

**Terminal Block Stacking Connectors**



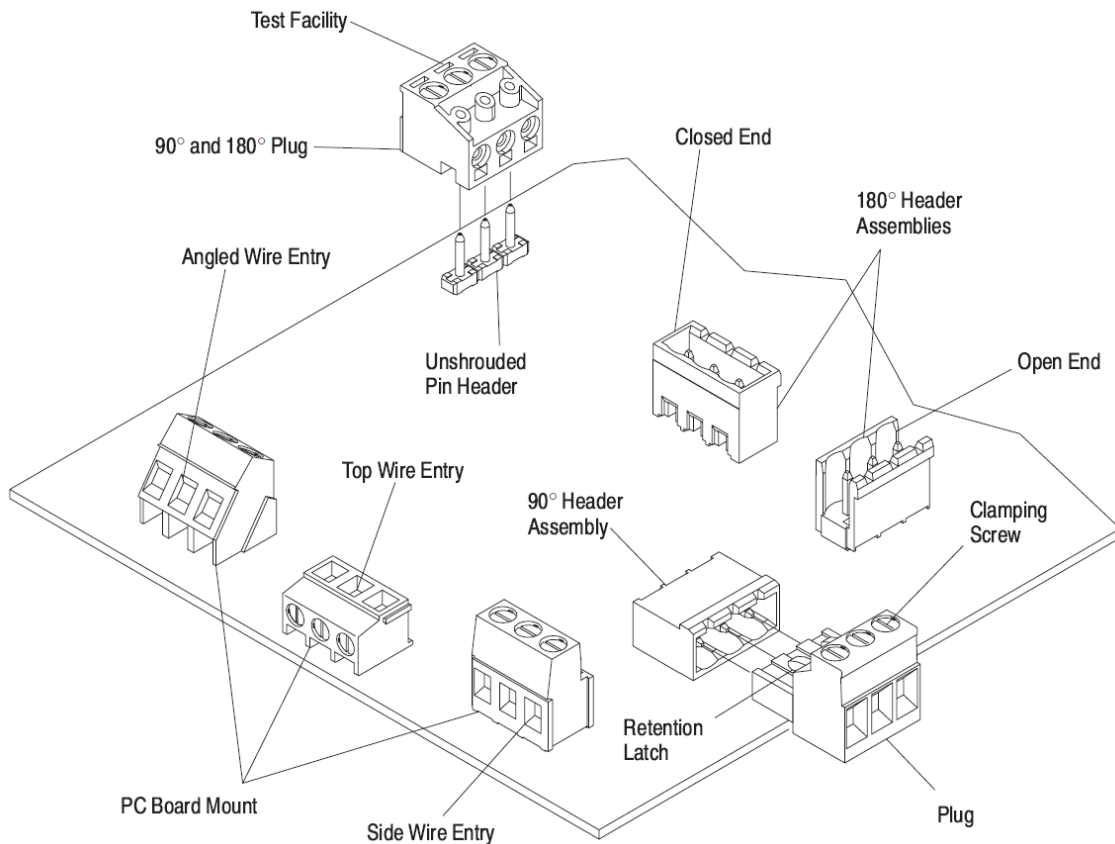
All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  [ $\pm .005$ ] and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale

**1. SCOPE**

This specification covers the requirements for application of Terminal Block Stacking Connectors. The complete line consists of side entry, angled entry, and top entry printed circuit (PC) board terminal blocks (one-piece solution) and plug connectors with mating right-angle or vertical mount PC board headers. PC board headers are offered with either open and closed ends, and in double-row configurations. These terminal blocks feature screw clamp contacts that accept wire sizes 12-30 AWG (solid and stranded). Wire entry is perpendicular to the screws. They are available in configurations of 2.54, 3.50, 3.81, 5.00, 5.08, 7.5, 7.62, 10.00, or 10.16 mm contact centerline spacings.

Side entry wire, angled wire entry and top entry wire PC board mount terminal blocks (only 5.00, 5.08, 7.5- and 7.62 mm pitch), as well as the PC board mating header (only 5.00, 5.08 mm pitch, open-ended, or unshrouded) are stackable end-to-end without loss of centerline. Ease of assembly is facilitated, in most versions, by built-in interlocks on the housing.

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



**Figure 1 (cont'd)**

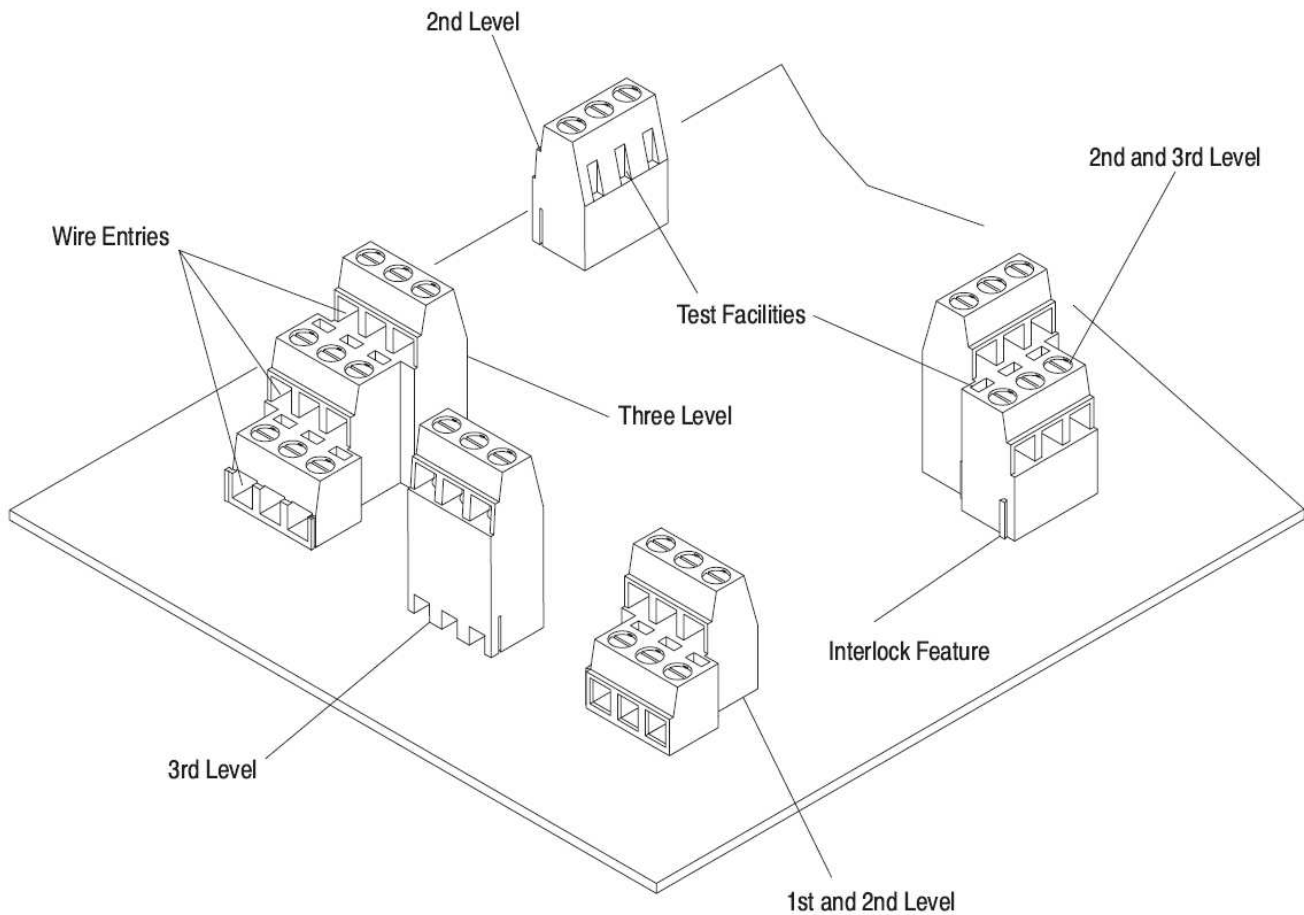


Figure 1 (end)

## 2. REFERENCE DOCUMENTS

### 2.1. Revision Summary

This paragraph is reserved for a revision summary covering the most recent additions and changes made to this specification which include the following:

- Baking and recommended temperature /RH details addition.

### 2.2. Customer Assistance

Reference base number 284093; 282822 and product code 7742; 7743 and 7744 are representative numbers of Terminal Block Stacking Connectors. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product information. Such information can be obtained through a local TE Representative or, after purchase, by calling the Product Information Center number at the bottom of page 1.

### 2.3. Drawings

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. Specifications

- TEC-109-11 - SOLDERABILITY SPECIFICATION PROVIDES TEST PROCEDURES AND SOLDERABILITY EVALUATIONS FOR THESE CONNECTORS.
- 109-202 - COMPONENT HEAT RESISTANCE TO WAVE SOLDERING

### 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 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. Product Materials

Terminal Block Stacking Connectors are made of UL 94V-0 rated PA-66.

### 3.2. Storage

#### A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition of the connector material.

#### B. Shelf Life

The connectors are packaged and shipped in protective anti-static tray or box containers. To prevent damage to these connectors, they should remain in the container until ready for installation. Also, to prevent possible storage contamination, the connectors should be used on a first in, first out basis.

#### C. Chemical Exposure

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

Alkalis	Ammonia	Citrates	Phosphates	Citrates	Sulfur compounds
Amines	Carbonates	Nitrites	Sulfur	Nitrites	Tartrates

#### D. Baking

Generally, baking these connectors is not required; however, if moisture is, or suspected to be present in the connector; baking could be performed prior to soldering. Baking can be performed in a convection oven/thermal chamber at 100°C for 4 hours.

## E. Environment

It is recommended to transport and store connectors in a dark environment having a temperature between  $-5^{\circ}$  and  $40^{\circ}\text{C}$  [ $23^{\circ}$  and  $104^{\circ}\text{F}$ ] and a maximum relative humidity (RH) of 60%. In high-humidity environments, it might be necessary to store the connectors in a dry location to prevent too much moisture absorption.

### 3.3. Polarization

Design configuration prevents plug and receptacle connectors from being mated incorrectly.

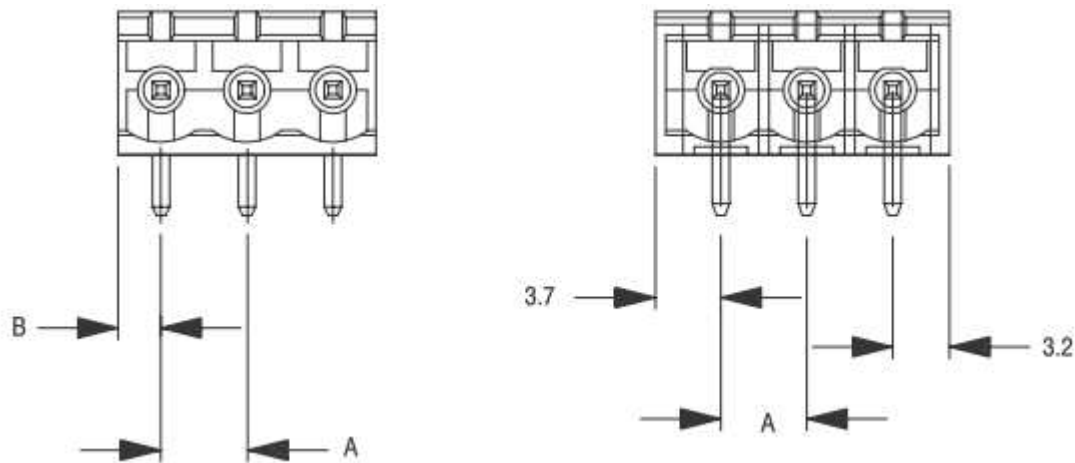
### 3.4. PC Board Layout

#### A. PCB thickness

Use a PC board with a nominal thickness of 1.6 to 2.4 mm. Customer drawings provide a complete definition of PC board layout

#### B. Stacked connectors

PC board mount connectors with 5.00, 5.08, 7.5, and 7.62 mm pitch; or headers with 5.00- and 5.08-mm pitch can be stacked end-to-end without loss of centerline spacing to create the required position size. Ease of assembly is facilitated in most versions by interlocking features. The 5.00- and 5.08-mm pitch open-ended headers are designed for stacking applications. However, those with closed ends are not. See Figure 2



Dimension "A" equals contact centerline spacing (5.00 or 5.08)

Dimension "B" equals 1/2 dimension "A"

Value in parenthesis refers to 5.08 pitch headers

Figure 2

### 3.5. Wire Preparation, and Installation

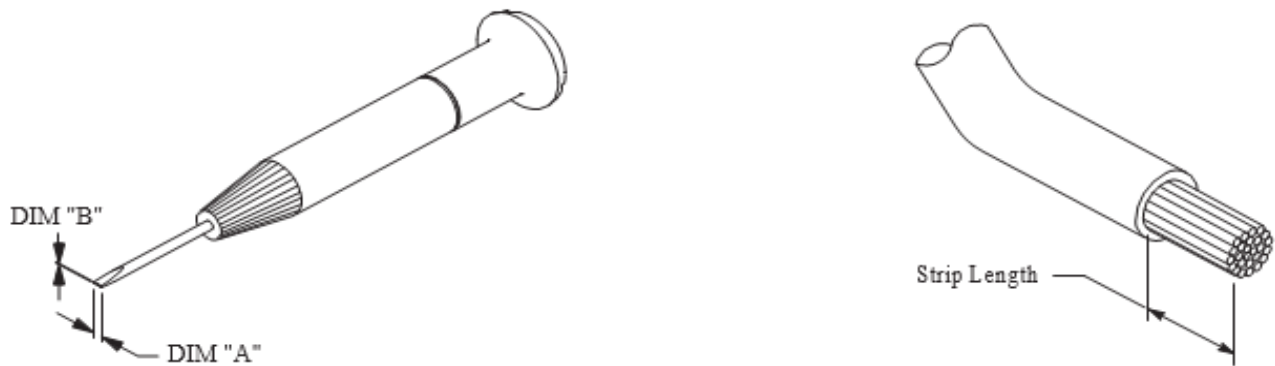
#### A. Strip length

The wire must be stripped to the proper dimension to ensure correct insertion depth in the connector. Excessive conductor will be exposed if the strip length is too long and entrapment of the insulation or improper termination will result if the strip length is too short. Refer respective customer drawing of the connector for recommended strip lengths.

#### B. Installation

Screwdrivers must be used to open and close the screw clamps. The wire must be inserted into the wire hole until the insulation is even, with the housing at the wire hole opening. The screw must be hand tightened with the proper screwdriver to within the recommended torque provided in respective customer drawings of the connectors.

Pull back on the wire to be sure, it is secure and check there are no wire strands outside the terminal block.



DIM "A"	DIM "B"	Remark
1.8	0.3	For terminal blocks/plug with 3.81 mm pitch or below
2.5	0.3	For terminal blocks/plug with 5.00 mm pitch or above

Figure 3

### 3.6. Physical Characteristics

The terminal block connectors consist of specially designed screw-activated mechanisms that are captivated inside the housing. When stripped wire is inserted into the connector and the screw is tightened, the screw activates a clamp which compresses the wire against the terminal. See Figure 4.

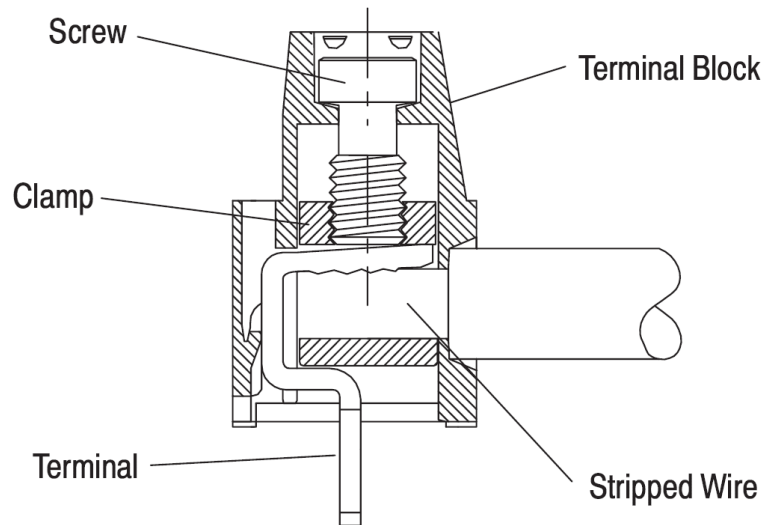


Figure 4

3.7. Soldering



Manual 402-40 provides some guidelines for establishing soldering practices

A. Fluxing

The contact solder tines and if applicable, attaching hardware 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 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	COMERICAL DESIGNATION	
			KESTER ▲	ALPHA ☐☐
Type RMA (Mildly Activated)	Mild	Non-Corrosive. Removal is recommended.	185/197	611
Center (Activated)	Medium	May be Corrosive	1544, 1545, 1547	711, 809, 811

▲ Trademark of MacDonal & Co. ☐☐ Designation of Alpha Metals Inc.

Figure 5

**B. Soldering Guidelines**

Connectors can be soldered using wave or equivalent soldering techniques. Refer to Manual 402–40 for soldering guidelines. The temperatures and exposure time shall be as specified in Figure 6.



*SMT High Temperature Connectors that are compatible with typical surface mount soldering techniques are also available. They can withstand a maximum of 260°C [500° F] for 40 seconds maximum.*

**C. Parameters**

SOLDERING PROCESS	TEMPERATURE*		TIME (At Max. Temp)
	CELSIUS	FAHRENHEIT	
Wave Soldering	265°	509°	10 +2/0 Seconds

\* Wave Temperature (Under PC Board)

**Figure 6**

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

**D. 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 if they are not exposed beyond time specified in 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.



*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*



*If you have a solvent that is not listed, contact PRODUCT INFORMATION at the 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	Solvent		

■ Product of Fry's Metals, Inc. ◆ Product of Petroferm, Inc. ● Product of Union Carbide Corp. ⚡ Product of Litton Systems, Inc.

**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 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.*

**E. Drying**

Air drying of cleaned connectors is recommended after soldering. Temperature for the connectors should not exceed 105° C [221° F]. Degradation of the housings could result from extreme temperatures.

**3.8. Repair/Removal**

Damaged wires can be removed from screw clamp connectors and replaced.

If a post in a header or terminal block is damaged, it cannot be repaired; the connectors should be removed from the PC Board by standard de-soldering methods. Damaged connectors must be replaced.

**4. QUALIFICATIONS**

Terminal block stacking Connectors are Recognized by underwriters Laboratories Inc. (UL) in file number E60677.

**5. TOOLING**

The only tooling required to attach the wire to these connectors is flat-bladed screwdriver. Refer to figure 3 for specific usage.



## 6. VISUAL AID

The illustration below shows typical application of Terminal Block stacking Connectors and calls out the conditions that production personnel should check to ensure a good installation.

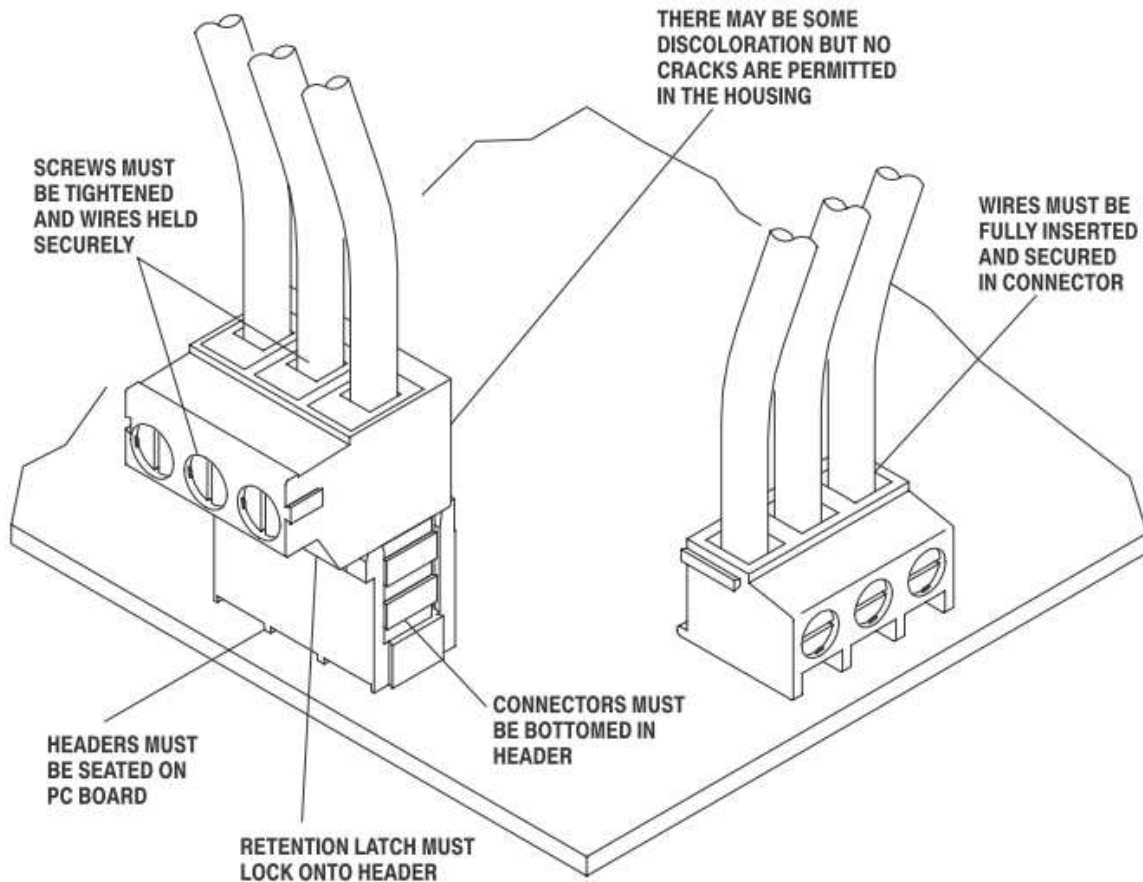


Figure 8 VISUAL AID

## 7. LEGEND

Following are icons used in this document along with their meanings.



### NOTE

*Highlights special or important information*



### CAUTION

*Denotes a condition which may result in product or equipment damage.*



### DANGER

*Denotes an imminent hazard which may result in moderate or severe bodily injury.*