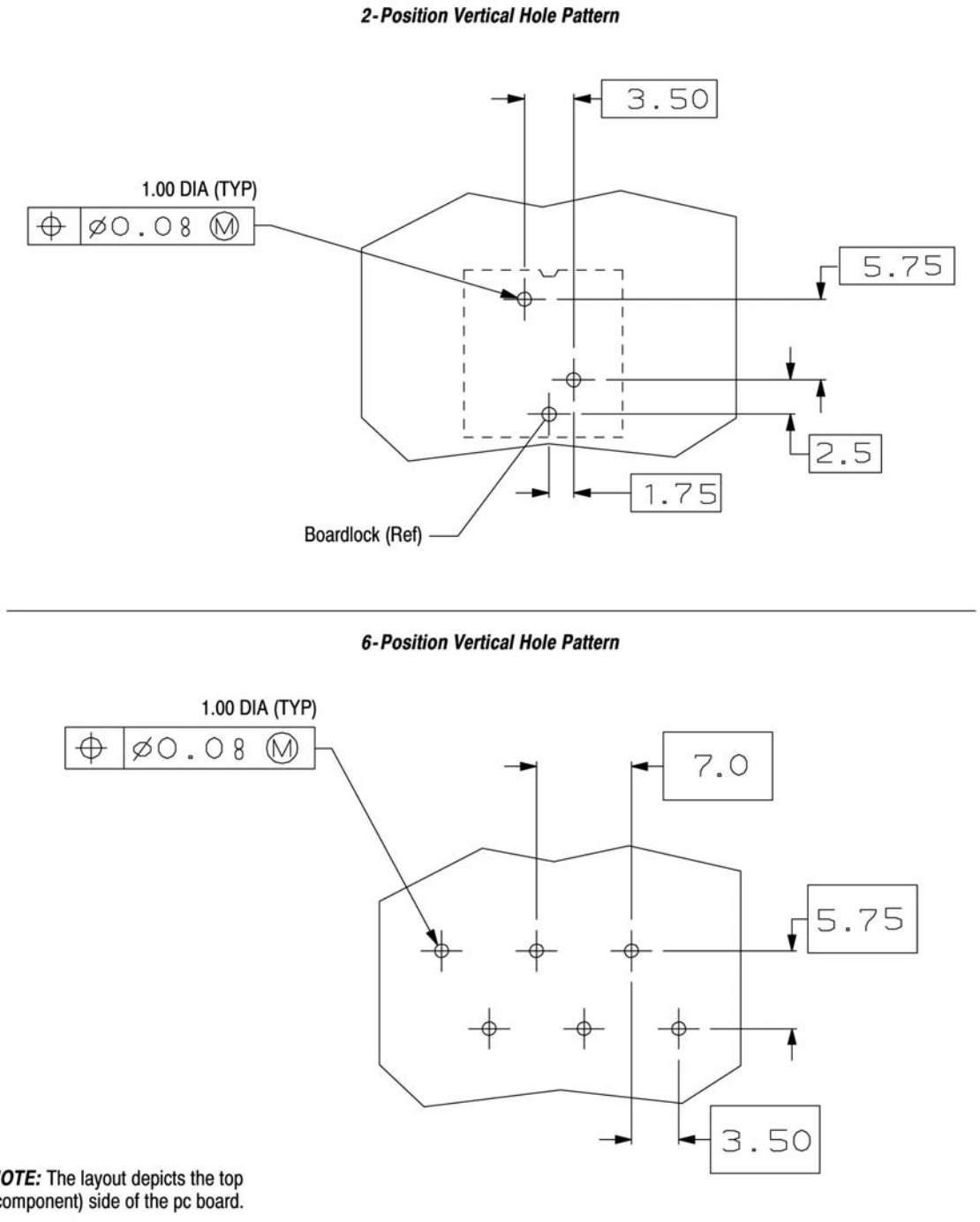


Figure 3

D. Contact Holes

The contact holes in the pc board must be precisely located to ensure proper placement and optimum performance of the connector, and must be prepared to the requirements provided in Figure 4.

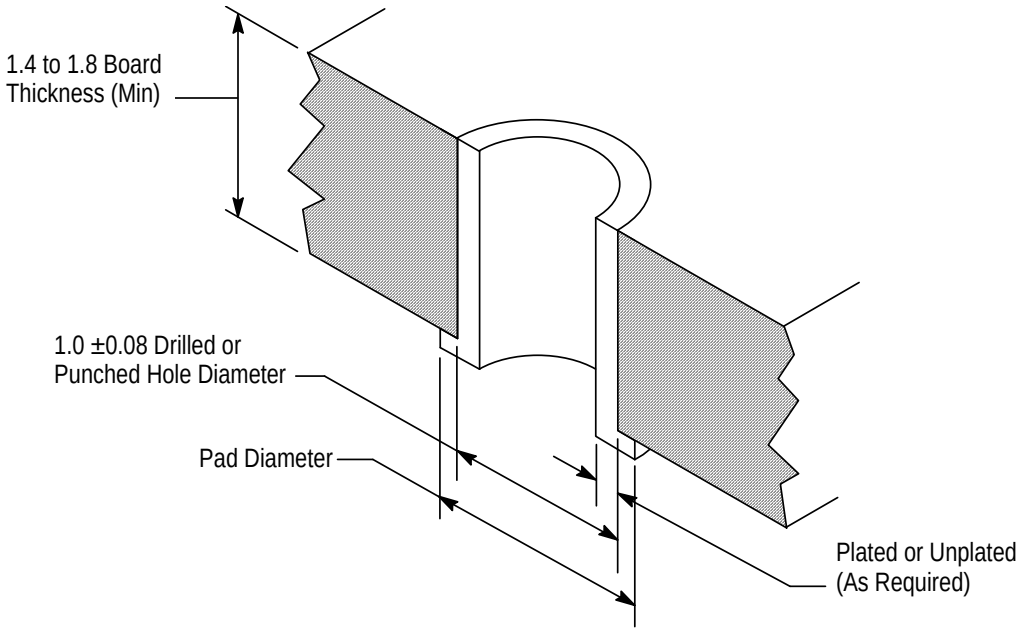


Figure 4

3.6. Connector Placement

NOTE
The connector should be handled only by the housing to avoid deformation, contamination, or other damage to the contact tines.

The connectors are applied to a pc board manually. Determine which hole in the pc board is to receive the number one contact tine. Start all solder tines into the board; then, when the contact tines start to engage the board, press the connector until it seats on the pc board.

The 2-position connector has a boardlock that engages the pc board when the solder tines are inserted to help in retention after soldering.

3.7. Soldering Receptacle Connectors

Vertical Screwless Wire Connectors can be wave soldered, provided the temperatures and exposure time are within the ranges specified in Figure 5. TE recommends the use of SN60 or SN62 solder for the connectors. Refer to Paragraph 2.5 for informational material that is available for establishing soldering guidelines.

SOLDERING PROCESS	TEMPERATURE	TIME (At Max Temperature)
Wave Soldering	260°C [500°F] (Wave Temperature)	5 Seconds

Figure 5

A. Flux Selection

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

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. For a list of 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, refer to Figure 6.

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 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 earth ozone layer.

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

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

C. Drying

CAUTION
Excessive temperatures may cause housing degradation.

Connectors can withstand a temperature of -30 to 100°C [-22 to 212°F]. Values may vary with different automatic cleaning equipment (see equipment manufacturer's recommendations).

D. Checking Installed Connector

All solder joints should conform to those specified in Workmanship Specification 101-21. The housing must seat on the pc board to within the tolerance shown in Figure 7.

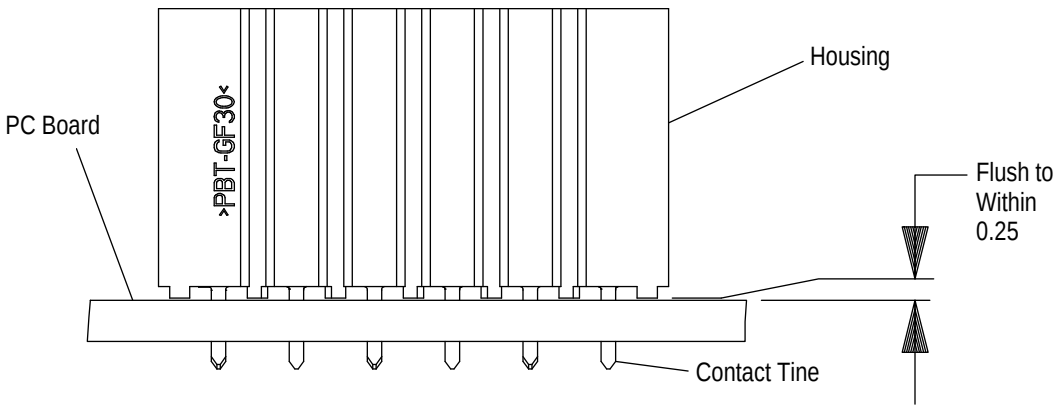


Figure 7

3.8. Wire Location

A. Wire Insertion

After the connector has been applied to the pc board, the stripped wire may be inserted into wire insertion hole of the housing until it bottoms. Pull back gently to ensure that the wire has engaged with the contact. See Figure 8.

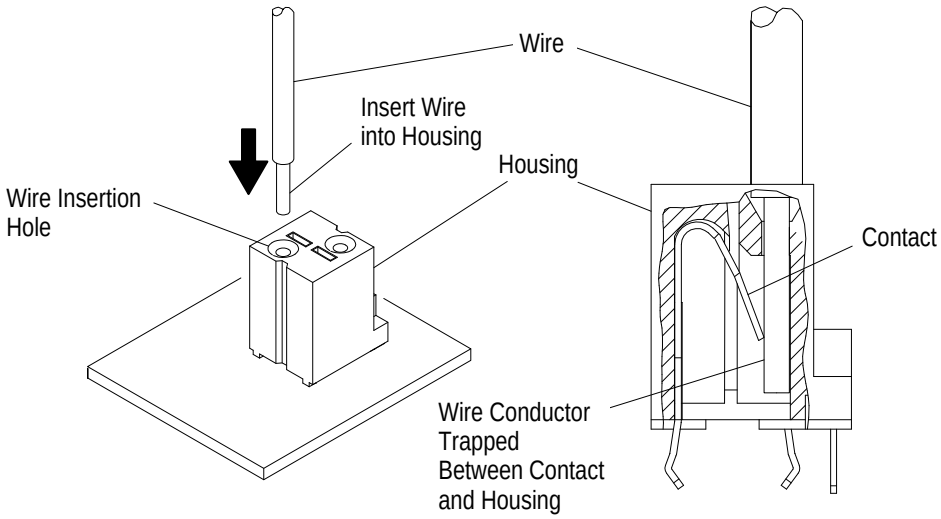


Figure 8

B. Wire Extraction

The wire may be removed by gently inserting an extraction tool into the wire removal slot until it bottoms. Pull back on the wire until it is removed from the housing. See Figure 9.

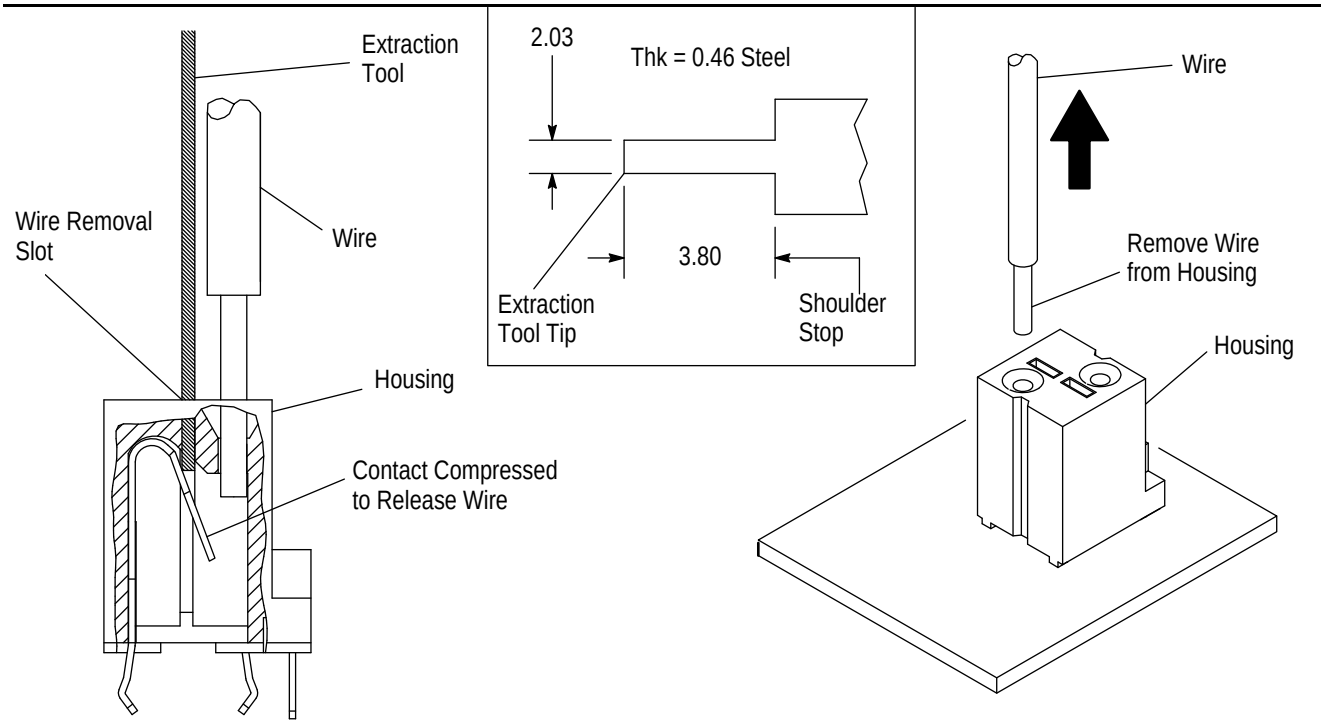


Figure 9

3.9. Strain Relief

Wires must be bundled together and supported with fixed clamps. Wires must not be stretched or confined in any way that would restrict the action of the contacts in the housings. Therefore, the wires must remain perpendicular to the housing and avoid an excessively sharp bend radius. The maximum distance for the fixed clamp, measured from the housing to the fixed clamp, and the minimum bend radius of a wire bundle is shown in Figure 10.

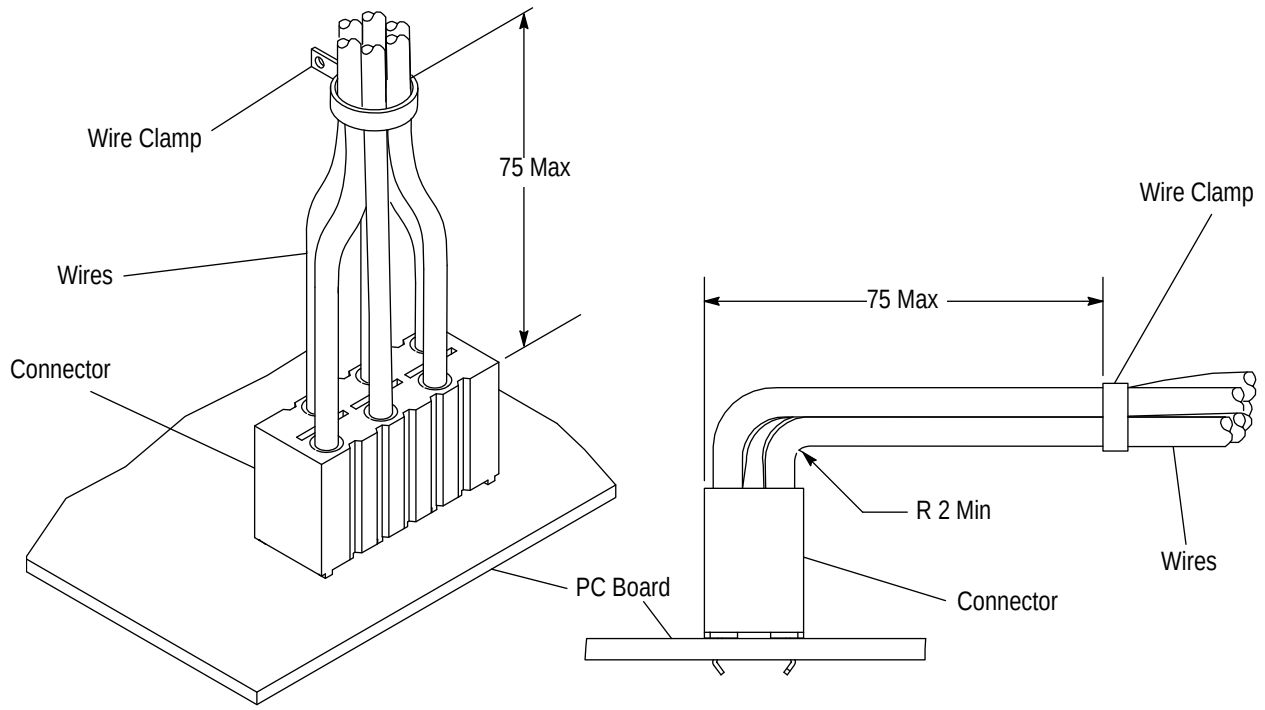


Figure 10

3.10. Connector Repair/Replacement

If the connector should become damaged, it must be replaced. The connector may be removed from the pc board by normal desoldering methods and replaced with a new connector.

4. QUALIFICATIONS

Vertical Screwless Wire Connectors are Recognized by Underwriters Laboratories Inc. (UL) in File E28476, Volume 39.

5. TOOLING

Even though no special tooling is required for the hand placement of Vertical Screwless Wire Connectors on a pc board, the following information should be considered.

- PC Board Support

  A pc board support should be used to prevent bowing of the pc board during the placement of a connector on the board. It should have flat surfaces with holes or a channel wide enough and deep enough to receive the solder tines and hold-down during installation of the connector on the board.

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.

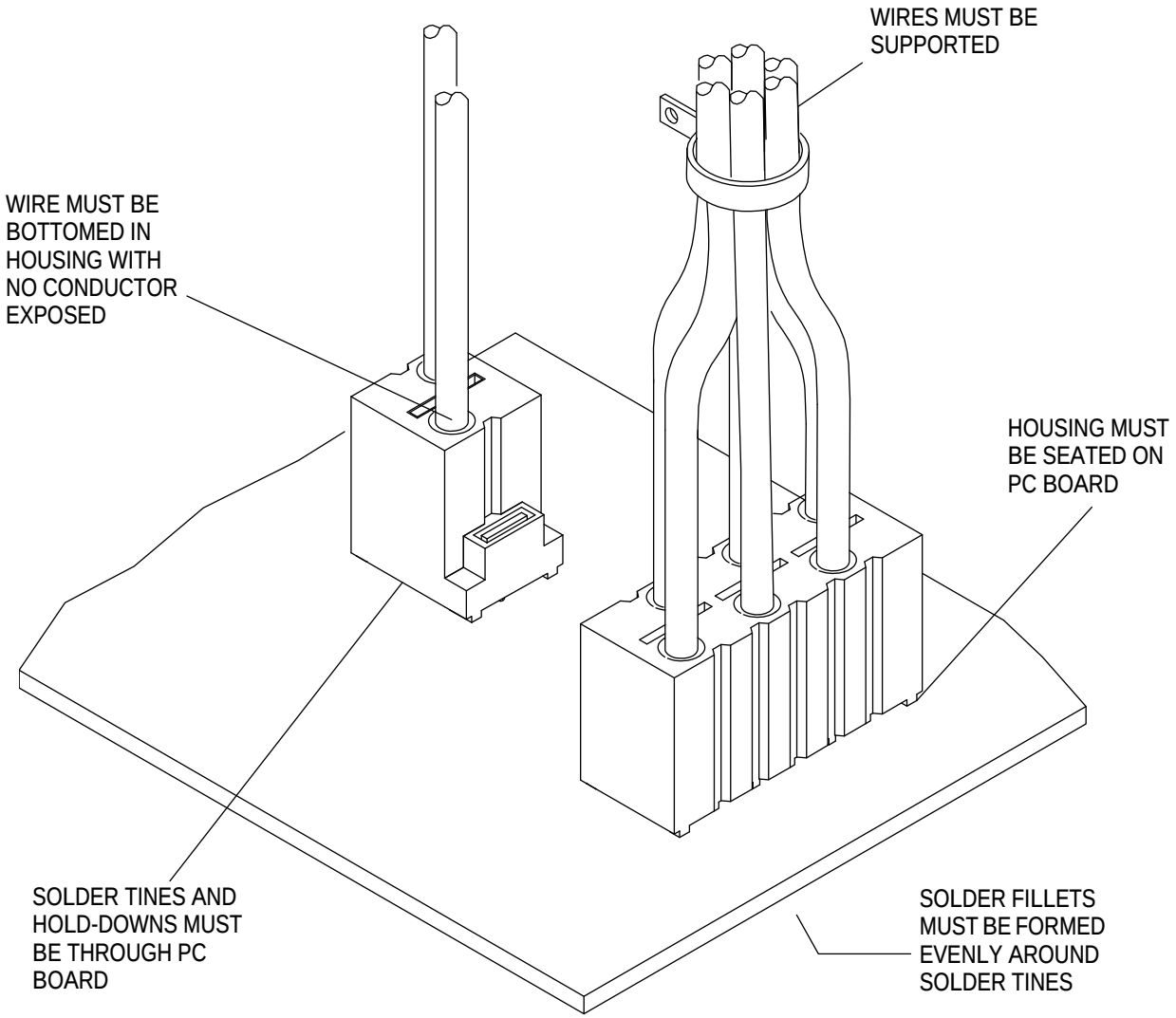


FIGURE 11. VISUAL AID