

**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 SFP Ganged Press-Fit PT Connector and Cage Assembly to interconnect fiber optic or copper transceiver modules to printed circuit (pc) boards. The connector with cage assembly is one unit available in a  $1 \times 4$  and  $1 \times 6$  configuration. The connector and the cage assembly are also available separately for rework purposes.

The connector consists of a housing with a 20-position receptacle port and compliant pin contacts on 0.8 centerline spacing. The housing features alignment posts that provide stability for placement on the pc board. Each receptacle port has a card entry slot that accepts a  $1.0 \pm 0.1$  thick integrated circuit card housed in the mating module.

The cage assembly is a frame with compliant pin contacts for mechanical retention to the pc board and to provide electromagnetic interference (EMI) suppression, thermal vent holes, and panel ground springs. The cage assembly features a locking latch and a kick-out spring for each mating module. The locking latch holds the module in place, and the kick-out spring releases the module for removal. A dust cover (for each port) is used when the module is not mated to the cage assembly to prevent contaminants from entering the chassis. The cage assembly is designed to be inserted into a bezel after being seated onto the pc board.

When corresponding with Tyco Electronics 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.

**Connector With Cage Assembly**

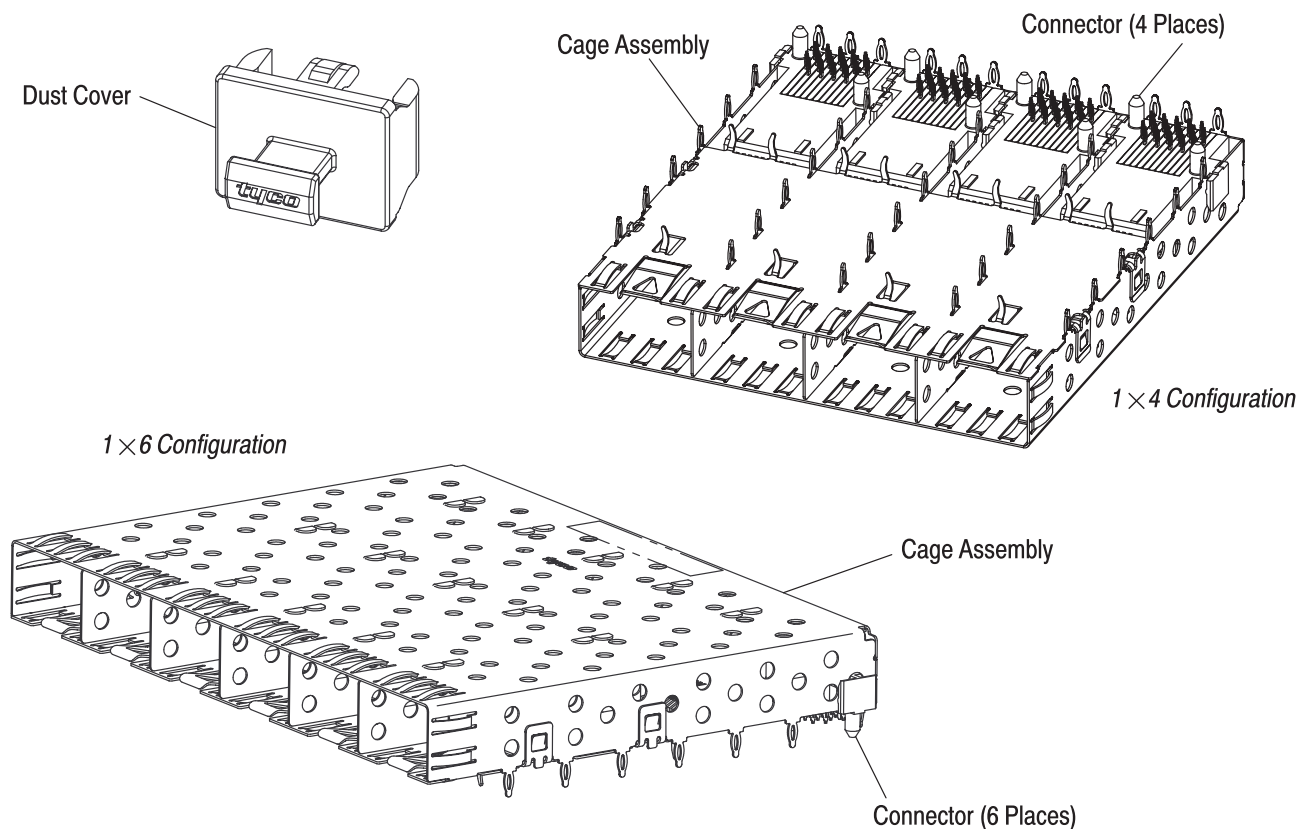


Figure 1 (cont'd)

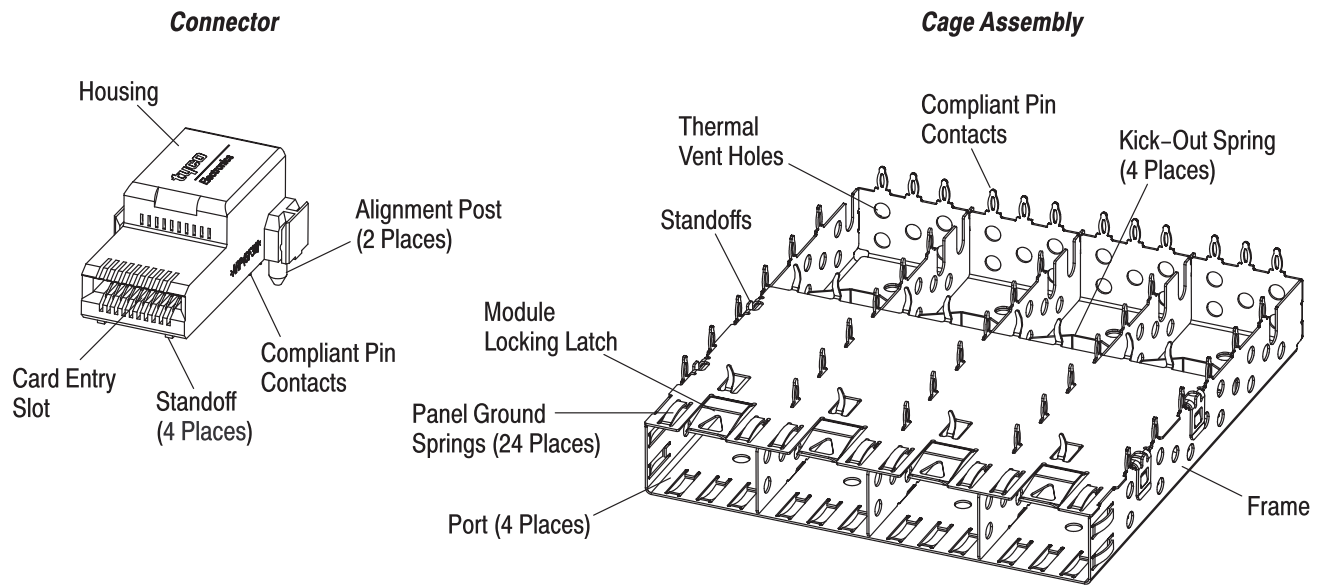


Figure 1 (end)

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

- Updated document to corporate requirements
- Added new text to Section 1, INTRODUCTION, Paragraph 3.6.D, and Section 4, QUALIFICATION
- Added new or changed artwork to Figures 1 and 3
- Deleted information in Paragraph 2.5
- Changed dimensions in Figures 4 and 6
- Added new tables to Figures 4 and 7

### 2.2. Customer Assistance

Reference Product Base Part Number 1658706 and Product Code K221 are representative numbers of the SFP Ganged Press-Fit PT Connector and Cage Assembly. 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 PRODUCT INFORMATION at the number at the bottom of page 1.

### 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. Specifications

Product Specification 108-2161 provides product performance and test information for the SFP Ganged Press-Fit PT Connector and Cage Assembly.

### 2.5. Instructional Material

Instruction Sheets (408-series) provide product assembly instructions or tooling setup and operation procedures. Documents available which pertain to this product are:

<u>Document Number</u>	<u>Document Title</u>
408-8848	SFP PT Connector and Cage Assembly Seating Tool Kits
408-8849	SFP Cage Assembly Extraction Tools
408-8850	SFP PT Connector Extraction Tool 1725480-2

**3. REQUIREMENTS**

**3.1. Safety**

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

**3.2. Limitations**

The connectors are designed to operate in a temperature range of  $-55^{\circ}$  to  $105^{\circ}\text{C}$  [ $-67^{\circ}$  to  $221^{\circ}\text{F}$ ].

The bezel requirements given in this document are specifically configured for products used in the communications industry. It is strongly recommended that this bezel configuration NOT be used for peripheral component interconnect (PCI) applications.

**3.3. Material**

The connector housing is made of molded liquid crystal polymer (LCP), UL 94-V-0. The chicklets (part that holds the compliant pin contacts) are made of molded thermoplastic, UL 94-V-0. The connector compliant pin contacts are made of copper alloy underplated with nickel; plated with tin at the leads and plated with gold at the interface area. The cage assembly is made of copper alloy plated with tin. The dust cover is made of thermoplastic.

**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 connector and cage assembly should remain in the shipping container until ready for use to prevent deformation to the compliant pin contacts. The connector and cage assembly 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 the connector and cage assembly near any chemical listed below as they may cause stress corrosion cracking in the compliant pin 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 minimum pc board thickness shall be 1.5.

**B. Tolerance**

Maximum allowable bow of the pc board shall be 0.08 over the length of the connector and cage assembly.

**C. Hole Dimensions**

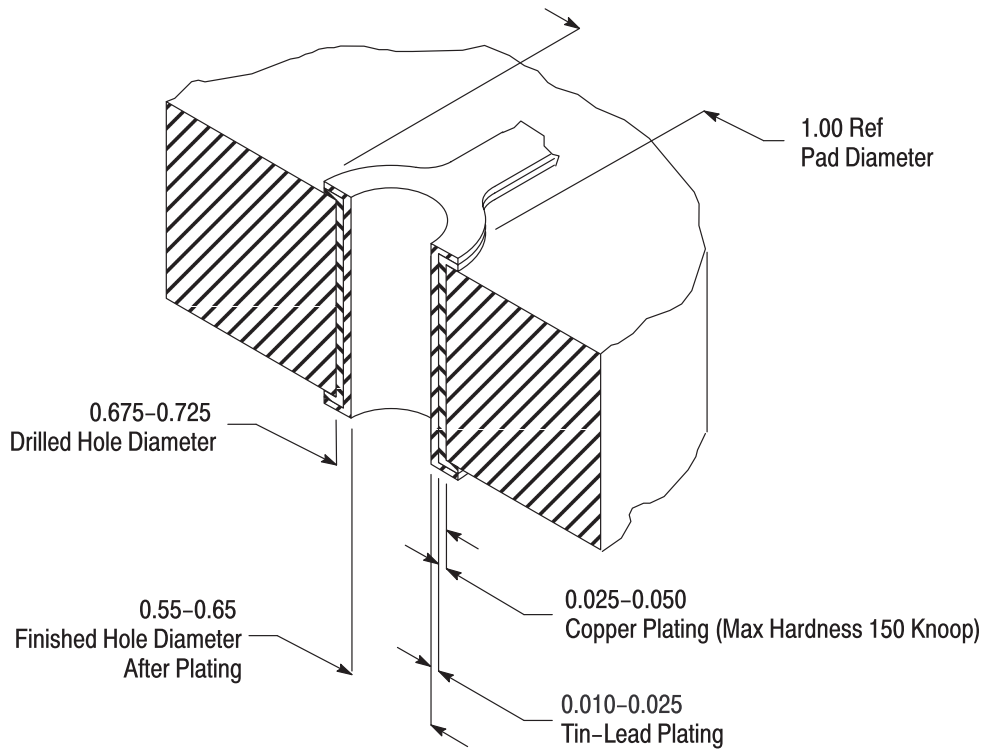
The holes for the connector and cage assembly compliant pin contacts must be drilled and plated through to dimensions specified in Figure 2.

Finished hole diameters for alignment posts are given in Figure 3.

**D. Layout**

The holes for the connector and cage assembly must be precisely located to ensure proper placement and optimum performance of the connector and cage assembly. A sample layout is provided in Figure 3.

**Recommended Hole Dimensions  
For Connector Compliant Pin Contacts**



**Recommended Hole Dimensions  
For Cage Assembly Compliant Pin Contacts**

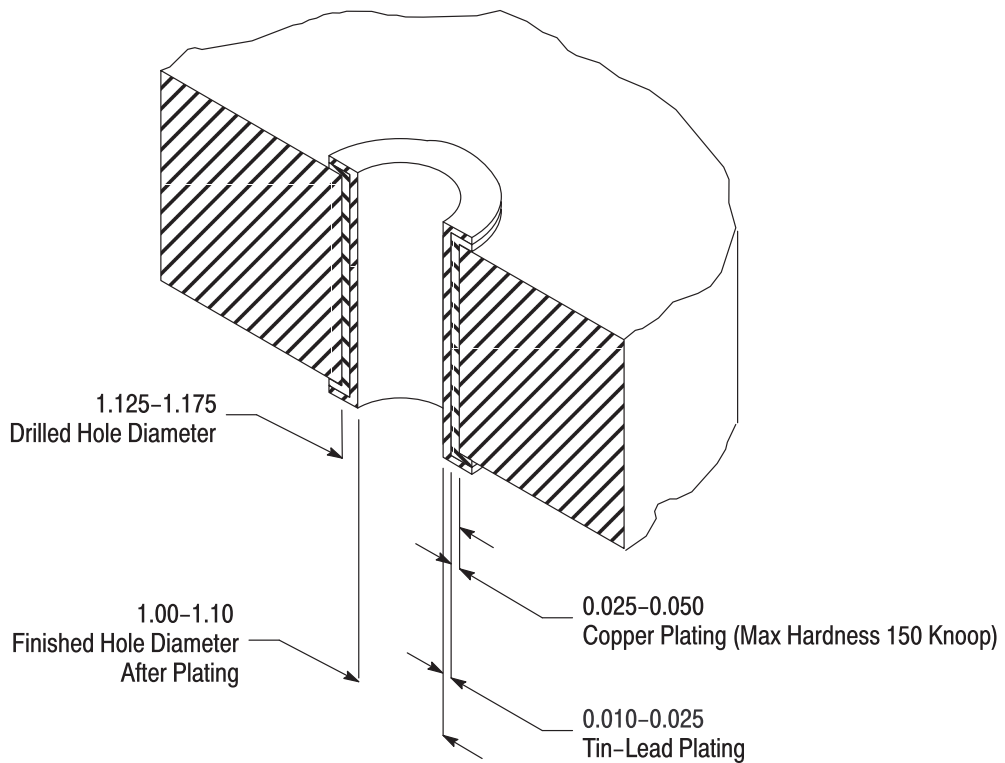
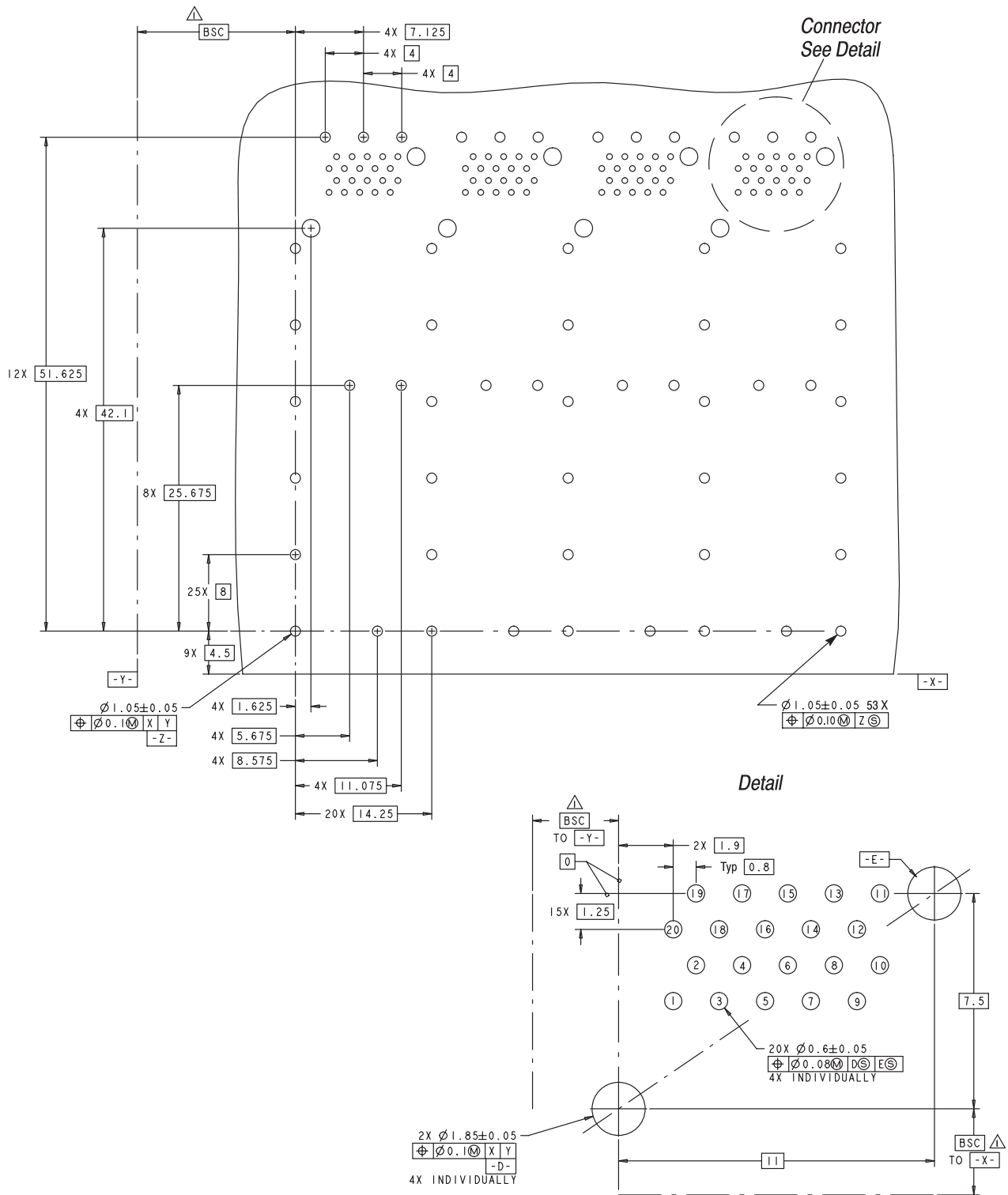


Figure 2

**Recommended PC Board Layout  
For Connector and Cage Assembly  
(1 X 4 Configuration)**



△ Datum and Basic Dimension Determined by Customer

Figure 3

### 3.7. Transceiver Modules

**CAUTION** The mating transceiver module packing size cannot exceed the width of each cage port opening. This includes the part of the transceiver that is extending outside the cage. Since the port-to-port spacing has a 14.25 mm centerline, the widest transceiver width extending outside of the cage should be less than 14 mm. This will prevent any possible interference when transceivers are inserted in adjacent ports.

### 3.8. Bezel

**CAUTION** It is strongly recommended that this bezel configuration NOT be used in PCI applications. The following requirements were intended to be used in the communications industry only.

#### A. Thickness

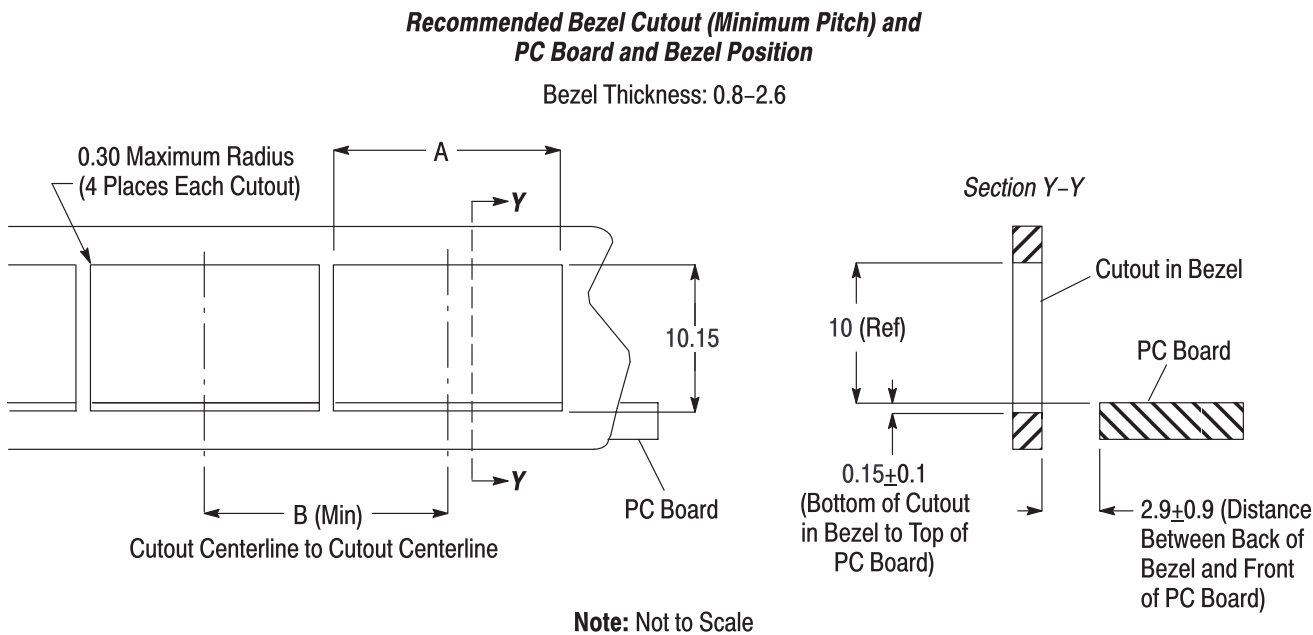
The bezel thickness range shall be 0.8 through 2.6.

#### B. Cutout

The bezel must provide a cutout that allows proper mounting of the connector and cage assembly. The cage assembly panel ground springs must be compressed by the bezel in order to provide an electrical ground between the connector and cage assembly and bezel for EMI suppression. Care must be used to avoid interference between adjacent connector and cage assemblies and other components. The minimum allowable distance between connector and cage assemblies must be considered to ensure proper assembly. Dimensions for bezel cutout and minimum allowable distance between cutouts are shown in Figure 4.

### 3.9. PC Board and Bezel Position

The bezel and pc board must be positioned in relation to each other to avoid interference with the function of the cage assembly module locking latch and to ensure proper function of the panel ground springs. This relationship must conform to the dimensions stated in Figure 4.



CONNECTOR AND CAGE ASSEMBLY		DIMENSION ( $\pm 0.1$ )	
TYPE	CONFIGURATION	A	B (Min)
Ganged	1 X 4	58	16.5
	1 X 6	86.5	87.75

Figure 4

### 3.10. Placement

The following requirements also apply to connectors and cage assemblies used for rework purposes.

**CAUTION** Connectors should be handled only by the housing and cage assemblies only by the frame to avoid deformation, contamination, or damage to the compliant pin contacts.

**A. Registration**

The compliant pin contacts and alignment posts must be aligned with matching holes in the pc board, then inserted into the pc board simultaneously to prevent twisting or bending of the compliant pin contacts.

**B. Seating**

Using proper seating force and seating height is essential to interconnection performance. The force used to seat the connector and cage assembly must be applied evenly to prevent deformation or other damage to the compliant pin contacts. The force required to seat the connector and cage assembly onto the pc board can be calculated by:

$$\text{Amount of Compliant Pin Contacts} \times 44.5 \text{ N [10 lbs]} (\text{Force per Compliant Pin Contact}) = \text{Seating Force}$$

**CAUTION** Over-driving of the connector and cage assembly will deform parts critical to the quality of the connection. Maximum force should occur prior to the connector and cage assembly bottoming on the pc board.

The shut height of the application tool must be specifically set for proper seating of the connector and cage assembly. The shut height can be calculated by:

$$\text{Seating Height (Connector and Cage Assembly Seated)} + \text{Height of Seating Tool} + \text{Combined Thicknesses of PC Board and PC Board Support Fixture} = \text{Shut Height (Ram Down)}$$

The seating height, measured from the top of the cage assembly (not including the panel ground springs) to the top of the pc board, is given in Figure 5.

The connector and cage assembly must be seated on the pc board not exceeding the dimensions shown in Figure 5.

**NOTE** The shut height might have to be adjusted to obtain the 0.10 maximum gap between the standoffs of the cage assembly and the pc board.

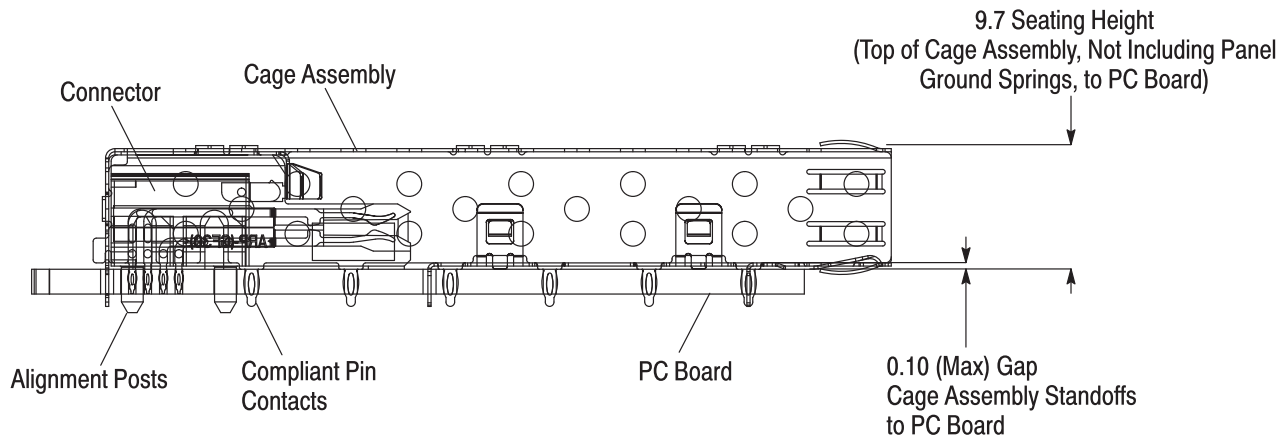


Figure 5

**3.11. Checking Assembly**

After assembly, the cage assembly panel ground springs must be compressed by the bezel. A slight bow in the cage assembly is permitted. The bezel must not interfere with the function of the module locking latch. The bezel and pc board must be positioned according to the dimensions shown in Figure 6.

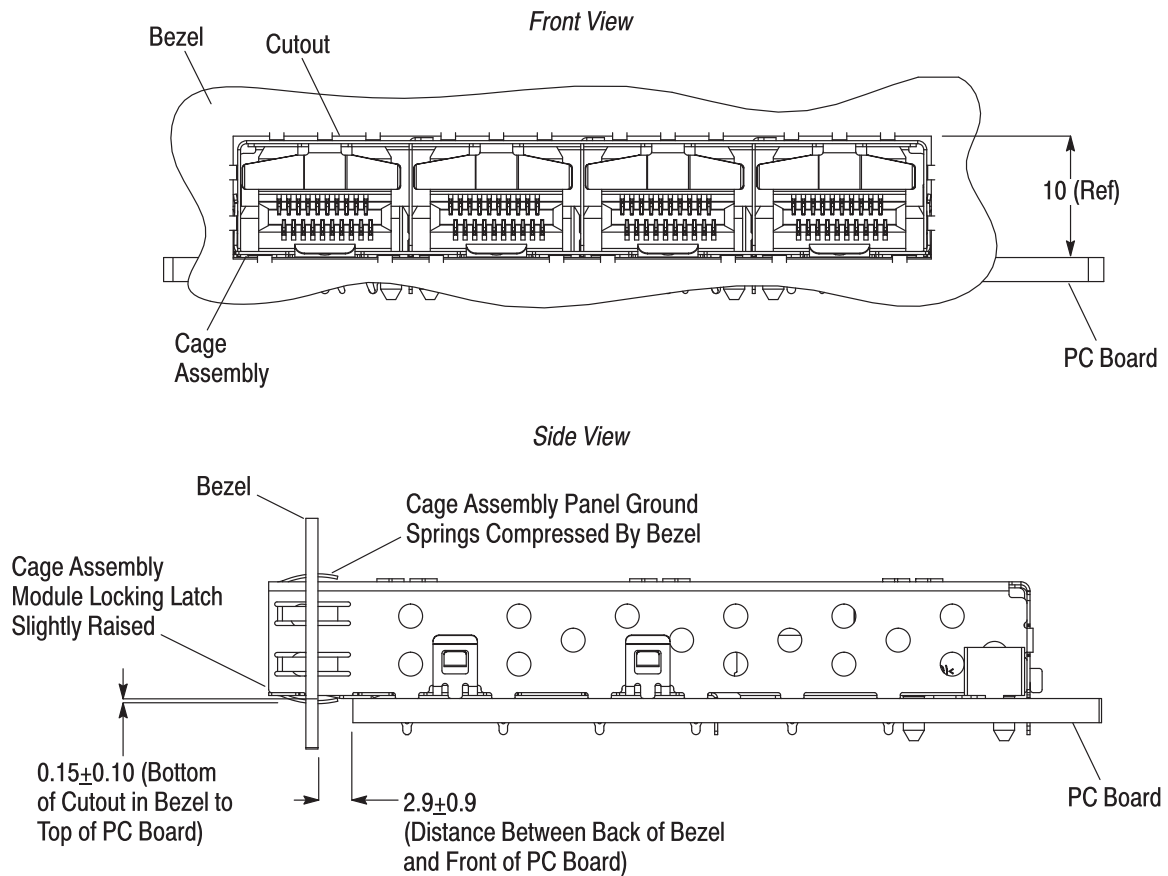


Figure 6

### 3.12. Dust Cover

A dust cover must be installed into its respective port when the module is not mated with the cage assembly.

### 3.13. Repair and Rework

The connector and cage assembly is not repairable. Damaged or defective connectors or cage assemblies MUST NOT be used.

If repair or rework to the pc board requires soldering after the connector and cage assembly has been seated onto the pc board, the following must apply:

- 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. Even when using a “no clean” solder paste, it is imperative that the contact interface be kept clean of flux and residue (since it acts as an insulator).

**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).*

- Air drying is recommended. Otherwise, make sure that temperature limitations are not exceeded:  $-55^{\circ}$  to  $105^{\circ}\text{C}$  [ $-67^{\circ}$  to  $221^{\circ}\text{F}$ ]. Excessive temperatures may cause housing degradation.

## 4. QUALIFICATION

SFP Ganged Press-Fit PT Connectors are Recognized by Underwriters Laboratories, Inc. (UL) under File No. E28476.

## 5. TOOLING

Tooling part numbers and instructional material packaged with the tooling are given in Figure 7.



**5.1. Seating Tool Kit**

The seating tool kit (consists of a seating tool and wall support) is used to seat the connector with cage assembly onto the pc board. The seating tool and wall support are also available separately. For rework purposes, the seating tool can be used to seat the cage assembly onto the pc board. No tooling is required to seat the connector for rework purposes.

**5.2. Extraction Tools**

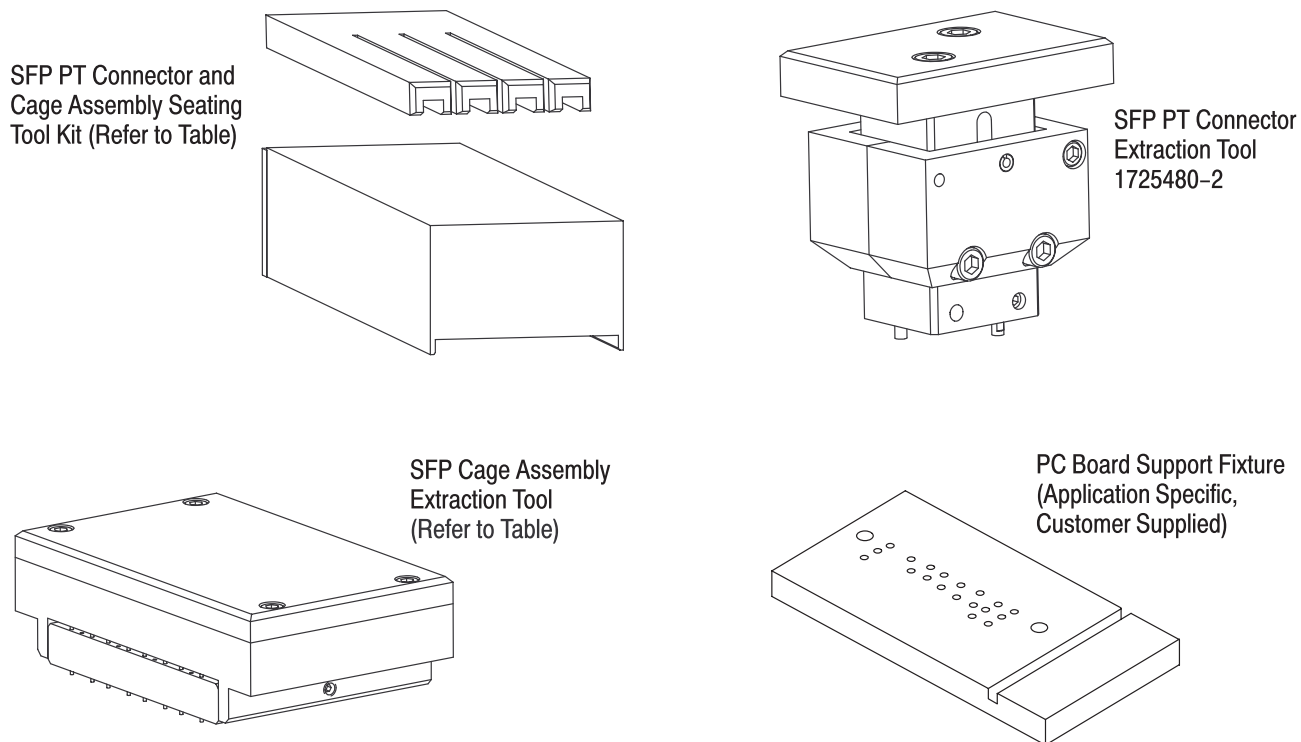
The cage assembly extraction tool is used to remove the connector with cage assembly from the pc board by pushing the compliant pin contacts and alignment posts out of their holes without overstressing the compliant pin contacts. For rework purposes, this extraction tool can be used to remove the cage assembly from the pc board; and the connector extraction tool is used to remove the connector from the pc board.

**5.3. Application Tool**

Power for the seating tool and extraction tool must be provided by application tool (with a ram) capable of supplying a downward force of 44.5 N [10 lb] per compliant pin contact. For available application tools, call PRODUCT INFO at the number at the bottom of page 1.

**5.4. PC Board Support Fixture**

A pc board support must be used with the seating tool and the extraction tool. The support fixture provides proper support for the pc board and protects the pc board and the connector and cage assembly from damage. The support fixture must be customer designed according to the instructions included with the tool being used.

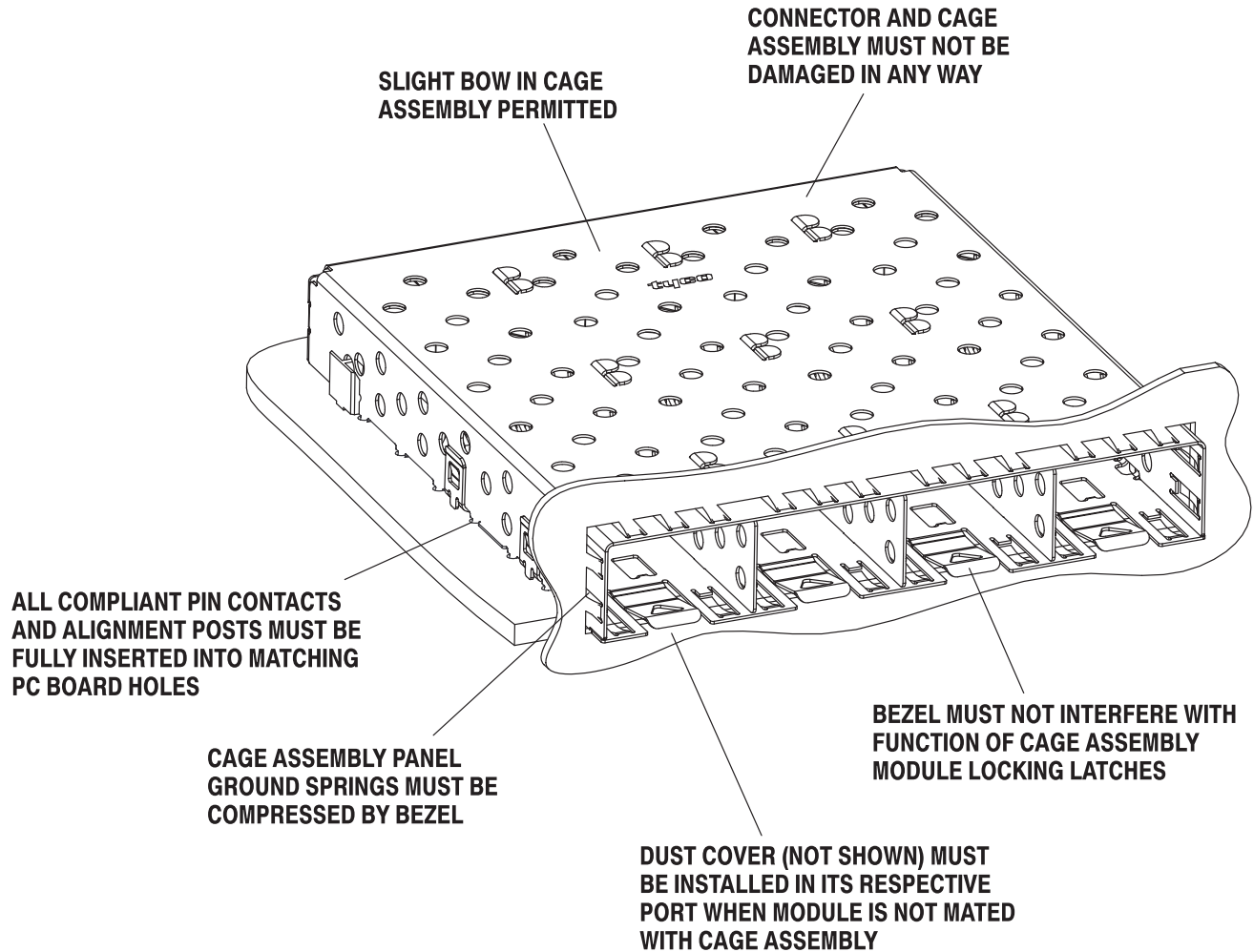


CONNECTOR AND CAGE ASSEMBLY		SEATING TOOL KIT (DOCUMENT)	CAGE ASSEMBLY EXTRACTION TOOL (DOCUMENT)	SFP PT CONNECTOR EXTRACTION TOOL (DOCUMENT)
TYPE	CONFIGURATION			
Ganged	1 X 4	1725761-1 (408-8848)	1725194-1 (408-8849)	1725480-2 (408-8850)
	1 X 6	1725761-2 (408-8848)	1804086-1 (408-8849)	

Figure 7

**6. VISUAL AID**

Figure 8 shows a typical application of SFP Ganged Press-Fit PT Connector and Cage Assembly. 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 8. VISUAL AID**