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 ±0.13 [±.005] 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 Signal Grace Inertia (SGI) 2.0 crimp version connector system used in wire to board applications.

The crimp version Signal Grace Inertia (SGI) 2.0 connector system is available in a 2 to 10 position configuration for a 22 AWG to 28 AWG wire range (2350223-1 22-28AWG, 2486278-1/2 22-26AWG).

Header assembly: Vertical through hole type, Vertical surface mount technology (SMT) type and Right angle SMT type which position is from 2P to 10P.

Optional terminal position assurance (TPA) accessories are available for all wire sizes. Plug housings are available in multiple keying and color configurations.

Basic terms and features of this product are provided in Figure 1.

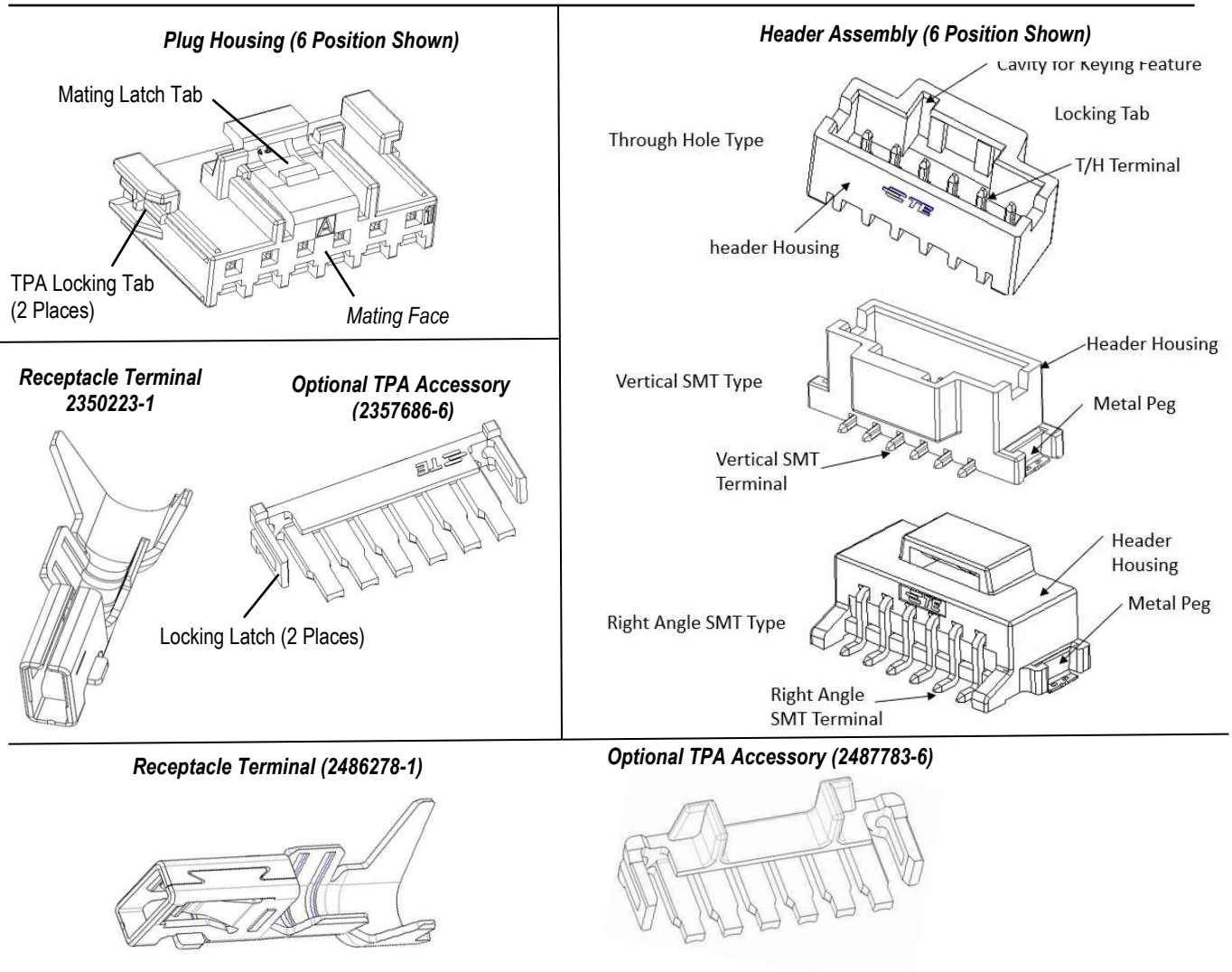


Figure 1 (end)

2. REFERENCE MATERIAL

2.1. Revision Summary

- Updated images and crimping information in Figure 3
- Added extraction tool information in Figure 11
- Added new receptacle terminal 2486278, item 3.10~3.11 and header assembly figure on page1.

2.2. Customer Assistance

Reference Product Base Part Number 2357686, 2350223, and 2350224 and Product Code L957 and X530 are representative of the SGI 2.0 crimp version connector system. Use of these numbers will identify the product line and help you to obtain product and tooling information when visiting www.te.com or calling the number at the bottom of page 1.

2.3. Drawings

Customer drawings for product part numbers are available from www.te.com. Information contained in the customer drawing takes priority.

2350223	Receptacle Terminal (Crimp Version)
2357686	Terminal Position Assurance (TPA) Accessory (mating with terminal 2350223)
2486278	Receptacle Terminal (Crimp Version)
2487783	Terminal Position Assurance (TPA) Accessory (mating with terminal 2486278)
2350224	Plug Housing (All Keying Configurations)
2232826	Header assembly (Vertical Through hole Version)
2232829	Header assembly (Vertical SMT Version)
2336678	Header assembly (Right Angle SMT Version)

2.4. Specifications

Product Specification 108-143160 provides product performance and test results for crimp version SGI2.0.

3. REQUIREMENTS

3.1. Safety

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

3.2. Storage

A. Ultraviolet Light

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

B. Shelf Life

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

C. Reels

When using reeled contacts, store coil wound reels horizontally. When storing partial reeled contacts, the end of the strip should be secured to the flange using a wire tie or similar method.

D. Chemical Exposure

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

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

NOTE
Contacts that contain brass must not be stored or used in environments where these chemicals exist.

3.3. Wire Selection and Preparation

The contacts designed for unsealed applications accept a single stranded copper wire sizes 22 AWG to 28 AWG(2350223-1 22-28AWG, 2486278-1/2 22-26AWG) for with an insulation diameter range on each wire of 1.18 to 1.56 mm.

Each wire must be stripped to the dimension given in Figure 2.

CAUTION
Care must be taken not to nick, scrape, or cut any part of the wire during the stripping operation.

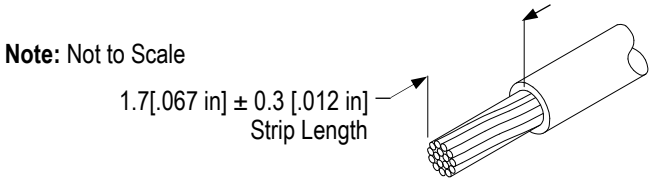


Figure 2

3.4. Contact Crimp

A. Cutoff Tab

The cutoff tab is the remaining portion of the carrier strip after the contact is cut from the strip. The cutoff tab must not exceed the dimensions given in Figure 3.

B. Wire Barrel Crimp

The crimp applied to the wire barrel portion of the contact is the most compressed area and is most critical in ensuring optimum electrical and mechanical performance of the crimped contact. The crimp must be centered on the closed wire barrel. The crimp must result in an “F” crimp where the wire barrel forms a closed seam with no evidence of loose wire strands or wire strands visible in the seam. The crimp height and width must be within the dimensions given in Figure 3.

C. Insulation Barrel Crimp

The crimp applied to the insulation barrel of the contact must result in either an “F” crimp where the insulation barrel forms a closed seam with no evidence of wire insulation in the seam or an overlap crimp where the tips of the insulation barrel wraps overlap each other and wrap firmly around the wire insulation without cutting into the wire insulation. The crimp height and width must be within the dimensions provided in Figure 3.

D. Wire Barrel Flash

Wire barrel flash is the formation that may appear on both sides of the wire barrel as the result of the crimping process. It must not exceed the dimension provided in Figure 3.

E. Twist and Roll

There should be no twist or roll of the wire barrel or mating portion of the crimped contact that would cause overstress or impair usage. See Figure 3 for allowable limits.

F. Wire End Extrusion Length and Height

The wire conductor ends must extend beyond the end of the wire barrel within the dimensions given in Figure 3. The wire end extrusion height may not exceed the limits given in Figure 3.

G. Bellmouths

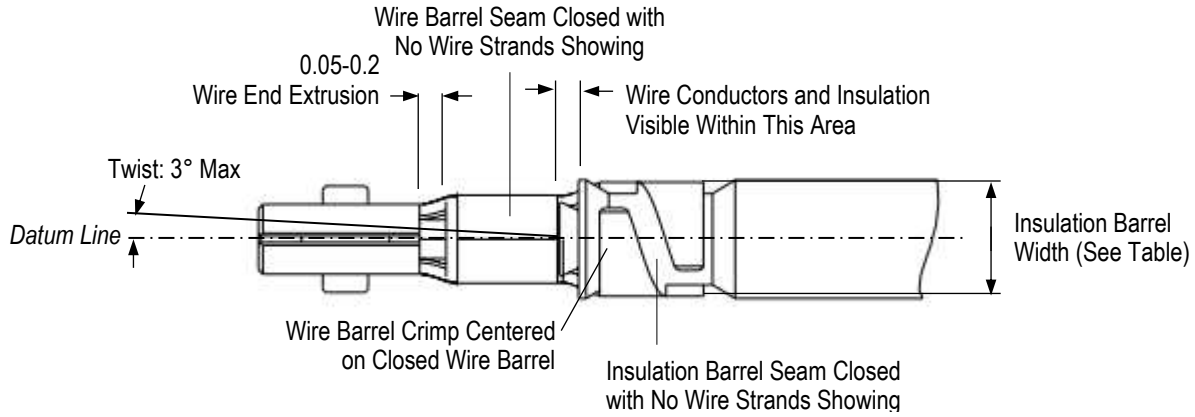
The front bellmouth and rear bellmouth shall conform to the dimensions given in Figure 3.

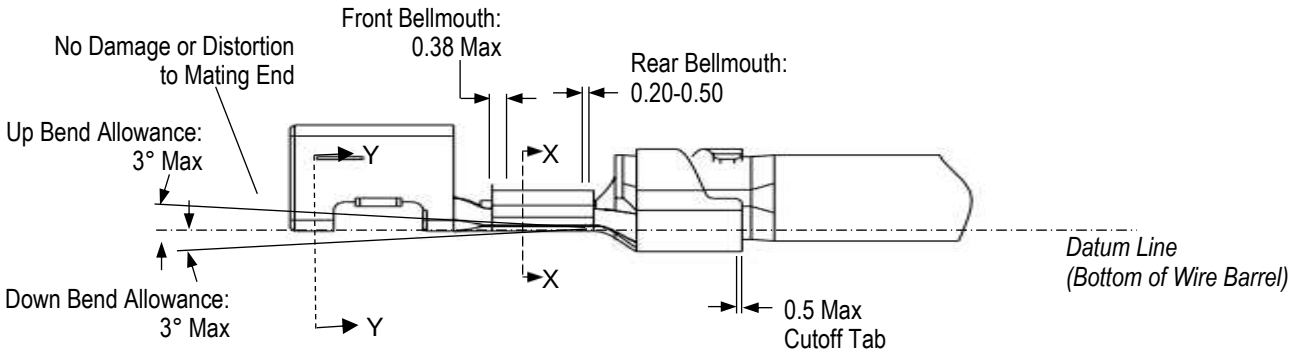
H. Wire Location

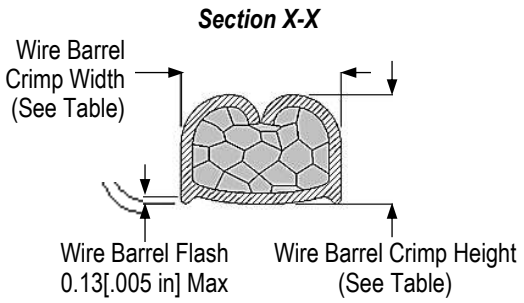
All conductors must be held firmly inside the wire barrel. No strands can be folded back over the wire insulation. The wire insulation must be inside the insulation barrel, but must not enter the wire barrel. The wire conductors and insulation must be visible within the area between the wire barrel and insulation barrel as shown in Figure 3.

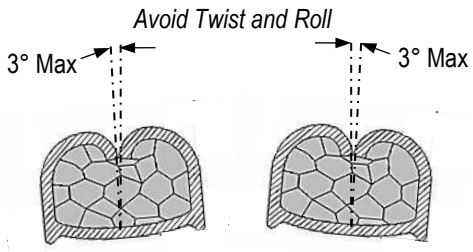
I. Bend Allowance

Then bend allowance between the wire barrel and the cable is acceptable within the limits given in Figure 3.









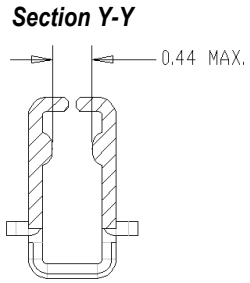


Figure 3 (continued below)

Part Number	AUTOMATIC MACHINE							
	Applicator Number	Wire Size (AWG [mm²])	Wire Crimp		Insulation Crimp Width	Insulation Crimp Form	Insulation Crimp Height (Ref)	Gap after crimping
			Width	Height ± .03mm [±.001 in]				
2350223-1	2837719-2	22	1.07mm [.042 in]	0.76mm [.030 in]	1.50mm [.059 in]	O	1.86mm [.073 in] MAX	0.44mm max.
		24		0.69mm [.027 in]				
		26		0.64mm [.025 in]				
		28		0.61mm [.024 in]				
2486278-1 2486278-2	4151434-2	22	1.07mm [.042 in]	0.75mm [.030 in]	1.50mm [.059 in]	O	1.86mm [.073 in] MAX	0.38mm max.
		24		0.66mm [.026 in]				
		26		0.64mm [.025 in]				

Part Number	HAND TOOL							
	Hand tool Number	Wire Size (AWG [mm²])	Wire Crimp		Insulation Crimp Width	Insulation Crimp Form	Insulation Crimp Height (Ref)	Gap after crimping
			Width	Height ± .05mm [±.002 in]				
2350223-1	2377922-1	22	1.07mm [.042 in]	0.76mm [.030 in]	1.50mm [.059 in]	O	1.86mm [.073 in] MAX	0.44mm max.
		24		0.69mm [.027 in]				
		26		0.62mm [.0245 in]				
		28						

Note: O – O Crimp

Figure 3 (end)

3.5. Keying

Only plug housings and header housings with identical keying configuration will mate; for example, key A will only mate with key A, etc. The TE Connectivity customer drawing provides keying configurations.

3.6. Contact Insertion and Extraction

A. Insertion

Each contact must be aligned with the appropriate circuit cavity from the wire end of the housing so that the contact key(s) faces in the same direction as they key in the housing. The contact must be inserted into the circuit cavity until the contact internal latch locks onto the circuit cavity locking finger.

NOTE
Gently pulling on the wire after the contact has been inserted will ensure that the contact is locked.

B. Extraction

If the optional TPA accessory is used, the contacts cannot be removed until the accessory is removed from the housing. Contacts must be removed individually from the housing. After extraction, the contact must be inspected for damage or deformation; if evident or questionable, the contact must be replaced. After contact extraction, discard the housing as it may have internal damage. It is important that the housing not be re-used because internal damage cannot always be easily determined.

To use the extraction tool, lightly pull back on the wire of the contact you are extracting. Insert the tip of the extraction tool into the housing window. Pivot the tool to raise the locking tab of the housing up, then pull the wire out of the housing.

See Figure 4 for recommended extraction tools for receptacle contact.

3.7. Optional TPA Accessories

An optional TPA accessory is available for the plug and cap housings. The following requirements apply for installation and removal:

NOTE
All contacts must be inserted before the devices can be installed into the housing.

— The TPA must be installed onto the rear of the housing so that the latches are secure to the housing TPA locking tabs. There should be an audible click. If the latches do not reach the locking tabs, this indicates that one or more contacts has not been fully inserted.

— The TPA must be removed by lifting each latch so that it clears the housing locking tab and pulling the accessory straight from the housing.

3.8. Mating and Unmating

The mating face of the PCB header housing must align with the mating face of the plug housing, then the housing must be pushed together until the mating latch is secured to the latch retainer. There should be an audible click.

To unmate the housings, the plug housing mating latch must be depressed until it is released from the latch retainer, then the housings can be pulled straight apart.

CAUTION
These housings are not intended to be used as an electrical interruption device. To avoid degradation to the contacts, there must be no current flow when unmating.

3.9. Replacement and Repair

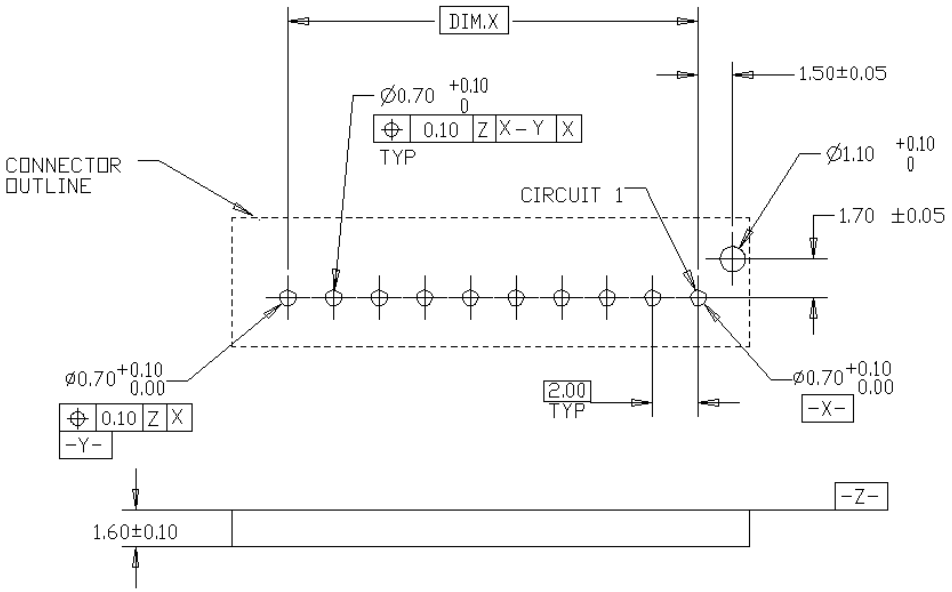
Damaged or defective product must not be used. The housings, contacts, TPA device, and seals are not repairable. If gang seals are used and terminals are extracted, the seals must be carefully examined for damage. If there is any doubt as to the integrity of the seal, it is recommended that the seal be replaced.

3.10. PC Board

A. Layout for Through Hole Mount Connectors

a. The mounting and contact holes in the PC board must be precisely located to ensure proper placement and optimum performance of the header assembly. Design the PC board using the dimensions provided in Figure 4. The layout shows the top (component) side of the board.

b. PC Board Solder Tine Holes in the pc board for the solder tines must be drilled and plated through to specific dimensions. See Figure 5. The drilled hole size, plating types, and plating thickness will depend on application requirements.



Position	Dim X / mm
2P	2.00
3P	4.00
4P	6.00
5P	8.00
6P	10.00
7P	12.00
8P	14.00
9P	16.00
10P	18.00

Figure 4

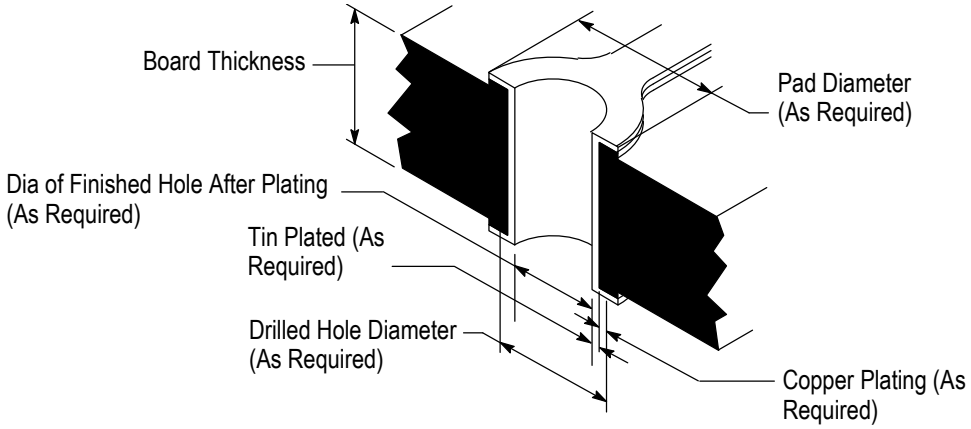


Figure 5

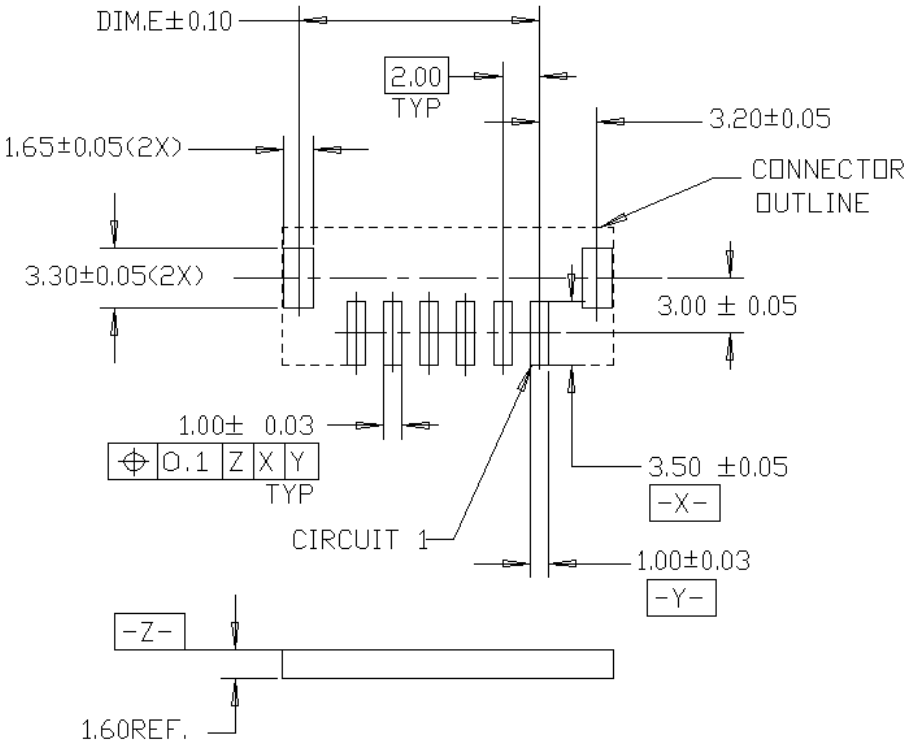
B. Layout for Surface Mount Connectors

a. The PC board pads must be solderable in accordance with EIA-638(Electronic Industries Alliance).

b. Recommended PC board pad pattern, dimensions, and tolerances are shown in Figure 6 for Vertical SMT Type.

c. Recommended PC board pad pattern, dimensions, and tolerances are shown in Figure 7 for Right Angle SMT Type.

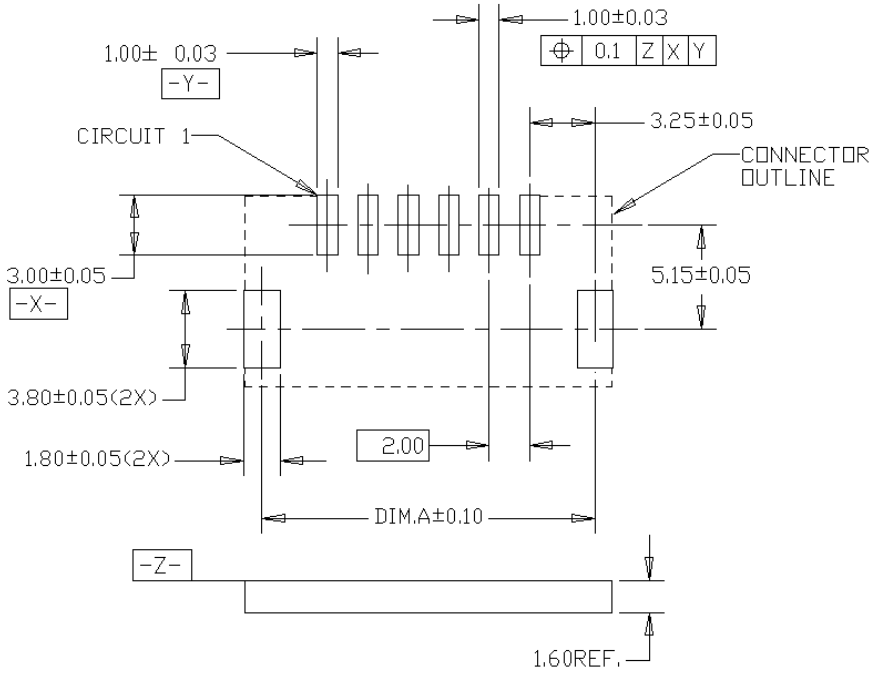
Vertical SMT Type Layout



Position	DIM.E /mm
2P	5.20
3P	7.20
4P	9.20
5P	11.20
6P	13.20
7P	15.20
8P	17.20
9P	19.20
10P	21.20

Figure 6

Right Angle SMT Type Layout



Position	DIM.A /mm
2P	8.50
3P	10.50
4P	12.50
5P	14.50
6P	16.50
7P	18.50
8P	20.50
9P	22.50
10P	24.50

Figure 7

C. Soldering

These header assemblies can be soldered using a variety of soldering techniques. The temperatures and exposure time shall be within the ranges specified in Figure 8.

NOTE
Manual 402-40 provides some guidelines for establishing soldering practices. Refer to Paragraph 2.4, Manuals.

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

Figure 8

3.11. PC Board Header Assembly Placement

CAUTION
If connectors are placed on the board manually, the connector should be handled only by housing to avoid deformation, contamination, or damage to the contact solder tines and metal pegs.

A. Manual Placement

1. Through Hole Mount Connectors When placing through hole mount connectors on the PC board, make sure that the contact solder tines are aligned and started into the matching holes before seating the connector onto the PC board.

Surface Mount Connectors Optimally, the contact solder tines should be centered on the PC board circuit pads. However, slight misalignment is permissible as shown in Figure 9.

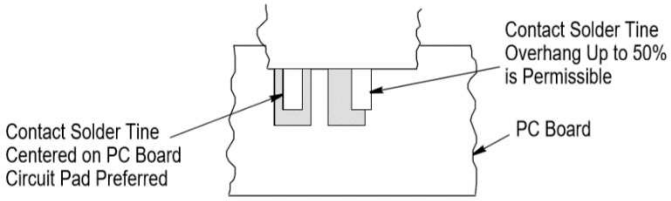


Figure 9

B. Robotic Placement

The robotic equipment must be adjusted to feed, pick up, and place the headers on the PC board with an accuracy as required. The header assembly datum surfaces detailed on the customer drawing will ensure correct placement of the header.

4. QUALIFICATION

4.1. Underwriters Laboratories Inc. (UL)

Underwriters Laboratories Inc. (UL) recognition for selected PNs in the SGI 2.0 connector system is done. An exact status can be provided by contacting the TE Product Information Center at the number at the bottom of page 1.

5. TOOLING

Applicators contain the tooling for feeding and crimping strip-form terminals. Automatic machines provide the power to operate the applicator. See Figure 4 for representative images.

Tooling information for product part numbers is available from www.te.com or by calling the Product Information Center at the number at the bottom of page 1.

5.1. Machine (Power Unit)

The machine provides the force required to drive an applicator for crimping the contacts. These machines can be set up to automatically measure, cut, strip and terminate wire.

5.2. Applicator

Applicators for product part numbers are available in Figure 4 and from the Applicator Search Portal on www.te.com or by calling the Product Information Center at the bottom of page 1.

5.3. Hand Tool

Hand tools for product part numbers are available from the Hand Tool Search Portal on www.te.com or by calling the Product Information Center at the bottom of page 1.

5.4. Contact Insertion and Extraction

An extraction tool 9-1579007-1 is available for removing the terminal from the plug housings.

Ocean Applicator

Automatic Machine

Extraction Tool
9-1579007-1

Hand Tool Assembly

Figure 4

6. VISUAL AID

Figure 5 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.

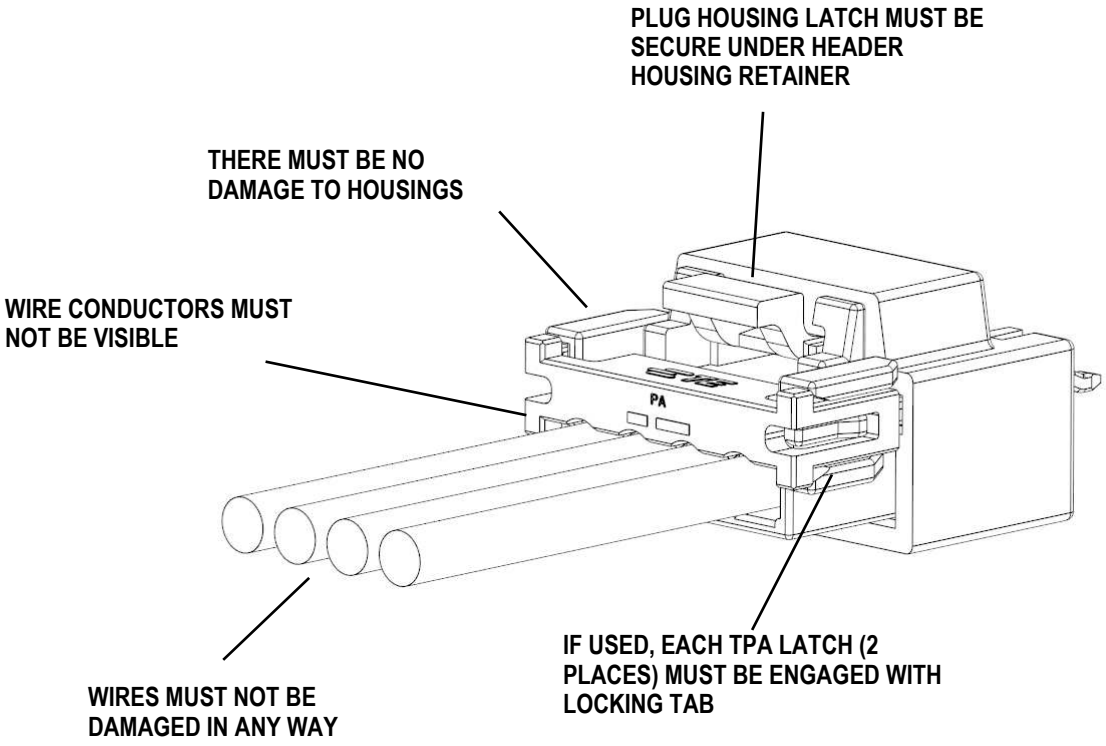


Figure 5