



**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  $\pm 0.13$  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 requirements for application of NECTOR S Line connectors for printed circuit (pc) board applications. The connector is available in an outlet and a plug; both available in vertical configuration and right-angle configuration. The connectors are also available in low-voltage with keying and high-voltage with keying. Keying provides error-free mating and prevents damage to the mating connectors.

Each connector has a housing holding two contacts on 3.7 centerline. The vertical connector features an orientation post for polarization to the pc board and standoffs that support the housing on the pc board. The right-angle connector features a base with boardlocks, which are designed to engage the pc board and help retain the connector onto the pc board. The boardlocks also prevent pressure on the solder joints when mating the connectors. An arrow marked on the housing indicates the connection end of the connector. Interaction of the outlet embossments and plug slots ensures positive mating.

When corresponding with 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.

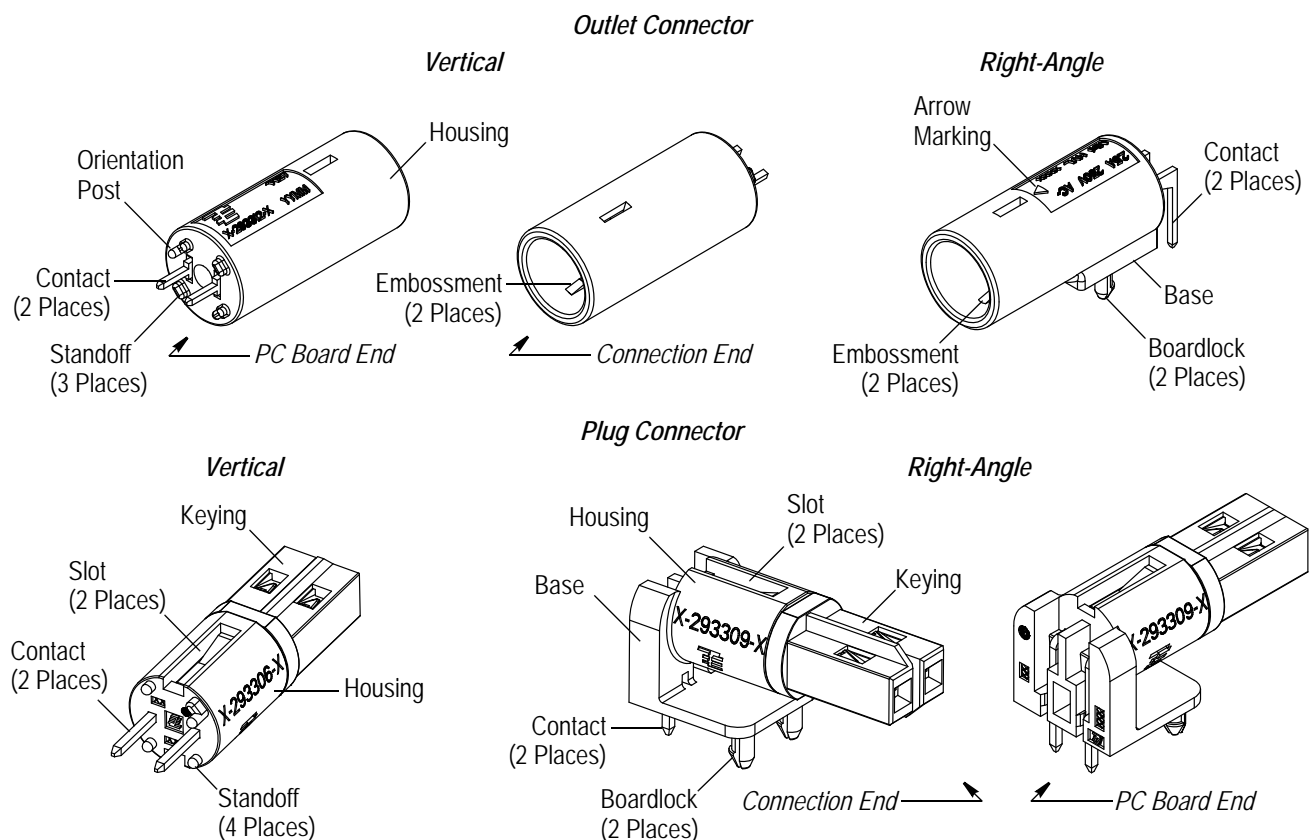


Figure 1

**2. REFERENCE MATERIAL**

**2.1. Revision Summary**

Initial release of application specification

## 2.2. Customer Assistance

Reference Product Base Part Number 293313 and Product Code L764 are representative of NECTOR S Line 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 Representative, by visiting our website at [www.te.com](http://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 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

Product Specification 108-94018 (European version) or 108-20294 (US version) provides product performance and test results.

## 2.6. Instructional Material

Instruction Sheets (408-series) provide product assembly instructions or tooling setup and operation procedures and Customer Manuals (409-series) provide machine setup and operating procedures. There are no documents available that pertain to this product.

## 3. REQUIREMENTS

### 3.1. Material

The connector housing is made of high-temperature rated (UL 94V-0) polybutylene terephthalate (PBT), and the contacts are made of copper alloy with tin over nickel underplate finish.

### 3.2. Safety

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

### 3.3. Limitations

These connectors are designed to operate in a temperature range of -40° to 120°C [-40° to 248°F].

### 3.4. Storage

#### A. Ultraviolet Light

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

#### B. Shelf Life

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

### 3.5. Chemical Exposure

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

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

### 3.6. PC Board

#### A. Material and Thickness

The pc board material shall be glass epoxy (FR-4 or G-10). The pc board thickness range shall be 1.4 through 1.8.



**NOTE**

Contact *PRODUCT INFORMATION* at the number listed at the bottom of page 1 for suitability of other board materials and thicknesses.

#### B. Tolerance

Maximum allowable bow of the pc board shall be 0.03 over the length of the connector.

#### C. Holes and Pads

The pc board holes for the connector contacts must be plated through to specific dimensions to prevent stubbing during placement of the connector on the pc board and to ensure optimum continuity for circuits after soldering. The plating type and thickness must be used as stated to provide unrestricted insertion. See Figure 2.

Boardlock hole dimensions and pad diameters must be designed as stated on the customer drawing for the specific connector.

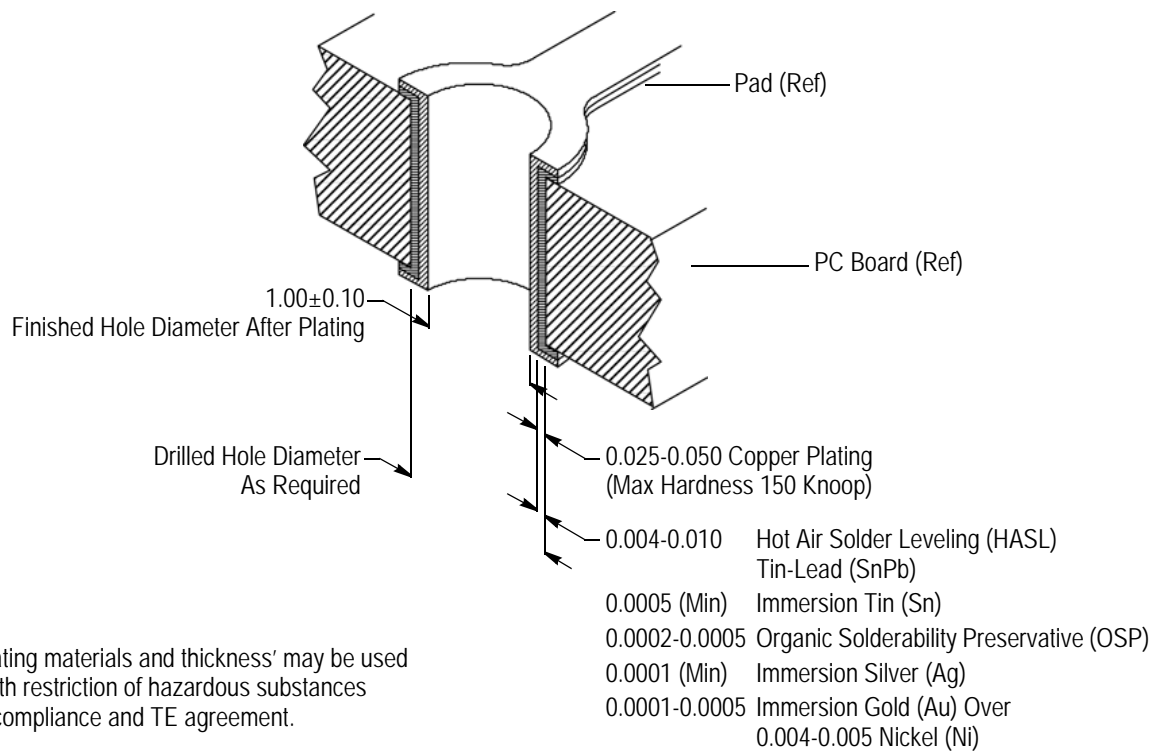


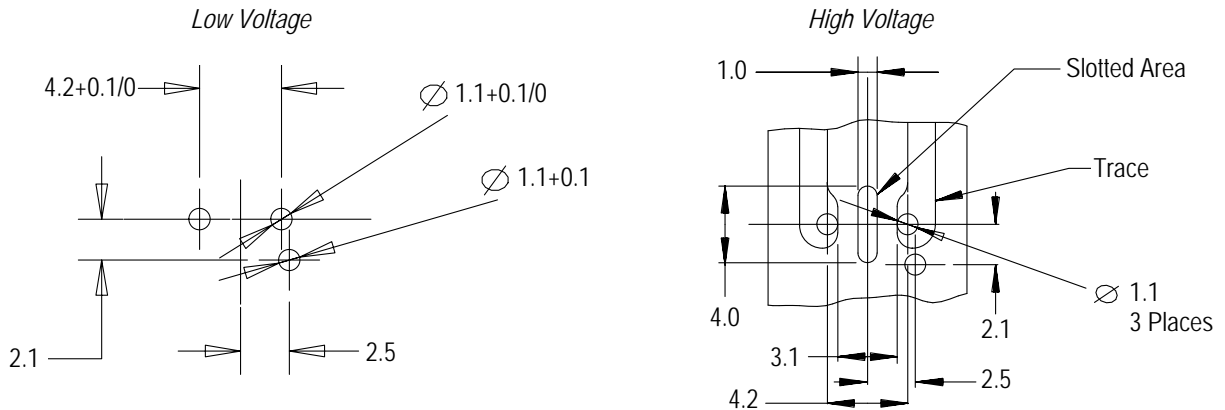
Figure 2

#### D. Layout

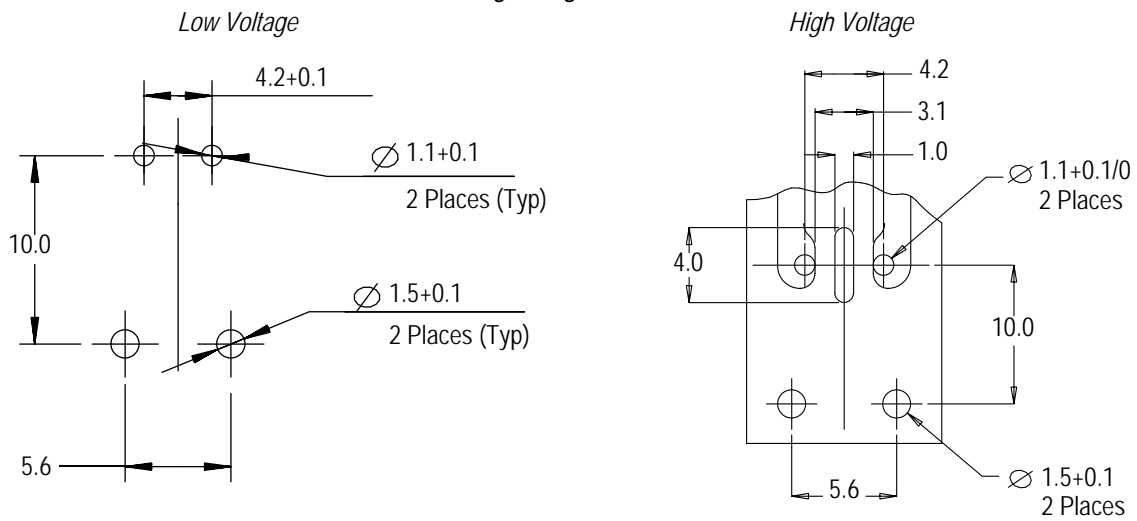
The pc board layout must be designed using the dimensions provided on the customer drawing for the specific connector. Reference samples of the recommended pc board layouts are shown in Figure 3.

Reference Sample PC Board Layouts

Vertical Outlet or Plug



Right-Angle Outlet



Right-Angle Plug

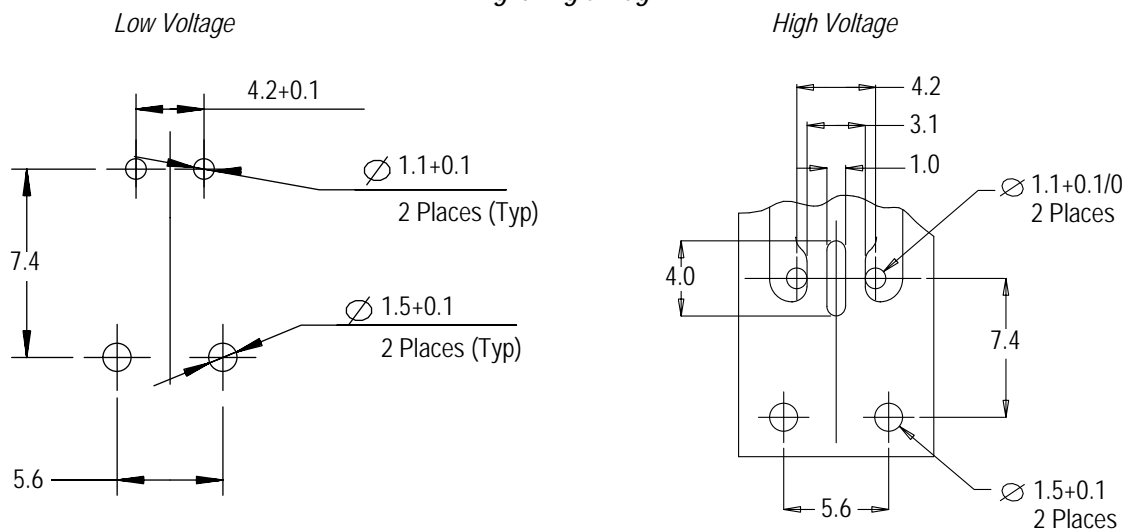


Figure 3

### 3.7. Soldering

Guidelines and procedures must be observed when soldering the connectors. All solder joints should conform to those specified in this application specification. All contacts should be soldered, cleaned, and dried according to the following:

#### A. Process

The connectors can be soldered using wave soldering or equivalent soldering techniques. It is recommended using SN60 or SN62 solder for these connectors. The temperatures and exposure time shall be as specified in Figure 4.

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

Figure 4

#### B. Flux Selection

The connector contacts 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 PRODUCT INFORMATION at the number at the bottom of page 1 for consideration of types of flux.

#### C. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. Cleaners must be free of dissolved flux and other contaminants. Common cleaning solvents with times and temperatures that will not affect these connectors is specified in Figure 5.



**DANGER**

Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the manufacturer's Material Safety Data Sheet (MSDS) for characteristics and handling of cleaners. Trichloroethylene and Methylene Chloride is not recommended because of harmful occupational and environmental effects. Both are carcinogenic (cancer-causing).



**NOTE**

If there is a particular cleaning solvent that is not listed, contact PRODUCT INFORMATION at the number at the bottom of page 1 for advice.

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 5

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

### D. Drying

When drying cleaned connectors and pc boards, temperature limitations must not be exceeded: -30° to 100°C [-22° to 212°F]. Values may vary depending on cleaning equipment (refer to the equipment manufacturer's recommendations). Excessive temperatures may cause housing degradation.

### 3.8. Connector Placement



**CAUTION**

*Connectors should be handled only by the housing to avoid deformation, contamination, or damage to the contacts.*

When placing the connector on the pc board, make sure that the contacts and, if present, boardlocks are aligned with matching holes before placement, then the connector can be gently pressed downward onto the pc board.

For the vertical outlet, the orientation post must align with the orientation hole in the pc board.

### 3.9. Checking Installed Connector

All solder joints should conform to those specified in Workmanship Specification 101-21 and all other requirements specified in this application specification. The installed connector must have solder fillets evenly formed around each contact. The boardlocks, if present, must be through the intended pc board holes. The connector must be seated on the pc board to the dimensions given in Figure 6.

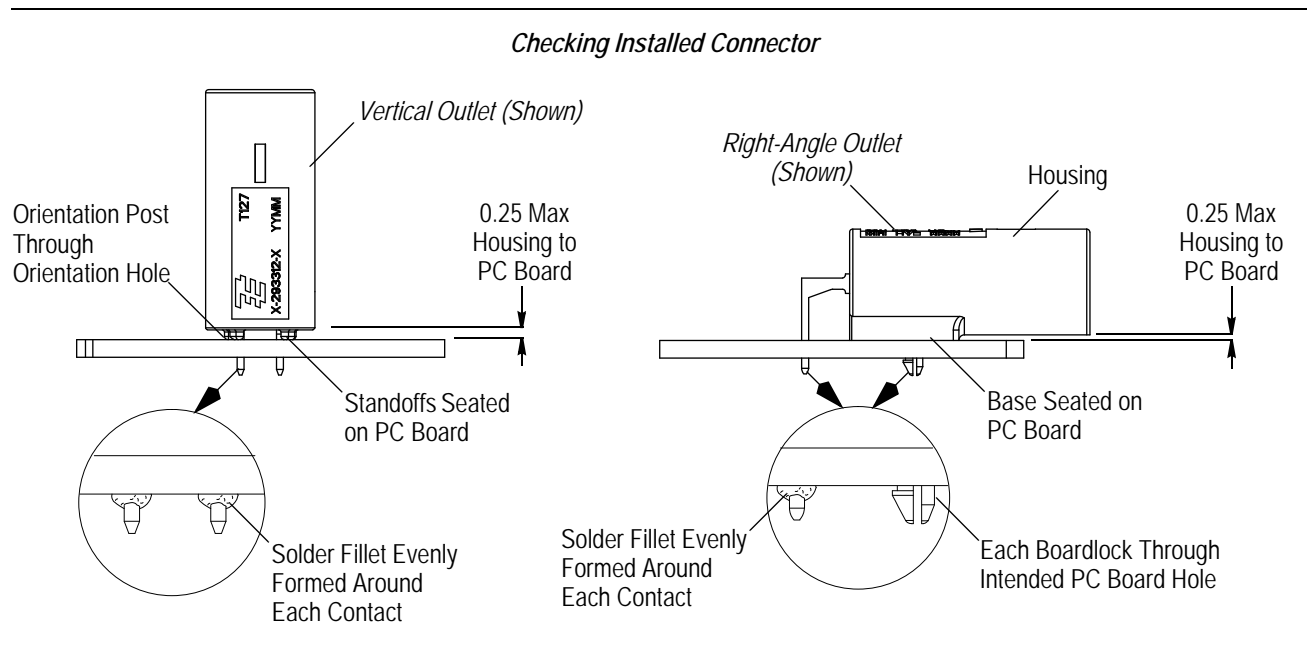


Figure 6

### 3.10. Mating and Unmating

The connectors must be pushed together until the outlet embossments and plug slots engage.

The connectors can be unmated by pulling the connectors straight apart.

### 3.11. Replacement and Repair

Damaged or defective connectors must not be used. The connector can be removed from the pc board using standard de-soldering methods.

## 4. QUALIFICATION

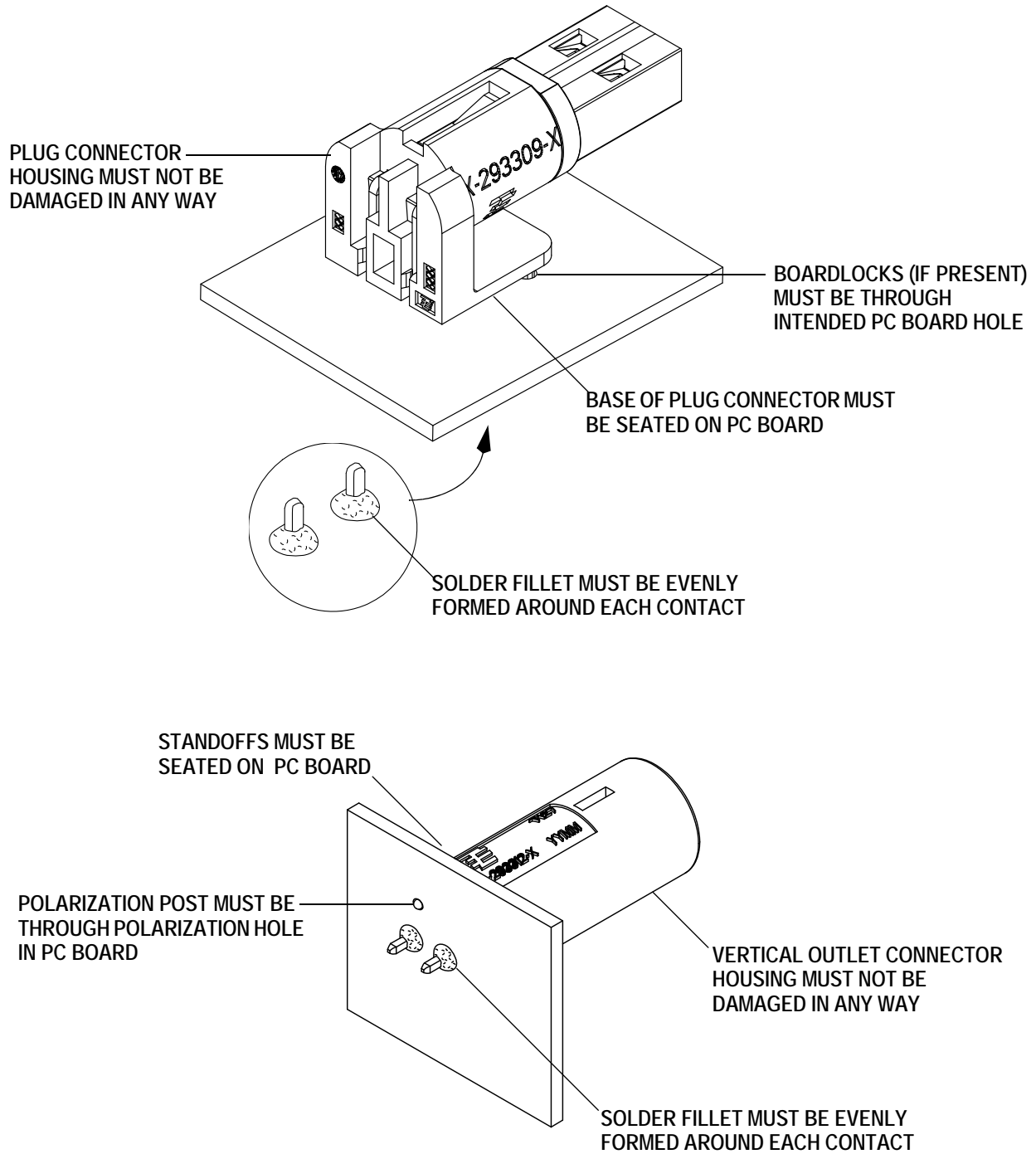
Recognized by Underwriters Laboratories Inc. (UL) in File E28476 and for CSA International.

## 5. TOOLING

These connectors are designed for manual placement on the pc board. No tooling is required.

## 6. VISUAL AID

The illustration below shows a typical application of NECTOR S Line connectors. 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 7. VISUAL AID**