

### NOTE



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. INTRODUCTION

This specification covers the requirements for application of Miniature Spring Sockets on polyester strip. These requirements are applicable to hand application tooling. The spring sockets are available in either a bullet nose or flat bottom version. See Figure 1.

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

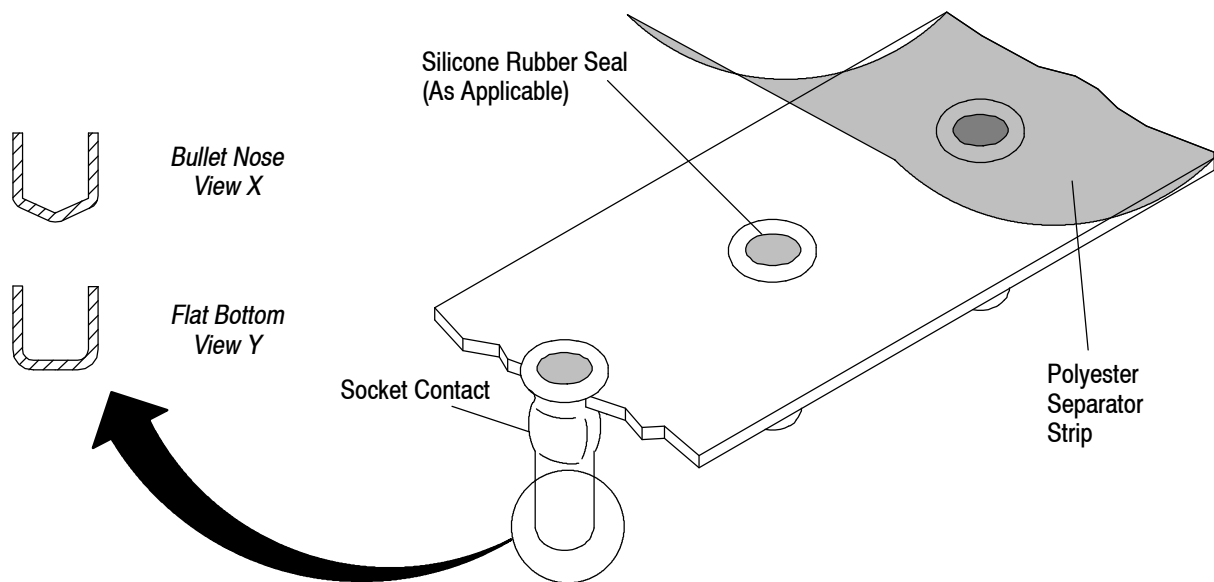


Figure 1

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

- Updated document to corporate requirements, new logo and format
- Deleted obsolete documents and tooling in Paragraph 2.5 and Section 5, TOOLING

### 2.2. Customer Assistance

Reference Base Part Number 645955 and Product Code 3084 are representative numbers of Miniature Spring Closed Bottom Socket Contacts. Use of these numbers will identify the product line and expedite your inquiries through a service network established to help you obtain product and tooling information. Such information can be obtained through a local Tyco Electronics Representative or, after purchase, by calling the Tooling Assistance Center or Product Information number at the bottom of this page.

### 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 other technical documentation supplied by Tyco Electronics.

## 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. Instructional Material

The following list includes available instruction sheets (408-series) that provide assembly procedures for operation, maintenance and repair of tooling; and customer manuals (409-series) that provide setup, operation, and maintenance of machines.

<u>Document Number</u>	<u>Document Title</u>
408-3295	Preparing Reel of Contacts for Application Tooling
408-9816	Handling of Reeled Products
409-5851	Pneumatic Hand Tools 354700-[ ] for Miniature Spring Sockets
409-5888	MIS Mylar Strip Miniature Spring Socket Insertion Head
409-5893	Modular Insertion System (MIS) Bench Machine 662820-[ ]

## 2.6. Specifications

Product Specification 108-14008 provides information about performance, test results, and quality requirements for the miniature spring sockets.

## 3. REQUIREMENTS

### 3.1. Safety

Do not stack socket contact packages so high that the shipping containers buckle or deform.

### 3.2. Material

The eyelet is made of copper; the spring is made of beryllium-copper; and the sealant is made of silicone rubber. The socket contacts are available in tin or gold plate.

### 3.3. Storage

#### A. Shelf Life

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

#### B. Chemical Exposure

Do not store sockets 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

### 3.4. PC Board Requirements

#### A. Material and Thickness

The pc board material must be glass epoxy (FR-4 or G-10). The pc board thickness shall be 0.79-3.18 mm [.031-.125 in.] thick.

#### NOTE



Contact the Product Information Center at the number listed at the bottom of page 1 for suitability of other board materials and thicknesses.

#### B. Hole Dimensions

The pc board may be single-sided or double-sided, with or without plated-thru holes. See Figure 2.

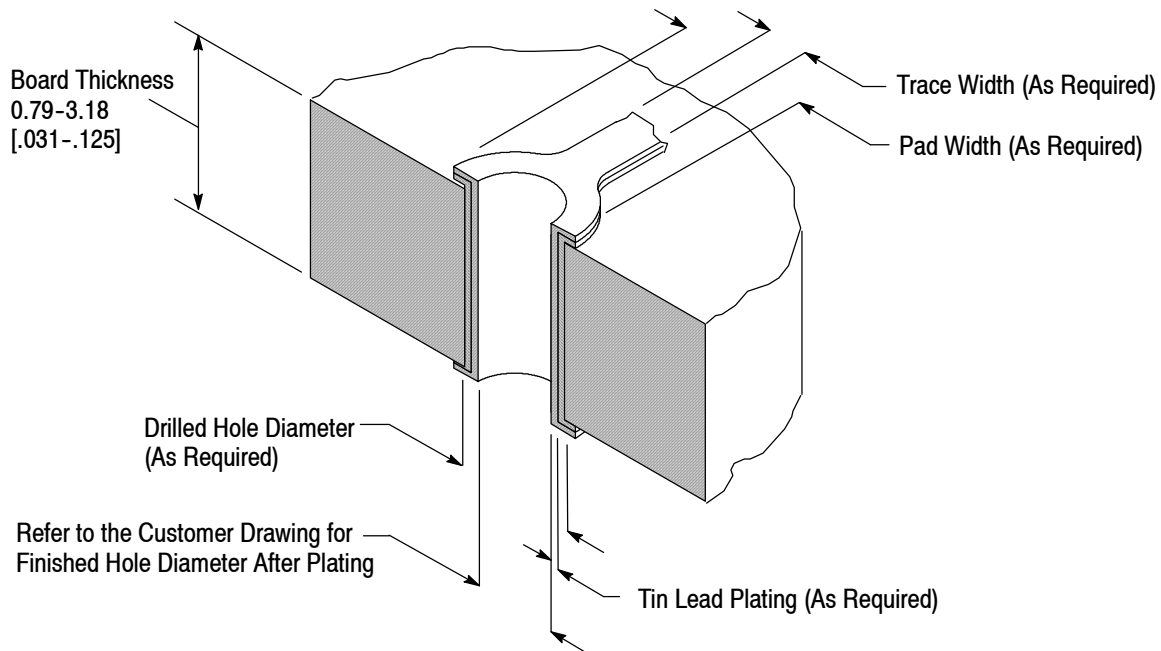


Figure 2

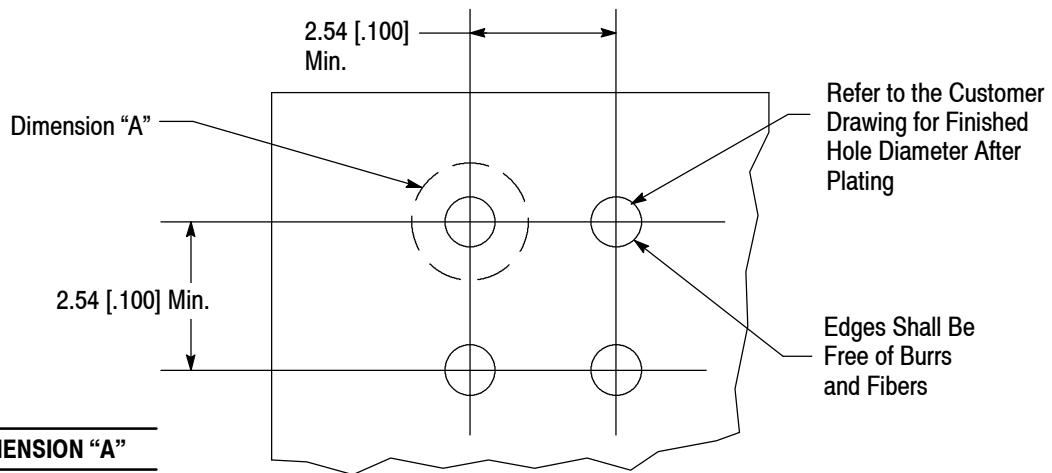
**C. Layout** (Figure 3)

For components other than Miniature Spring Closed Bottom Socket Contacts mounted on the pc board, the clearance envelope for application tooling shall be Dimension "A" (see Figure 3) minimum diameter on the head side of the pc board and 2.90 mm [.114 in.] minimum diameter on the other side. If a footprint is needed for inserting miniature spring sockets beside other components, refer to Tyco Electronics Drawing No. 818000.

For plated through holes, tin or tin-lead plating shall not exceed 0.03 mm [.001 in.] to ensure minimum retention.

**NOTE**

The pc board should be supported around the hole when inserting sockets.



SERIES	DIMENSION "A"
1 and 2	8.38 [.330]
3 and 4	8.79 [.346]
5	9.19 [.362]

Figure 3

### 3.5. Insertion

Using the recommended tooling and related documentation provided in Section 5, TOOLING, insert the socket contacts into the pc board.

**NOTE**

The socket contacts shall withstand a 2.22 N [0.5 lb] minimum retention force prior to soldering.



The sockets shall meet the requirements specified in Figure 4 after insertion.

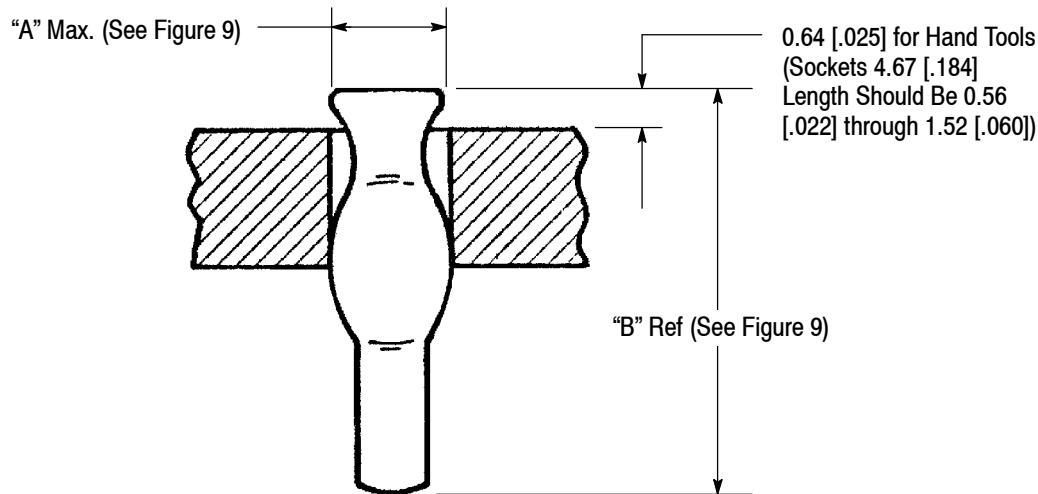


Figure 4

### 3.6. Soldering Socket Contacts

The Miniature Spring Closed Bottom Socket Contacts can be soldered with wave, vapor phase, or infrared reflow processes, provided the temperatures and exposure time are within the ranges specified in Figure 5. Tyco Electronics recommends the use of SN60 or SN62 solder for the socket contacts. Refer to Paragraph 2.4 for instructional material that is available for establishing soldering guidelines.

SOLDERING PROCESS	TEMPERATURE		TIME (At Max Temperature)
	CELSIUS	FAHRENHEIT	
Wave Soldering	265°●	509°●	12 Seconds
Vapor Phase Soldering	260°	500°	3 Minutes
Infrared Reflow Soldering	260°	500°	3 Minutes

● Wave Temperature

Figure 5

#### A. Flux Selection

The socket contact 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 the Product Information phone number at the bottom of page 1 for consideration of other types of flux. Some fluxes that are compatible with these contacts are provided in Figure 6.

FLUX TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			KESTER	ALPHA
Type RMA (Mildly Activated)	Mild	Noncorrosive	186	611

Figure 6

**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. The following is a listing of common cleaning solvents that will not affect the contacts for the time and temperature specified. See Figure 7.

**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 can be used with no harmful affect to the contacts; however Tyco Electronics 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.

**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)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
ALPHA 2110	Aqueous	1	132	270
BIOACT EC-7	Solvent	5	100	212
Butyl CARBITOL	Solvent	1	Room Ambient	
Isopropyl Alcohol	Solvent	5	100	212
KESTER 5778	Aqueous	5	100	212
KESTER 5779	Aqueous	5	100	212
LONCOTERGE 520	Aqueous	5	100	212
LONCOTERGE 530	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

Figure 7

**C. Drying**

When drying cleaned socket contacts, make certain that temperature limitations are not exceeded: -65° to 125°C [-85° to 257°F]. Excessive temperatures may cause degradation.

**3.7. Checking Installed Socket Contact**

All solder joints should conform to those specified in Workmanship Specification 101-21. The socket contact must seat on the pc board to within the tolerance shown in Figure 8. There shall be no deformation of the socket contact during the insertion operation that will affect the performance.

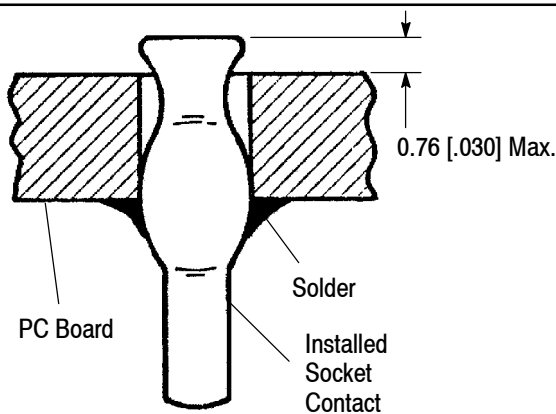


Figure 8

**3.8. Repair/Replacement**

Socket contacts are not repairable if damaged. Damaged socket contacts must be removed and replaced. The socket contact can be removed from the pc board by standard de-soldering methods.

#### 4. QUALIFICATIONS

Miniature Spring Socket on Polyester Strips are not required to be agency approved.

#### 5. TOOLING

Tyco Electronics has existing tooling for applying these socket contacts. Part numbers of available tooling and the applicable instructional material is provided in Figure 9.

- **Pneumatic Tooling** – The MSS Pneumatic Hand Tool 354700-[ ] is designed to individually seat the socket contact after it has been inserted into hole on the pc board. The tip of the pneumatic hand tool is inserted into the socket and the impact button is depressed. The socket is accurately seated into the pc board hole. Refer to Customer Manual 409-5851.
- **Power Units** – Power units are automatic or semi-automatic machines used to assist in the application of a product. A power unit supplies the force to seat the connector onto the pc board using the insertion heads.
- **Support Fixture** – A customer supplied support fixture should be used in conjunction with the application of the Miniature Spring Closed Bottom Socket Contacts.

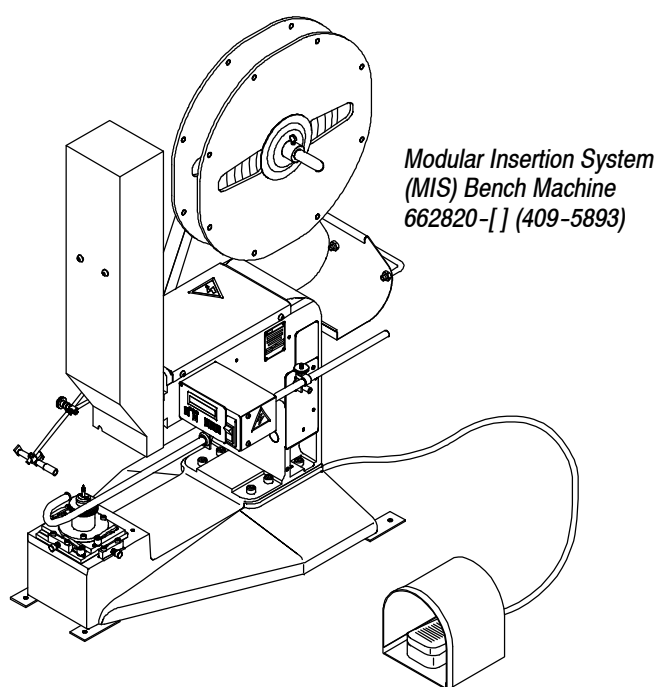
MINIATURE SPRING SOCKET●				TOOLING (DOCUMENT)		
TYPE BOTTOM	SERIES NO.■	HEAD DIAMETER “A” MAX.	LENGTH “B” ±0.20 [.008]	HAND INSERTION TOOL▼ (409-5851)	INSERTION HEAD (409-5888)	BENCH MACHINE (409-5893)
Flat	1	1.50 [.059]	3.30 [.130]	354700-1	904581-1	662820-4
			3.61 [.142]			
			4.27 [.168]			
	2	1.78 [.070]	3.50 [.138]	354700-2	904582-1	
			6.60 [.260]			
	3	2.03 [.080]	3.50 [.138]	354700-3	904583-1	
			6.53 [.257]			
Bullet Nose	1	1.68 [.066]	4.07 [.158]	354700-1	904581-1	
			4.67 [.184]			
	2	1.78 [.070]	4.27 [.168]	354700-2	904582-1	
		1.91 [.075]	4.01 [.158]			
			4.67 [.184]			
	3	2.03 [.080]	7.37 [.290]	354700-3	904583-1	
	4	2.24 [.088]	6.60 [.260]	354700-4	904584-1	
	5	3.05 [.120]	7.82 [.308]	354700-5	904585-1	

●Other socket contacts and pin sizes with related tooling may be available. Contact the Product Information or Tooling Assistance Center numbers at the bottom of page 1 for specific inquiries.

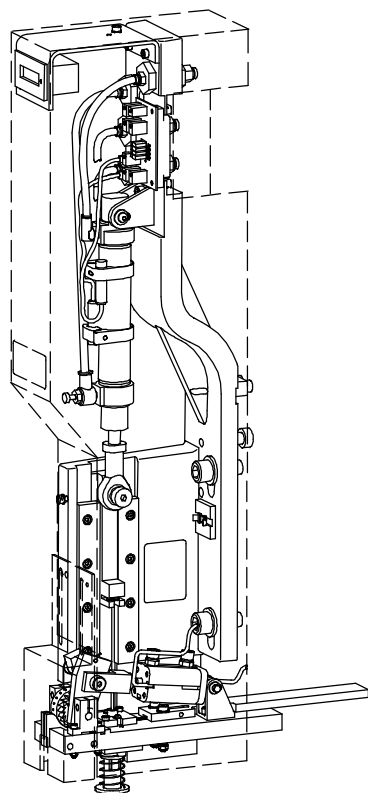
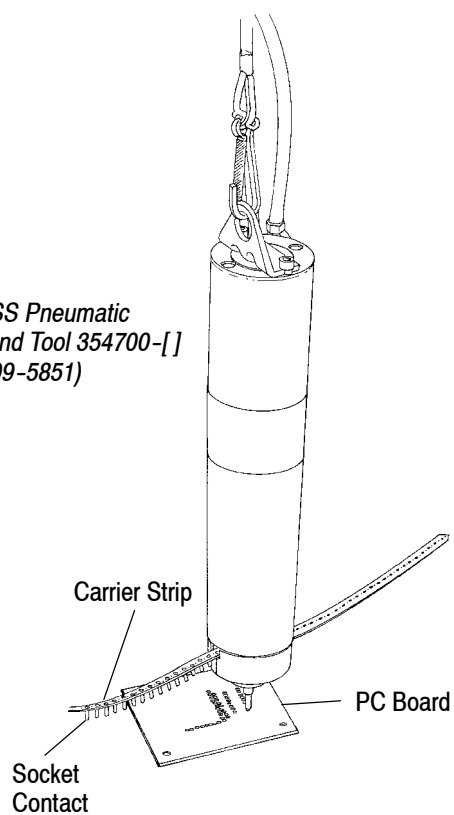
■For the recommended pc board hole size, refer to the applicable customer drawing.

▼Inserted height is not adjustable with the hand tools. For special applications, contact the Tooling Assistance Center number at the bottom of page 1.

Figure 9 (cont'd)



MSS Pneumatic  
Hand Tool 354700-[]  
(409-5851)



MIS Mylar Strip Miniature  
Spring Socket Insertion  
Head (409-5888)

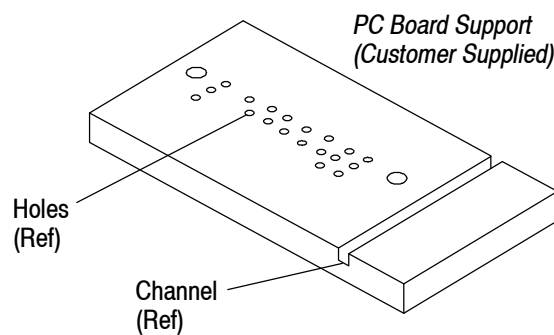
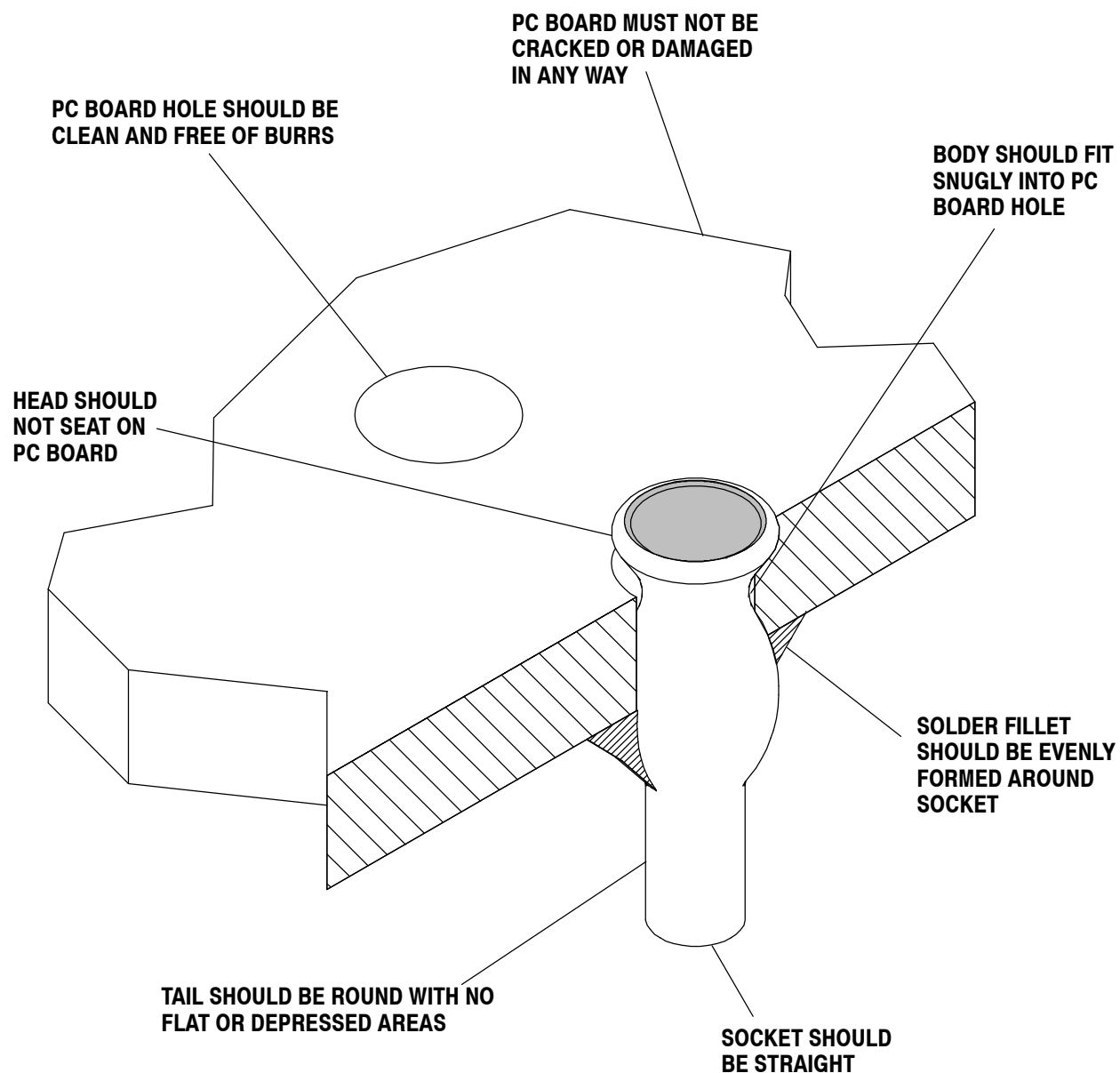


Figure 9 (end)

## 6. VISUAL AID

Figure 10 shows a typical application of a Miniature Spring Closed Bottom Socket Contact. 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.



**FIGURE 10. VISUAL AID**