



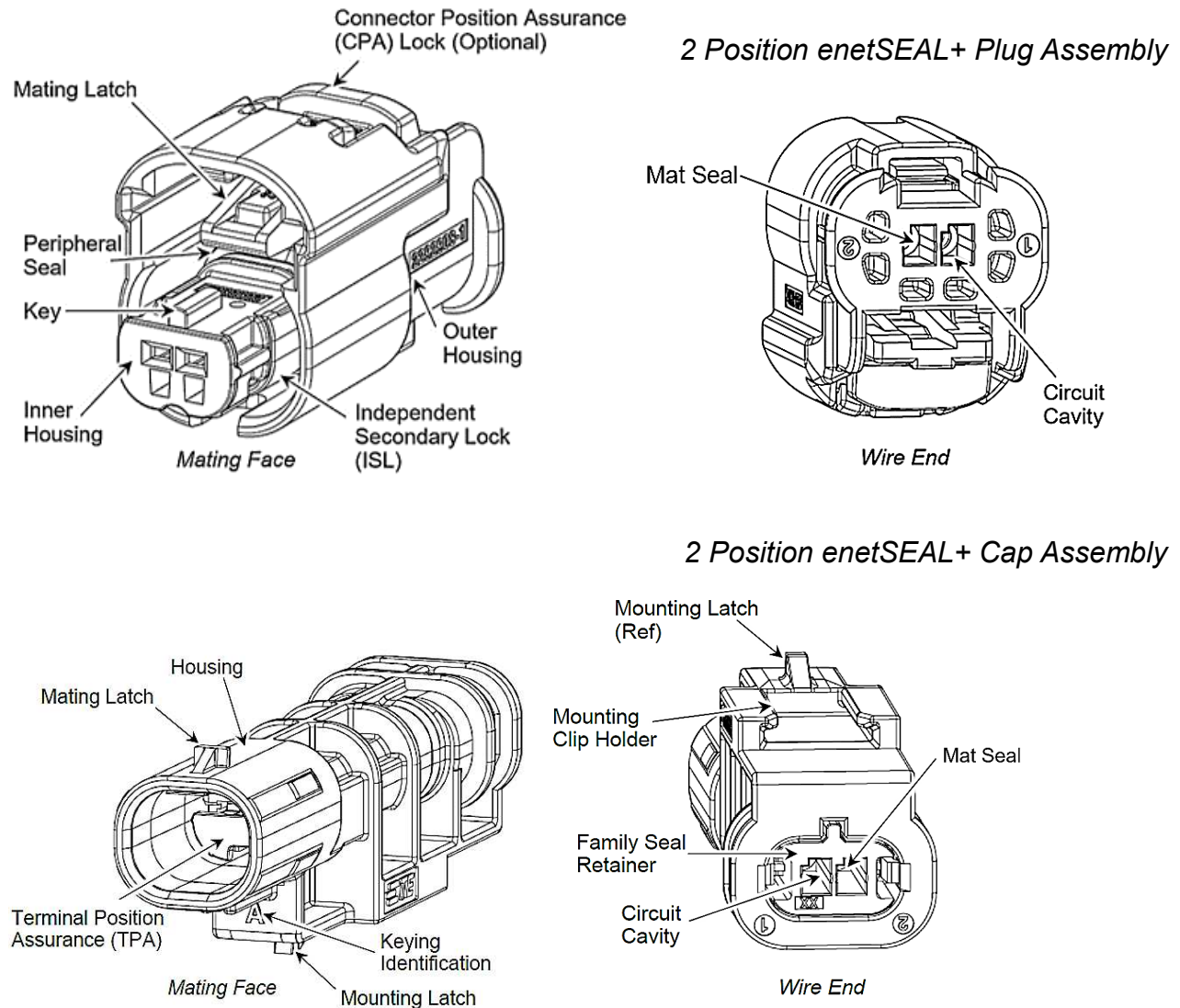
**NOTE**

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  $\pm 0.13$  mm [ $\pm 0.005$  in.] and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale.

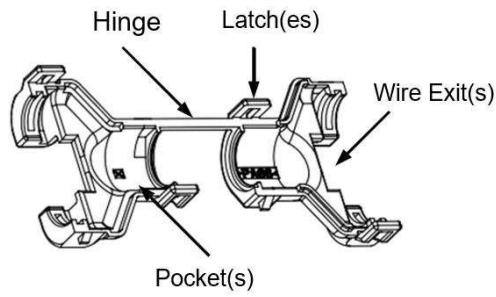
**1. INTRODUCTION**

This specification covers the requirements for application of the enetSEAL+ Connector System. The connector system includes a Plug assembly, Cap assembly and Wire Dress Cover. The connector has been designed to accept an unshielded twisted pair (UTP) or discrete wires. The connector system offers environmental protection by providing sealing to the wires and between the connector halves. The design allows for the tool-less mounting of the Cap connector to the panel.

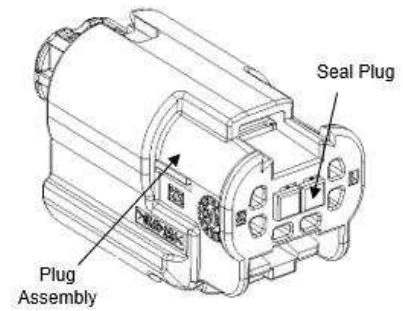
When corresponding with TE Connectivity Personnel, use the terminology provided in this specification to facilitate inquiries for information. Basic terms and features of this product are provided in Figure 1.



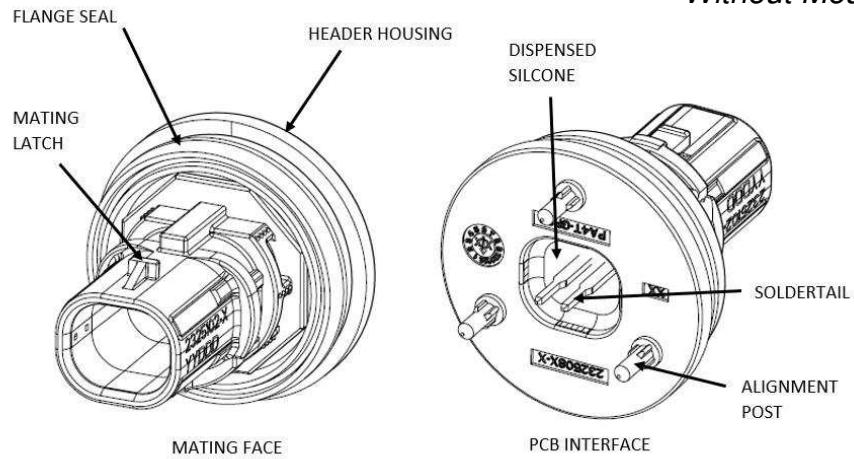
*2 position enetSEAL+ Wire Dress Cover*



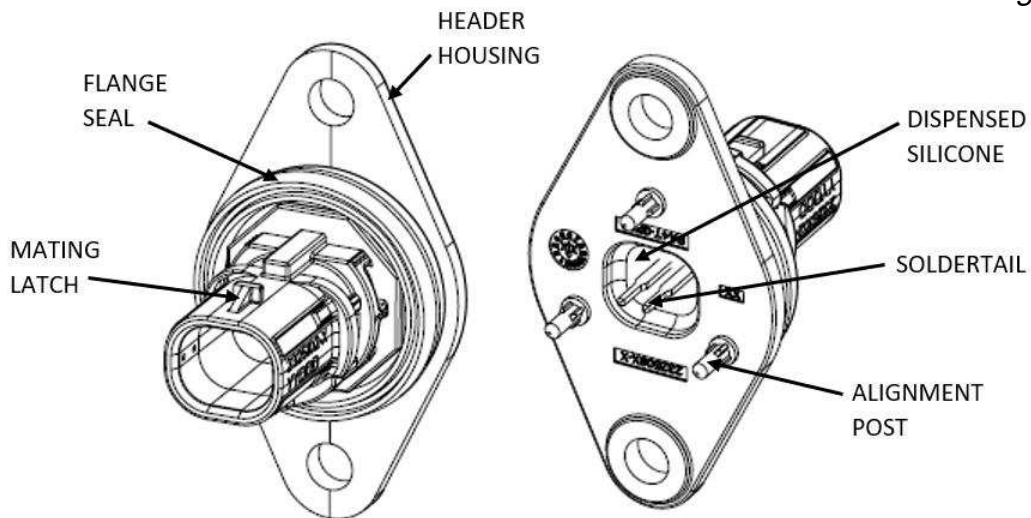
*2 position enetSEAL+ Sealed Plug Assembly*



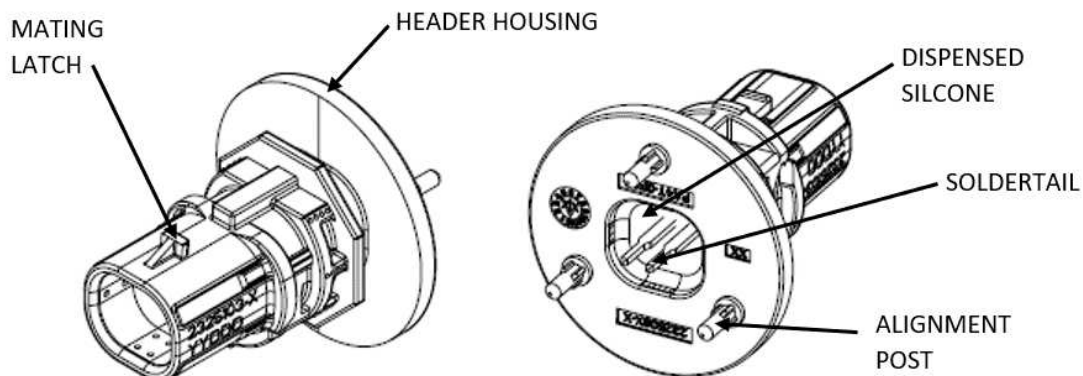
*2 Position enetSEAL+ Assembled Seal Header Assembly Without Mounting Holes*



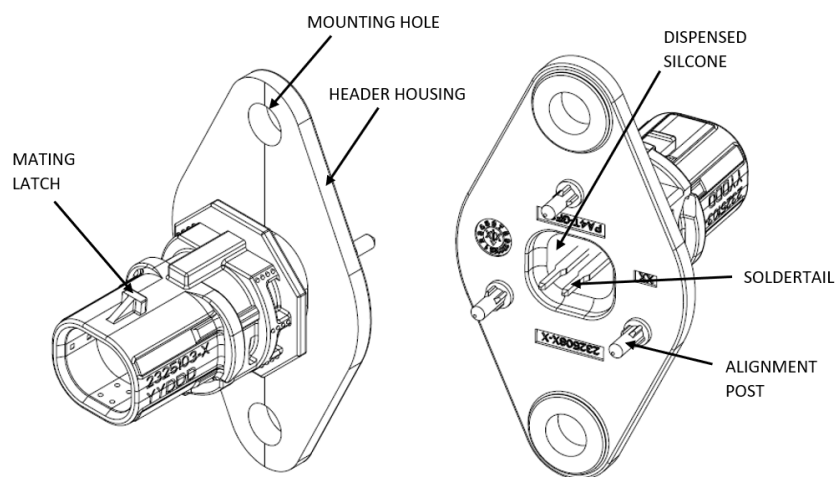
*2 Position enetSEAL+ Assembled Seal Header Assembly With Mounting Holes*



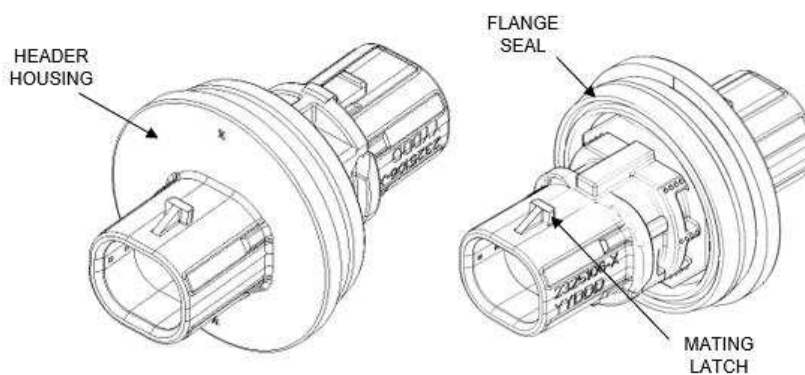
*2 Position enetSEAL+ Dispensed Seal Header Assembly Without Mounting Holes*



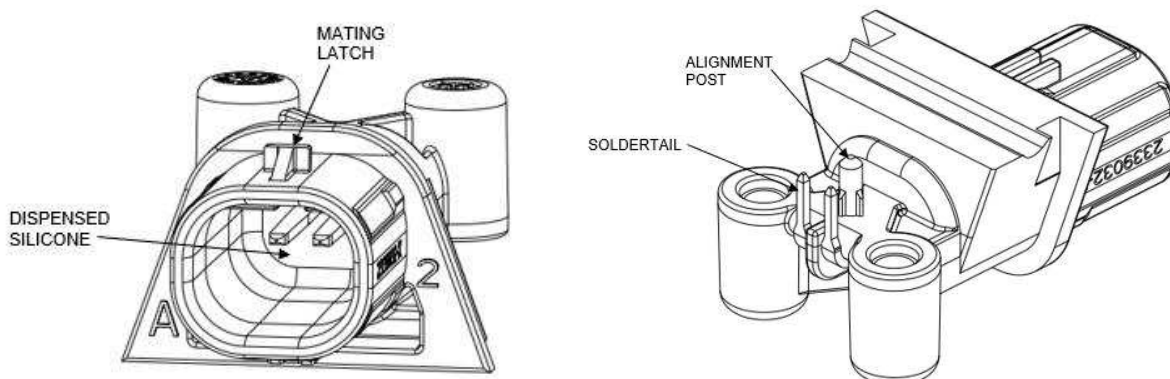
*2 Position enetSEAL+ Dispensed Seal Header Assembly With Mounting Holes*



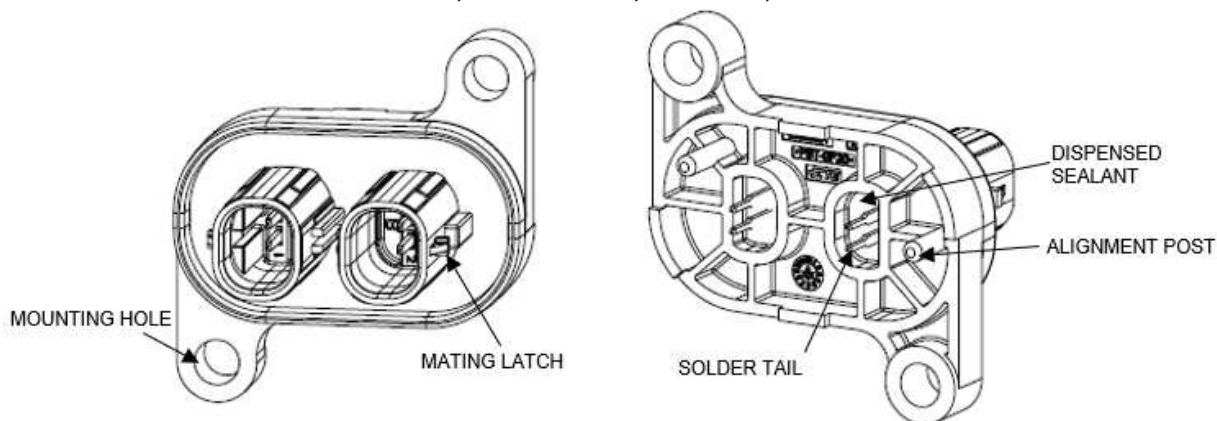
*2 Position enetSEAL+ Adapter Assembly*



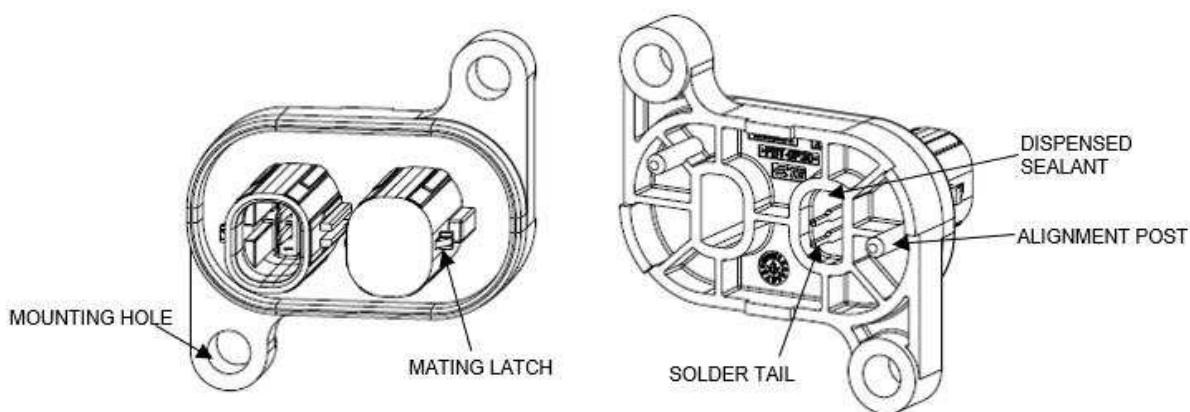
*2 Position enetSEAL+ 100MB Ethernet Right Angle Header*



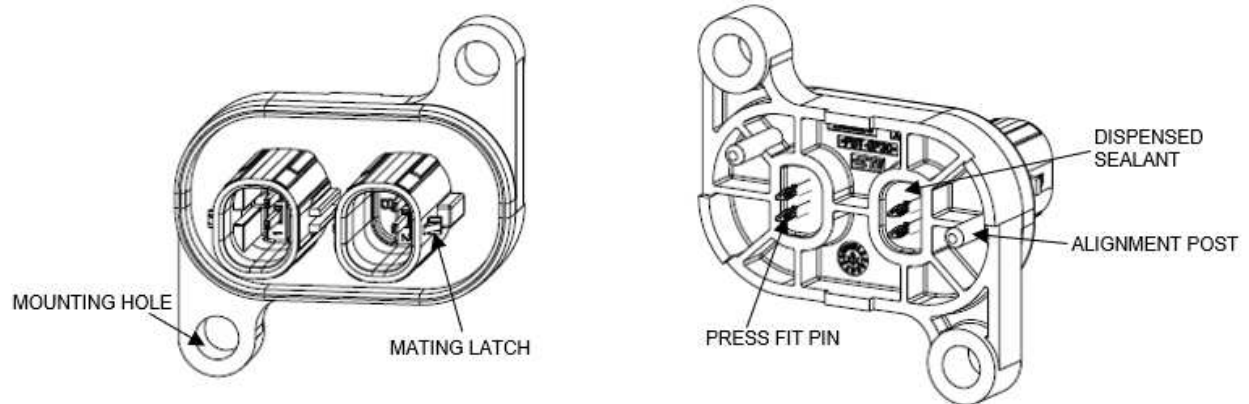
*4POS, HDR ASSY, 180DEG, Solder tail terminal*



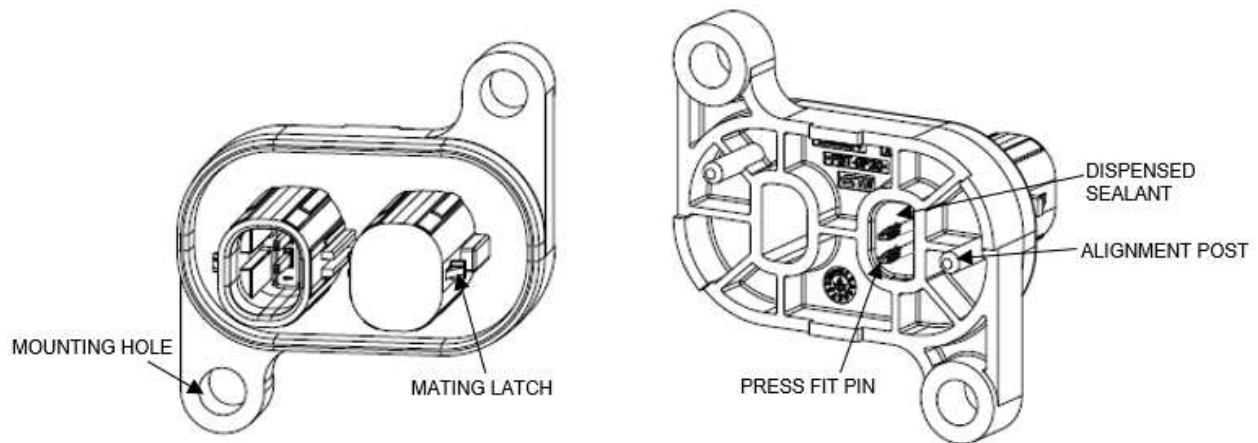
*2POS, HDR ASSY, 180DEG, Solder tail terminal*



*4POS, HDR ASSY, 180DEG, Press fit terminal*



*2POS, HDR ASSY, 180DEG, Press fit terminal*



*enetSEAL+ Blind Cap*

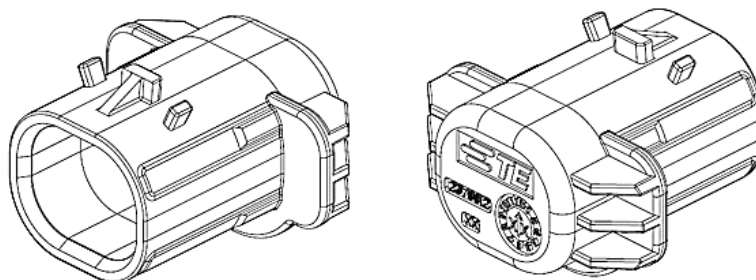


Figure 1

## 2. REFERENCE MATERIAL

### 2.1 Revision Summary

- Superseded blue seal with red seal and Improved sealing range Ø1.40-Ø1.55, to Ø1.22-Ø2.1
- Improved IP rating for Ø1.22-Ø1.55 sealing range from IP53 to IP6K7 (Table 2).

### 2.2 Customer Assistance

Reference Product Base Part Numbers 2292906, 2292937, 2345284, 2272168, 2325102, 2325103, 2325106, 2339032, 2366735, 2376612 and Product Code J041 are representative of the enetSEAL+ Connector System. 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 TE 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 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

Refer to the Application Specification 114-18464 for information on MCON 1.2 mm Tab and Receptacle Contacts.

## 3. REQUIREMENTS

### 3.1 Safety

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

### 3.2 Storage

#### A. Reel Storage

When using reeled contacts, store coil wound reels horizontally and traverse reels vertically.

#### B. Ultraviolet Light

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

#### C. 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.

### D. Chemical Exposure

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

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

### 3.3 Shipping Features

#### Shipped Condition

The “As Shipped” state of the connectors is as shown in Figure 2. The Plug ISL and CPA are in the “Pre-Staged” position. In the Cap assembly, the Cap TPA is also in the “Pre-Staged” position. The “Pre-Staged” ISL and TPA prevents the customer from having to assemble the ISL and TPA’s prior to inserting crimped leads into the connectors. See Figure 2.

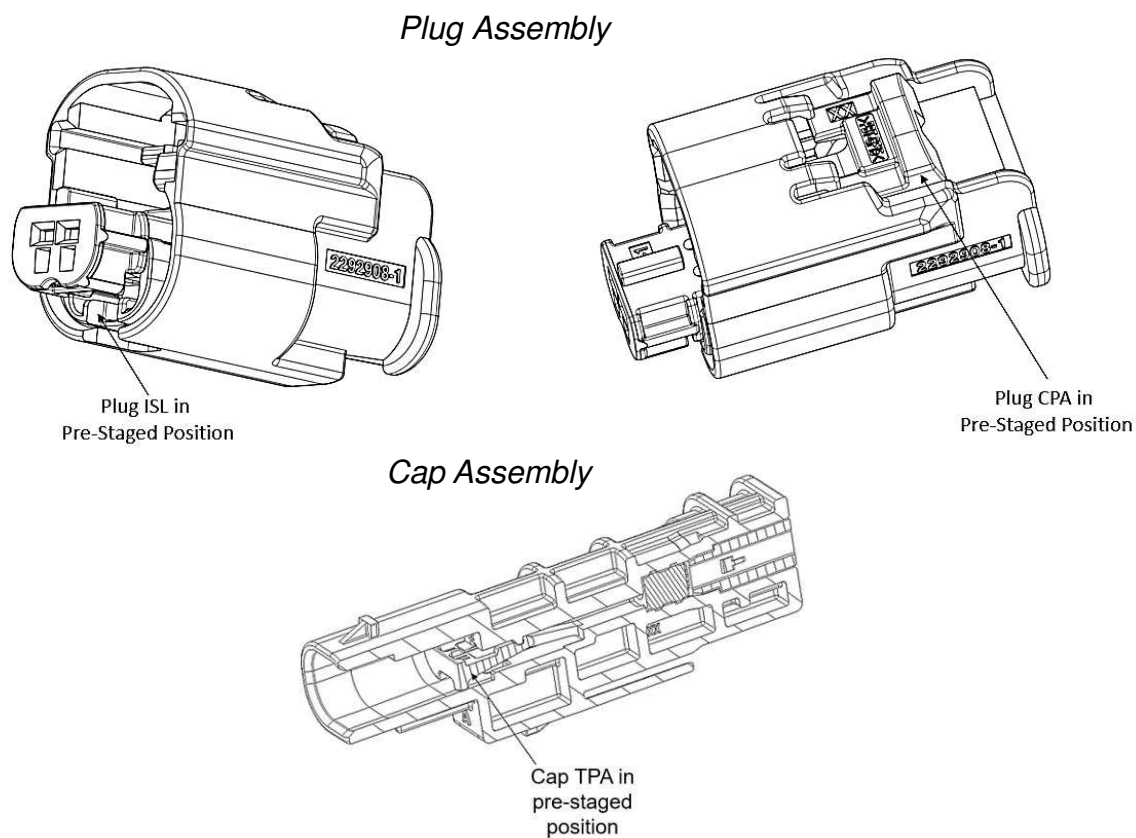


Figure 2

### 3.4 Mechanical Keying

The connector system has slots in the Cap assembly and corresponding ribs in the Plug assembly. These features act as mechanical keys and prevent miss-mating of the connector.

For easy identification the assemblies have key markings. Refer to Figure 3 & Table 1 for information on mechanical keying.

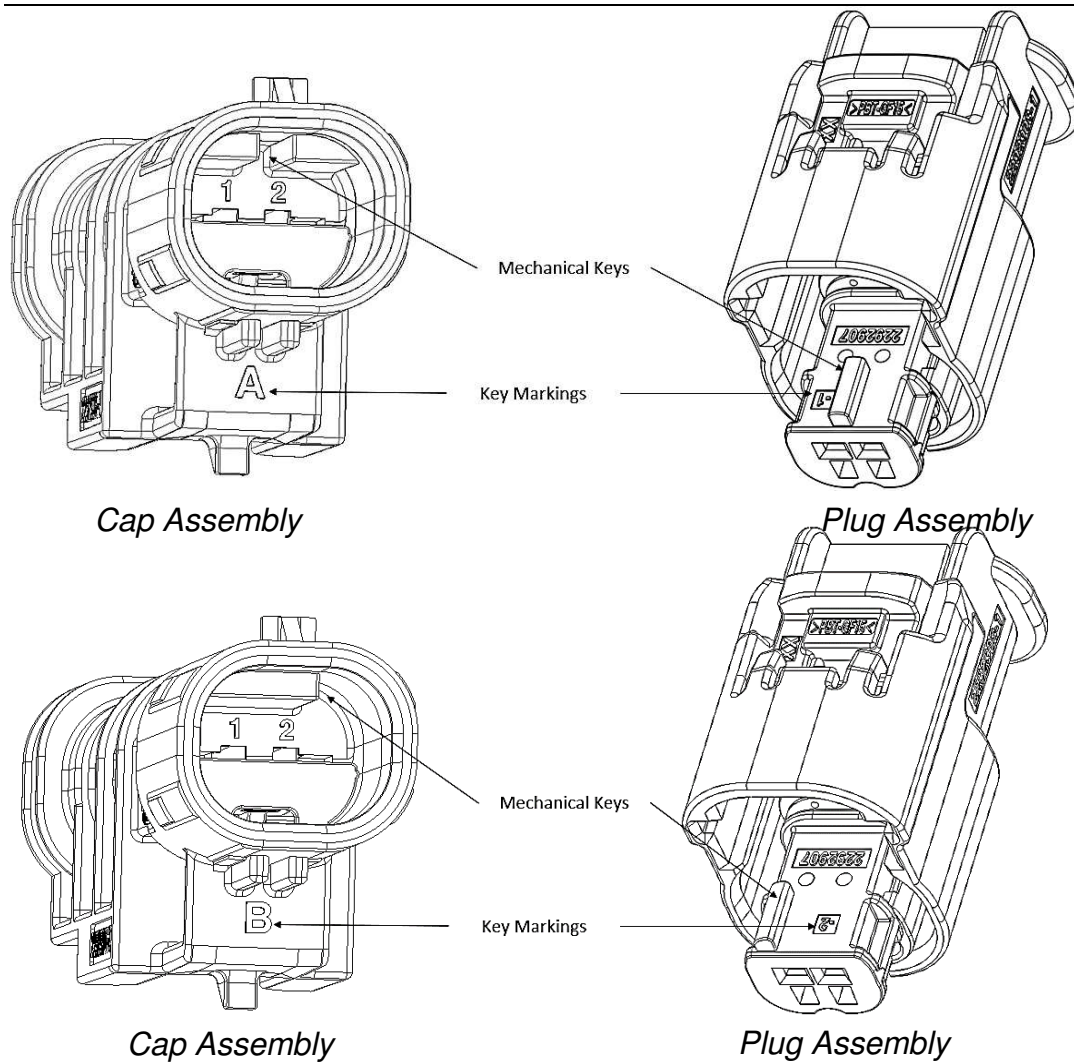


Figure 3

Table 1

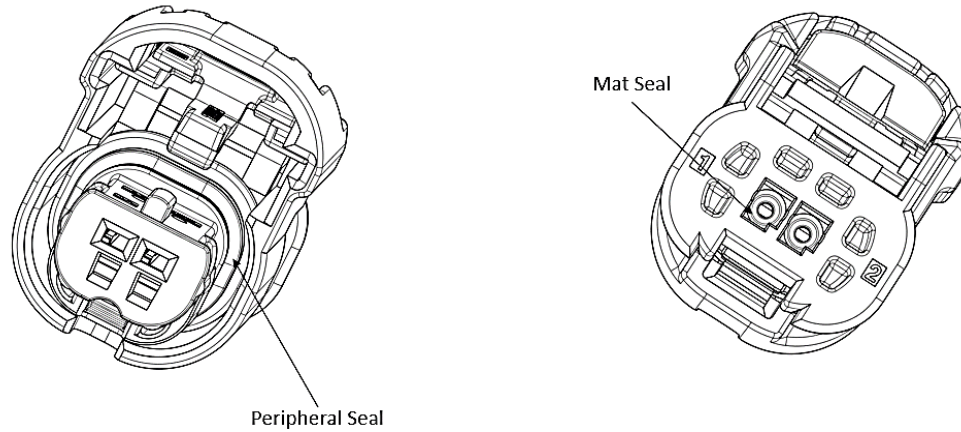
PLUG ASSEMBLY	CAP ASSEMBLY	PLUG KEY ID	CAP KEY ID
2292906-1	2292937-1	-1	A
2292906-2	2292937-2	-2	B

### 3.5 Sealing

The connector system provides for sealing to the wires using a mat seal and sealing between connector halves using a peripheral seal. See Figure 4. The wire range that can be accommodated in the mat seal is listed in Table 2.



*Plug Assembly*



*Cap Assembly*

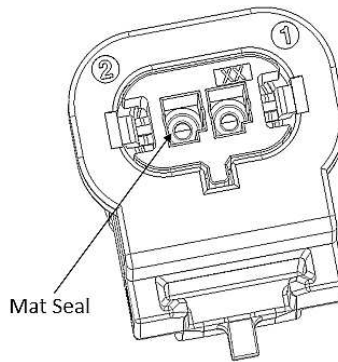


Figure 4

Table 2

PLUG ASSEMBLY	CAP ASSEMBLY	INSULATION DIAMETER RANGE (STANDARD)	SEALING PLUG
2292906-1	2292937-1	1.22 – 1.55 (IP6K7)	1612108-4
2292906-2	2292937-2	1.55 - 2.10 (USCAR2)	0413-003-1605

### 3.6 Cable Preparation

#### 3.6.1 Unshielded Twisted Pair (UTP) Cable Preparation

The UTP cable must be prepared for crimping as shown in the Figure 5. The wires must not be damaged, fanned out, cut or bent. The insulation surface must be clean and free of contaminants. The jacket strip length and Untwisted length of the pair must not exceed the limits shown in the Table 3.

Table 3

CONNECTOR	TERMINAL	JACKET STRIP LENGTH (mm)	MAXIMUM UNTWISTED LENGTH (mm)
2292906 (Plug)	1534594/ 1670144 (Female)	20 - 25	25
2292937 (Cap)	1718348/ 1718350 (Male)	29 - 32	32

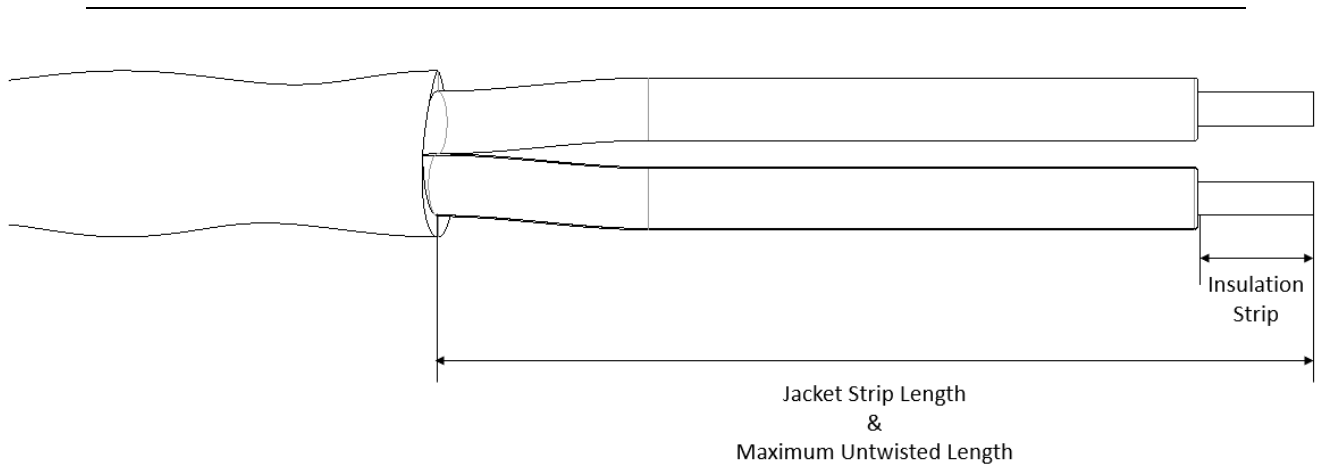


Figure 5



**NOTE**

For the wire insulation strip length, refer to Application Specification: 114-18464



**CAUTION**

After crimping the terminals, **DO NOT** twist the untwisted length of the wire and insert into the connector

**3.6.2. Heat Shrink Tube**

In certain applications, heat shrink tubing may be necessary to prevent fluid ingress into the cable (See Table 4 and Figure 6). For waterproof applications, adhesive lined heat shrink can be used. In those applications, a heat shrink tube may be slid over the cable prior to terminal insertion into the connectors. For customer specific applications, please reach out to your TE representative.

Follow steps outlined in sections 3.7 & 3.8 prior to applying heat to the heat shrink tubing.

Table 4

CONNECTOR	HEAT SHRINK LENGTH	CLEARANCE BETWEEN HEAT SHRINK & CONNECTOR
2292906 (Plug)	42 ± 5	1.50 ± 0.50
2292937 (Cap)		

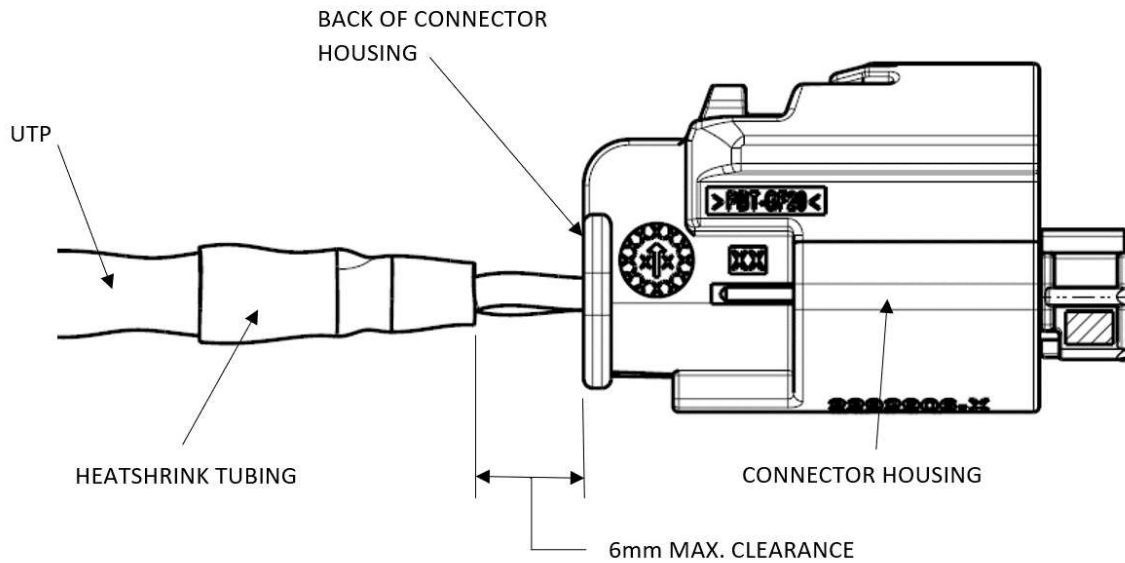


Figure 6



**CAUTION**

While applying heat to the heat shrink tubing, DO NOT exceed the maximum operating temperature of the connector system: 125°C.

**3.7. Assembly Procedure for Plug**

**A. Terminal Insertion for Plug**

- i. Ensure that the terminals are properly crimped. Refer to Application Specification 114-18464 for crimping requirements.
- ii. Determine the keying configuration by referring to the customer drawing of the specific connector, then select the corresponding connector.
- iii. Make sure that the ISL is open as shown in Figure 7, Detail A. If the ISL is twisted as shown in Figure 7, Detail B, or otherwise not fully open, open the ISL according to 3.7. C ii


**CAUTION**

The wire strands must **NOT** extend above the wire barrel crimp; otherwise, the strands could cause damage to the family seal as the terminal passes into the circuit cavity.


**NOTE**

The insulation barrel crimp measurement requirements are dependent on the wire insulation type and outside diameter.

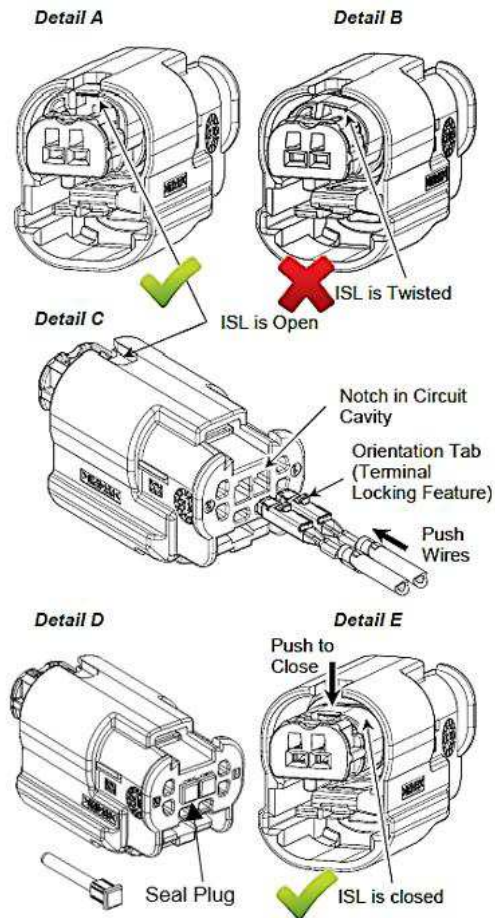


Figure 7

- iv. When using twisted pair wires, both terminals are inserted simultaneously. When using discrete wires, the terminals can be inserted one at a time. Insert terminals as follows:
  - a. Align the terminals with the selected circuit cavity of the housing so that the terminal orientation tab faces in the same direction as the notch in the circuit cavity. See Figure 7, Detail C.
  - b. Insert the terminal into the circuit cavity until it bottoms. There should be an audible or tactile “click” when the terminal is fully seated. Gently pull the wire to ensure that the terminal is locked in place. See Figure 7, Detail C.

- v. Install a seal Plug into any unused circuits. See Figure 7, Detail D.
- vi. After all terminals have been inserted, slide the ISL until it is closed. The ISL should be easy to close. See Figure 7, Detail E. Visually inspect that the ISL is closed and rests uniformly flush within the Plug housing. If the ISL does not close completely, confirm the terminals are indeed fully seated in the circuit cavities prior to re-closing the ISL.



**CAUTION**

*To prevent damage to the ISL, DO NOT force the ISL to close. The ISL is designed to close only if all terminals are fully seated in the circuit cavities.*

**3.8. DISASSEMBLY PROCEDURE OF PLUG**

**A. Terminal Removal**

- i. Open the ISL as follows:
  - a. Insert the tip of a small screwdriver into the opening of the ISL and lift the ISL until it free from the inside of the housing. See Figure 8

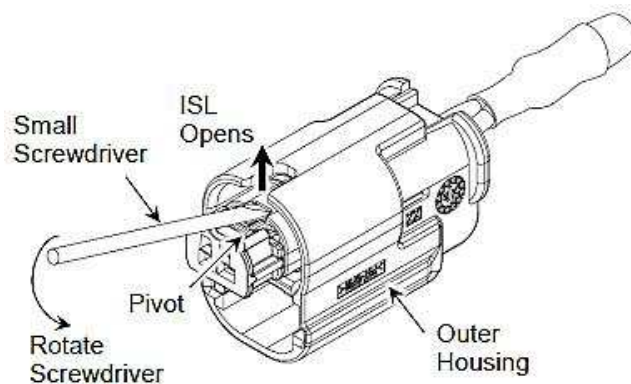


Figure 8

- b. The ISL will move by approximately 1.5 mm so that it is flush with the inside of the outer housing. See Figure 7, Detail A. This is the “open position” and the ISL must be in this position before removing the terminals from the connector.



**NOTE**

*The ISL is latched to the inner housing on both sides, and it is possible to unlatch one side without the other. Ensure that both sides of the ISL are opened. The ISL should not appear tilted in the “open position”.*

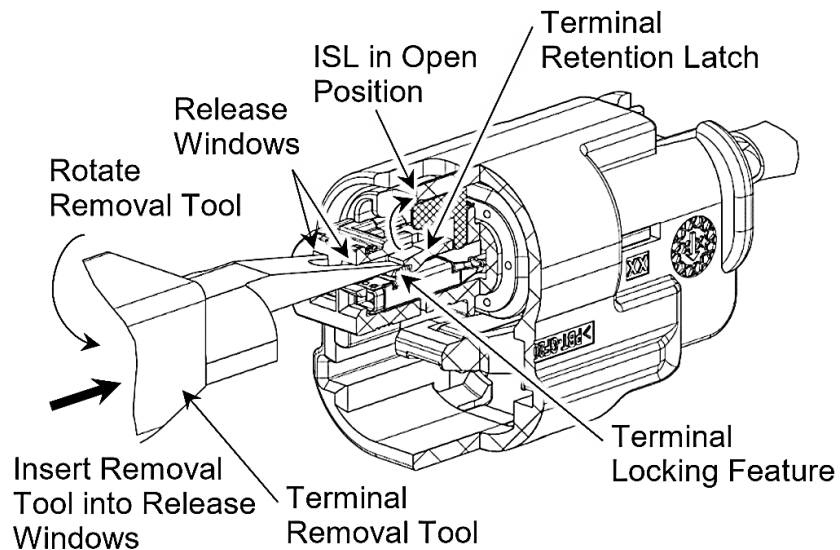
- ii. With the ISL in the open position, pull slightly on the wires while pushing on the back of the housing.

- a. Insert the tip of TE Removal Tool 2844610-1 into the release windows for the terminal(s) to be removed and direct the tip between the Terminal Locking Feature and the Terminal Retention Latch. The flat side of the removal tool faces the terminal.
- b. When the removal the tool is properly located, rotate the tool in the direction shown to gently pry the housing locking latch away from the terminal locking features (this will release the terminal). See Figure 9.



**CAUTION**

To avoid damage to the terminal retention latch in the housing, do not flex the latch further than necessary.



*Gently Pry Terminal Retention Latch  
Away from Terminal Locking Feature*

Figure 9

- iii. With the ISL in the open position and the terminal latches disengaged, use the wire(s) to pull the terminal(s) from the connector. See Figure 10



**NOTE**

When removing terminals crimped to twisted pair wire, pull both wires simultaneously to remove both terminals together.

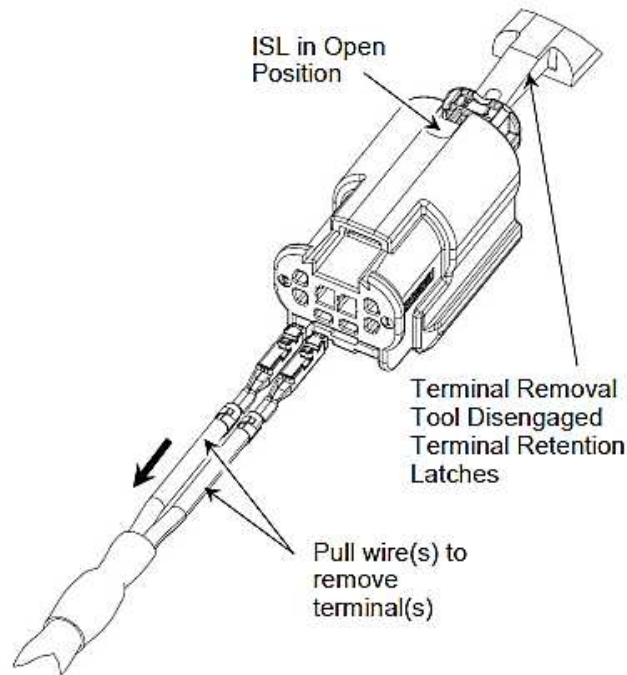


Figure 10

### 3.9. Assembly Procedure for Cap

#### A. Terminal Insertion

- i. Make sure that the terminals are properly crimped. Refer to Application Specification 114-18464 for inspection requirements.



#### **CAUTION**

*The wire strands must NOT extend above the wire barrel crimp; otherwise, the strands could cause damage to the family seal as the terminal passes into the circuit cavity.*



#### **NOTE**

*The insulation barrel crimp measurement requirements are dependent on the wire insulation type and outside diameter.*

- ii. Determine the keying configuration by referring to the customer drawing of the specific connector, then select the corresponding connector.
- iii. Make sure that the TPA is in the open (unlocked) position as shown in Figure 11, Detail A. If it is not, open the TPA as follows:
  - a. Insert the tip of TE Removal Tool 776441-1 (or similar hook tool) into the mating face of the connector and hook it behind the release window of the TPA. See Figure 11, Detail B.
  - b. Pull the TPA forward by 3.0 mm. This is the open (unlocked) position.

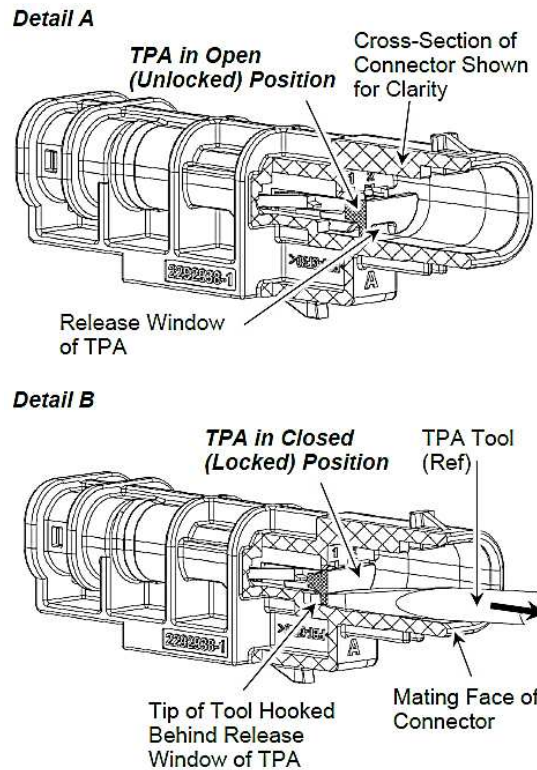


Figure 11

- iv. When using twisted pair wires, both terminals are inserted simultaneously. When using discrete wires, the terminals can be inserted one at a time. Insert terminals as follows:
  - a. Align the terminal with the selected circuit cavity of the housing so that the terminal orientation tab faces in the same direction as the notch in the circuit cavity. See Figure 12, Detail A.
  - b. Insert the terminal into the circuit cavity until it bottoms. There should be an audible or tactile “click” when the terminal is fully seated. Gently pull the wire to ensure that the terminal is locked in place.
- v. Install a seal Plug (part number 0413-003-1605) into any unused circuits. Note plugs will not sit flush if both cavities are being sealed using sealing Plug. See Figure 12, Detail B.
- vi. After all terminals have been inserted, move the TPA to the closed (locked) position. The TPA should be easy to close. See Figure 12, Detail C.


**CAUTION**

To prevent damage to the TPA or Housing, DO NOT force the TPA to close. The TPA is designed to close only if all terminals are properly oriented and fully seated in the circuit cavities.



### Inserting Terminated Terminals

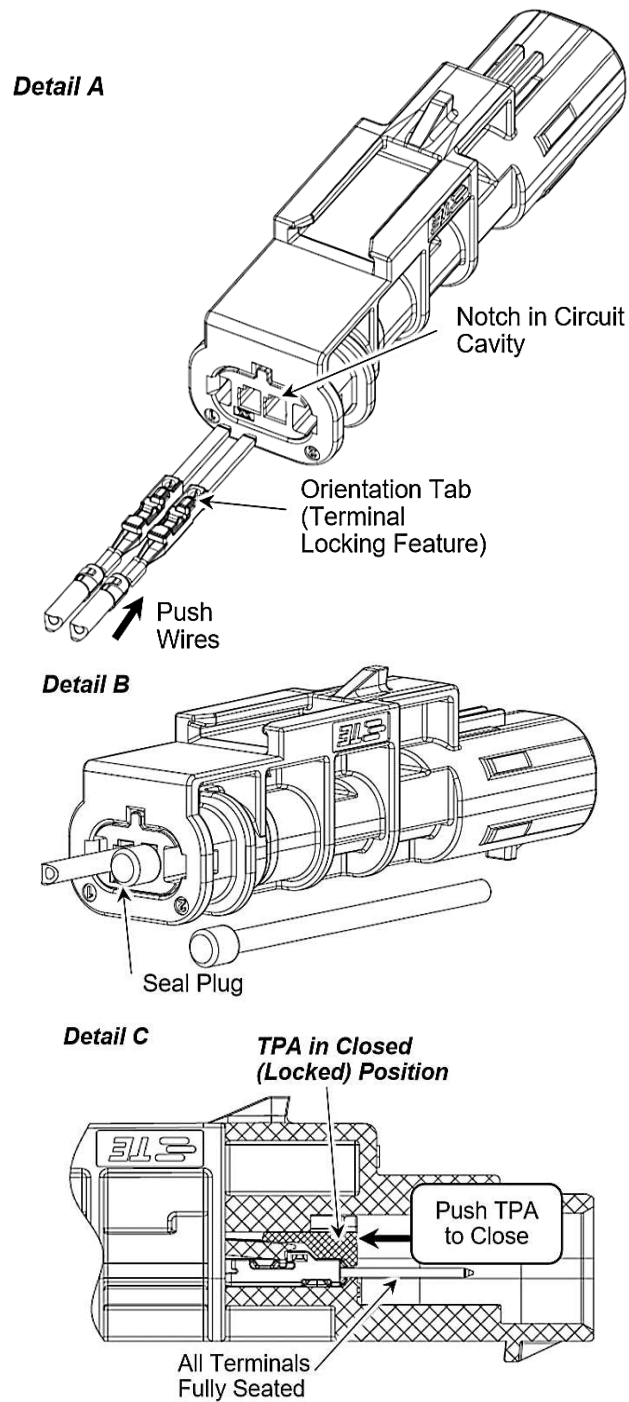


Figure 12

## B. Mounting for Cap Assembly

- i. Align the latch of the mounting clip with the opening of the connector mounting clip holder as shown in Figure 13, Detail A.
- ii. Slide the mounting clip into the mounting clip holder until the latches engage and there is an audible “click”. See Figure 13, Detail B. The connector is now ready to mount onto the panel.

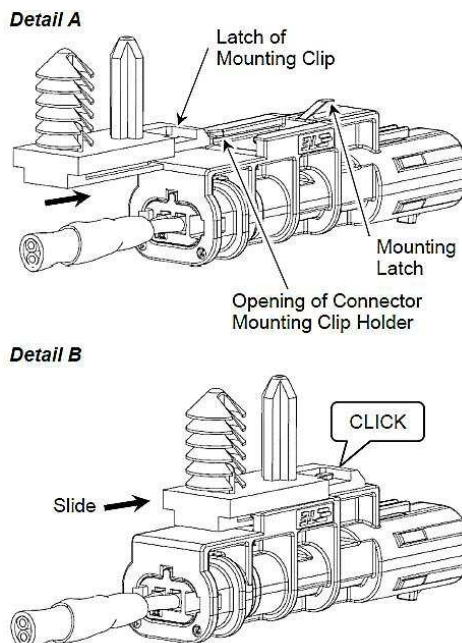


Figure 13

## 3.10. Mating and Unmating of Plug

### A. Mating of Plug Assembly



#### **CAUTION**

*For wire to device application, the interface on the device must meet requirements shown on interface drawing C-22951 14.*

- i. Align the Plug connector with the mating connector so that the connector mating latch faces the mating latch of the mating connector, and the key slot faces the key of the mating connector. Then, push the connectors together. Refer to Figure 14.
- ii. If using the CPA lock, push the CPA forward until there is an audible and tactile “click”; locking and mating the connector together. See Figure 14.

- iii. The CPA lock should be easy to engage. It will be difficult to engage if the connector and mating connector are not fully mated.



**CAUTION**

To prevent damage to the CPA lock or connector, **DO NOT** force the CPA lock to engage. The CPA lock is designed to engage only if the connector and mating connector are fully mated.

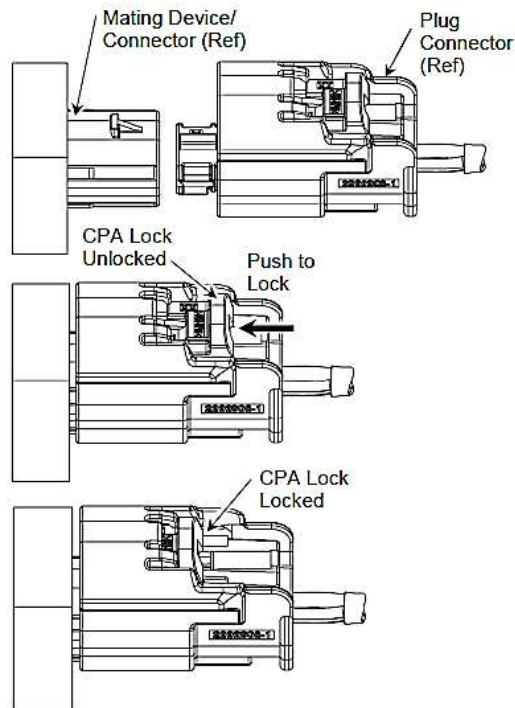


Figure 14

**B. Unmating**

- i. If using the CPA lock, pull back on CPA lock to unlock the connector and mating connector. Refer to Figure 15.
- ii. Depress the connector latch of the Plug connector and gently pull the Plug connector and mating connector apart

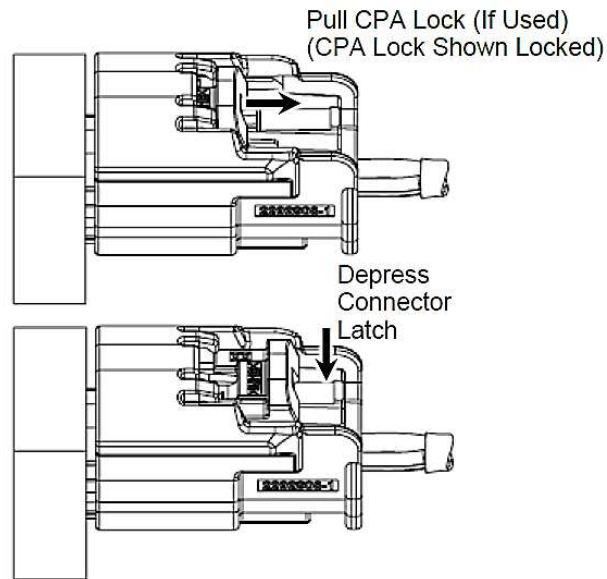


Figure 15

### 3.11. DISASSEMBLY PROCEDURE OF CAP ASSEMBLY

#### A. Dismounting

- i. Insert the tip of a small screwdriver between the latch of the mounting clip and the latch of the connector mounting clip holder. See Figure 16
- ii. Rotate the screwdriver until the latches disengage, then slide the mounting clip toward the wire end of the connector until it is out of the connector mounting clip holder.

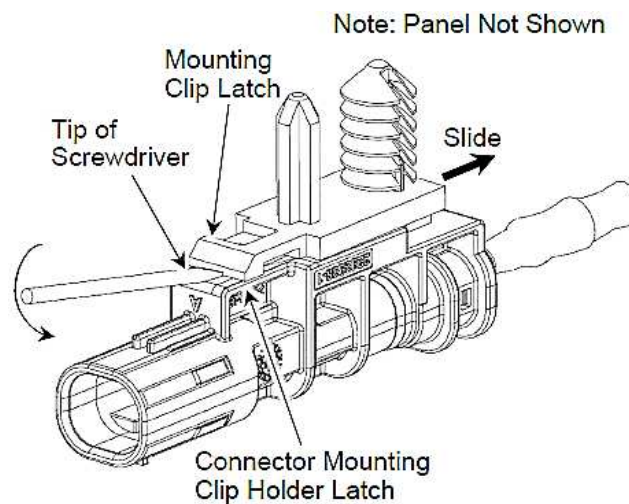


Figure 16

## B. Terminal Removal

- i. Insert the tip of TE Removal Tool 776441-1 (or similar hook tool) into the mating face of the connector and hook it behind the release window of the TPA. See Figure 17, Detail A. Then, pull the TPA straight out of the connector. Care must be taken to retain the TPA and observe the orientation of the TPA for re-insertion.
- ii. With the TPA removed, pull slightly on the wires while pushing on the back of the housing. This will pull the terminal back to the terminal retention latch of the housing.
  - a. Insert the tip of TE Removal Tool 2844610-1 into the mating face of the connector. Align the bottom surface of the tool with the inside of the shroud. The tool will bottom against the front face of the connector when fully inserted. When the removal tool is properly located, the sharp tip will be between the terminal locking feature and housing latch. See Figure 17, Detail A.
  - b. When the removal tool is properly located, rotate the tool in the direction shown to gently pry the housing locking latch away from the terminal locking features (this will release the terminal). See Figure 17, Detail B.

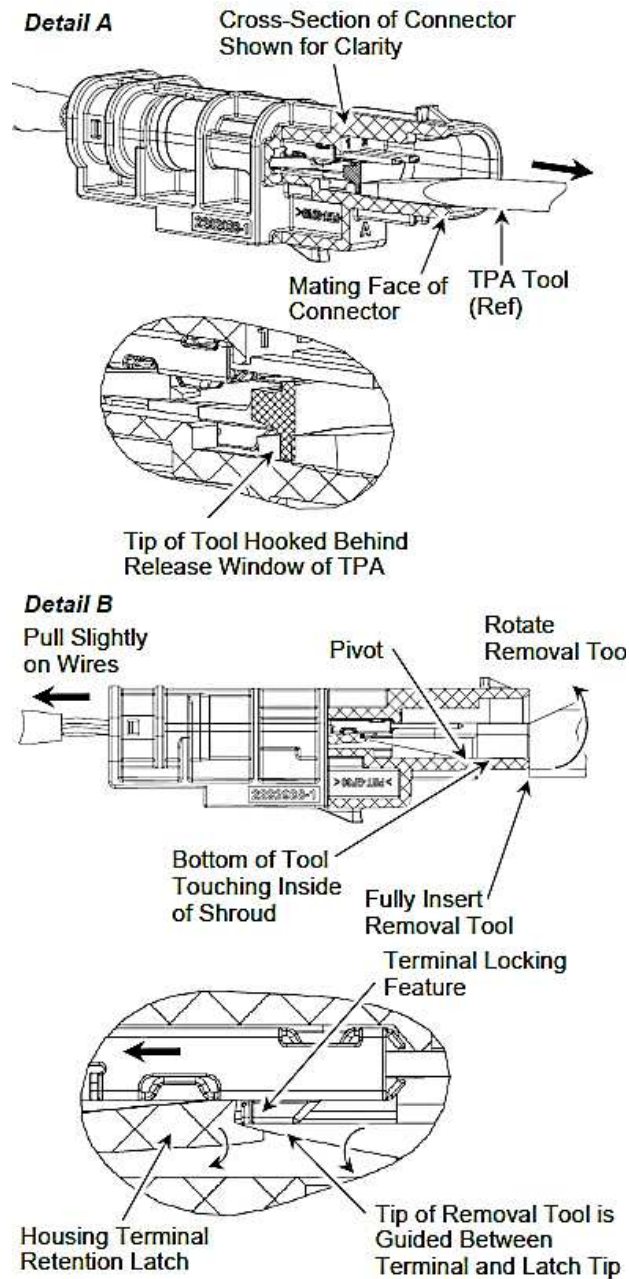


Figure 17

- iii. With the terminal latches disengaged, use the wire(s) to pull the terminal(s) from the connector. See Figure 18.


**NOTE**

When removing terminals crimped to twisted pair wire, pull both wires simultaneously to remove both terminals together.

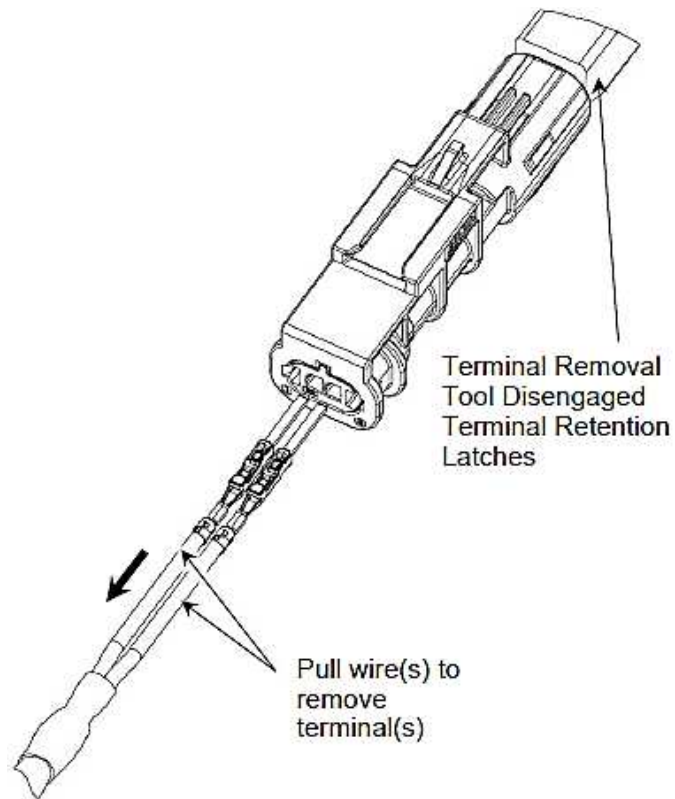


Figure 18

### 3.12. ASSEMBLY PROCEDURE FOR WIRE DRESS COVER

#### A. Installation of Wire Dress Cover onto Plug and Cap Assembly

- i. Place either pocket of the Wire Dress Cover onto the rear flange of the connector housing. Form and center the wire bundle in the wire exit. See Figure 19.

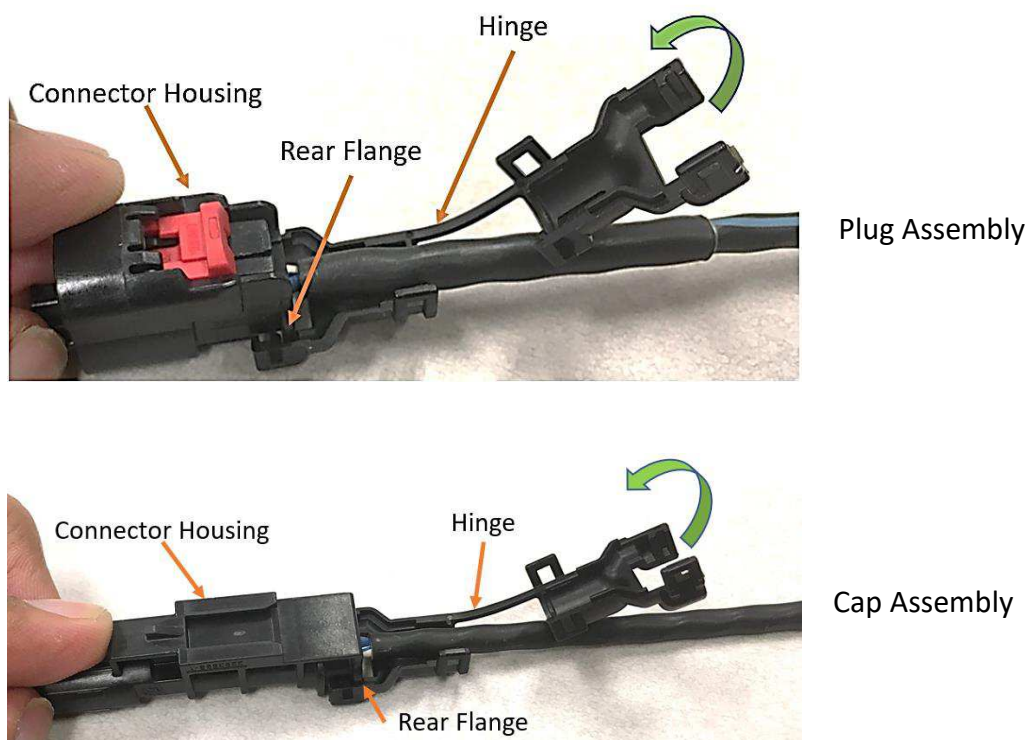


Figure 19

- ii. Fold the Wire Dress Cover at the center of the hinge so that the halves mate around the connector housing; then ensuring that the wire bundle is within the seams of the wire exit, compress the halves together until all the latches are secure. See Figure 20.

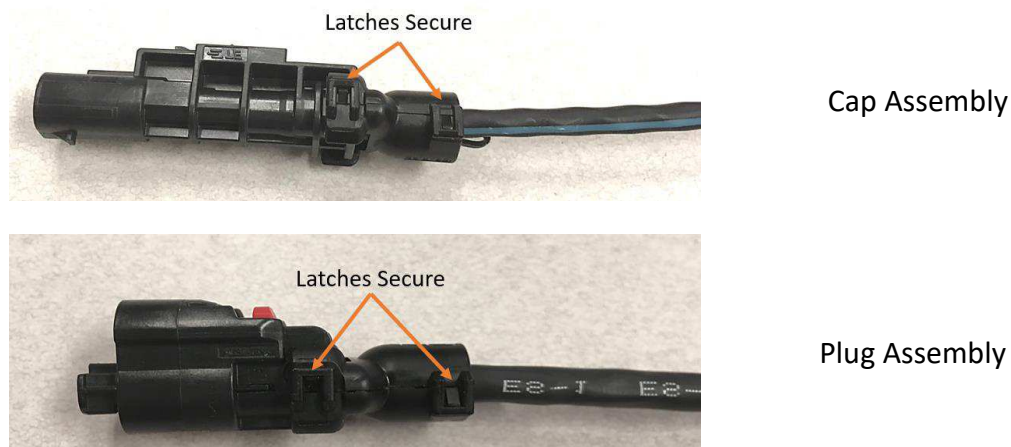


Figure 20

**NOTE**  
 Using the Wire Dress Cover in any manner other than the intended production process can allow the hinge of the cover to be manipulated in such a way that causes the latches to “bubble” and not be fully secured.





**CAUTION**

*Wire dress cover is recommended for applications involving High Pressure Spray*

**B. Removal of Wire Dress Cover**

Using the tip of a small screwdriver or TE Removal tool 776441-1, flex the latches, then rotate the halves apart. Refer to Figure 21.



**NOTE**

*Inspect latches for any damage. If damage is visible, replace Wire Dress Cover.*

Plug Assembly



Cap Assembly



Figure 21

**C. REPLACEMENT AND REPAIR**

The terminals and connectors are not repairable. DO NOT use any defective or damaged terminals or connectors. DO NOT re-use a terminated terminal by removing the wire.

**D. QUALIFICATION**

enetSEAL+ Connectors are not required to be agency evaluated and tested.

**E. TOOLING**

Figure 22 shows TE Extraction Tool 2884610-1 to unlock the female contacts from the Plug assembly and TE TPA Removal Tool 776441-1 for Cap Assembly. These tools are recommended for removing wires from connector and for TE TPA removal.

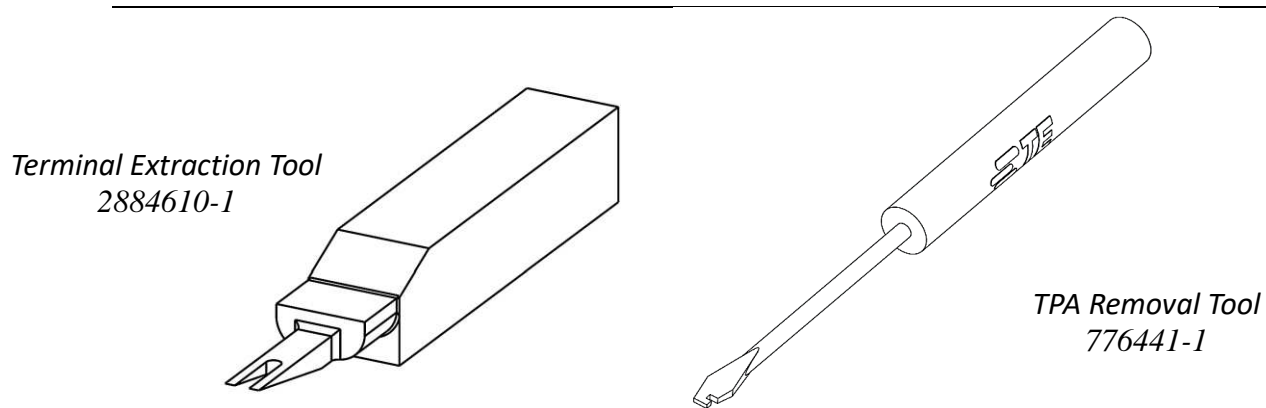


Figure 22

### 3.13. ASSEMBLY PROCEDURE FOR HEADERS AND ADAPTER

#### A. Assembly of Header/Adapter to Panel with Mounting Clip (2325098-X)

- i. Place Header or Adapter through the bulkhead panel or enclosure. Ensure that the assembly is pushed far enough through the panel to allow for ramp engagement with the clip as shown in Figure 23.

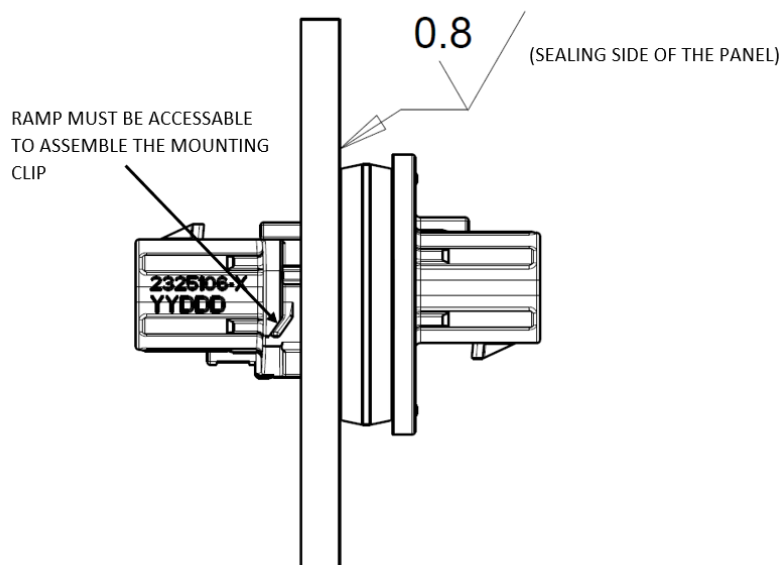


Figure 23

- ii. Align the key way on the mounting clip with the latching feature on the mating header or adapter as shown in Figure 24.

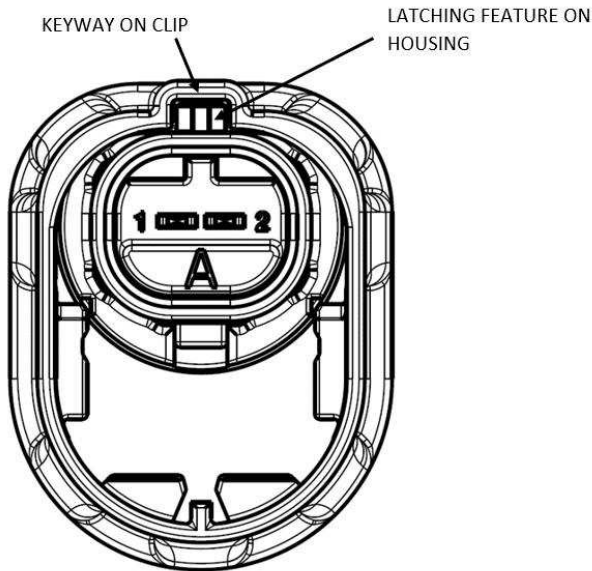


Figure 24

- iii. Slide the mounting clip linearly upwards until the part snaps into place. Take note that the ramps on the clip must engage with the ramps on the header or adapter housing otherwise assembly cannot be completed (See Figure 25). It is important to ensure the clip stays aligned as the clip is pushed upwards. The mating plug will not be able to assemble unless the mounting clip is properly assembled to the correct position.

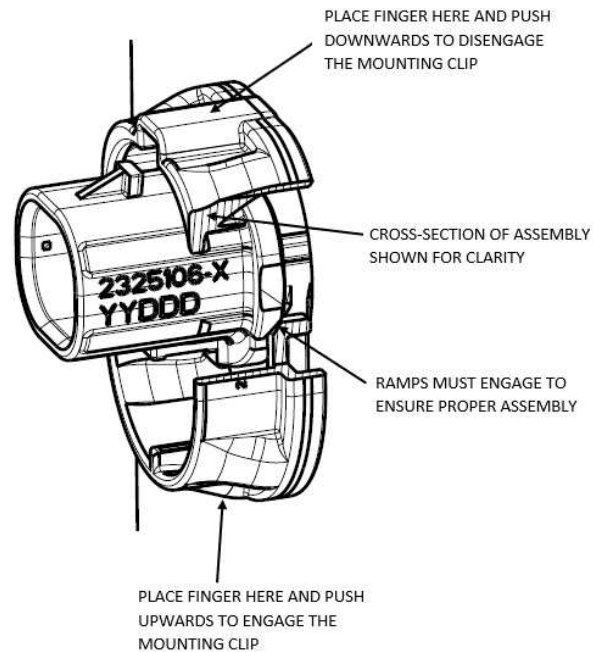


Figure 25

#### **B. Assembly of Header (with Mounting Holes, 2325102-7 and 2325103-7)**

- i. Place Header assembly through panel cutout and torque M4 fasteners 1.13 +/- 0.12Nm.

#### **C. Assembly of Dispensed Seal Headers (2325103-X)**

- i. Groove geometry should be included on mating enclosure. Dispense bead of sealant into the groove and secure the header assembly into place (See figures 31-33 in Section F).

#### **D. Assembly of Dispensed Seal Right Angle Headers (2339032-X)**

- i. Align the header with PCB using the alignment post.
- ii. Fasten the header to PCB by using M3 thread forming screw and torque it to 0.6 +/- 0.1 Nm.
- iii. Groove geometry should be included on mating enclosure. Dispense bead of sealant into the groove and secure the header assembly into place (See figure 38).

#### **E. Disassembly of Header/Adapter from Panel (with Mounting Clip)**

- i. Remove mated plug (2292906-X)
- ii. Slide mounting clip linearly downward pushing from the top surface as shown in Figure 25.
- iii. Slide the clip off the header or adapter assembly once the keyway has been aligned with the latching feature on the header or adapter.
- iv. Header or adapter can then be removed from the panel from the opposite side.

**F. Heat Staking the Header Assemblies to PCB (Optional)**

- i. Place header assembly through the PCB.
- ii. Heat stake each post to the PCB. Recommended set up parameters are as follows: Dwell time=22sec, Load = 65 psi, Temperature = 595F.
- iii. Further detail regarding a recommended heat stake geometry can be found in Section F below.

**G. Assembly of Dispensed seal 180degree Header (2366735-X)**

- i. Dispense bead of sealant into the groove and secure the header assembly into place. Place Header assembly through panel cutout. See figure 39.
- ii. Align the header with PCB using the alignment post. See figure 40,41.
- iii. Fasten the header to PCB by using M4 thread forming screw.



**CAUTION**

*If headers (2325102-X/2325103-X/2366735-X) or adapters (2325106-X) are dropped, the assembly must be discarded and replaced with a new assembly.*

**H. Recommended Panel/Enclosure, PCB, and Stake Geometries**

1. RECOMMENDED KEEP OUT REGION TO ENSURE PROPER ASSEMBLY TO PANEL/ENCLOSURE.

2. RECOMMENDED KEEP OUT REGION TO ENSURE PROPER CLIP ASSEMBLY.

3. SURFACE FINISH REQUIREMENT APPLIES WITHIN KEEPOUT REGION.

4. THICKNESS BETWEEN KEEP OUT REGIONS MUST MEET THICKNESS REQUIREMENT FOR SPECIFIC MOUNTING CLIP TO BE USED PER TE CUSTOMER DRAWING 2325098.

5. SEALING SURFACE, NO BURRS, SCRATCHES OR TOOL MARKS ALLOWED.

6. REMOVE SHARP EDGES. R0.5MM MAX.

7. X BASIC AND Y BASIC TO BE DEFINED BY THE CUSTOMER.

8. RECOMMENDED KEEP OUT REGION TO ENSURE PROPER ASSEMBLY WITH MATING PLUG. THE GEOMETRY SHOWN FOR THE KEEPOUT REGION IS ONLY NECESSARY IF THE DISTANCE FROM THE OUTSIDE SURFACE OF THE ENCLOSURE TO THE HEADER BOTTOMING SURFACE/SURFACES EXCEEDS 11.5MM.

Figure 26: Notes regarding recommended panel/enclosure geometry for 2325102-X.

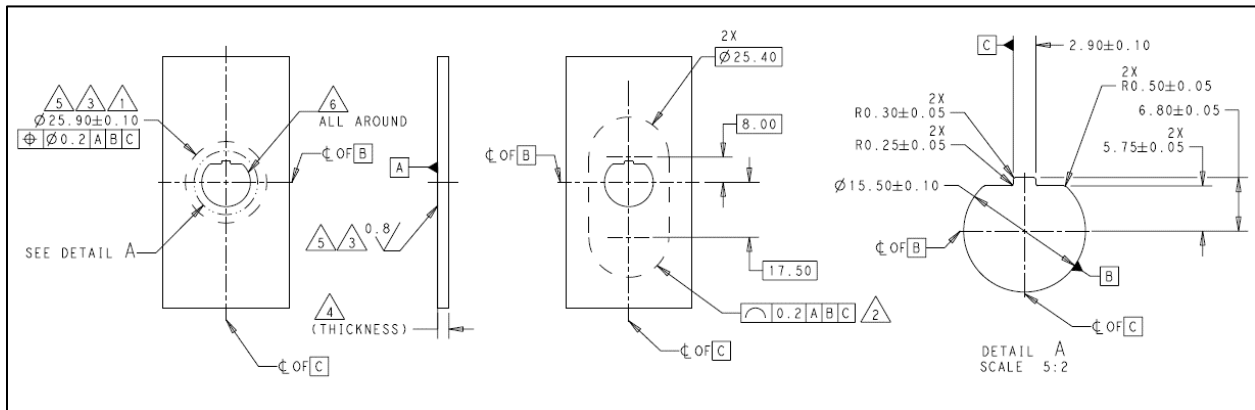


Figure 27: Recommended panel/enclosure geometry for header 2325102-1.

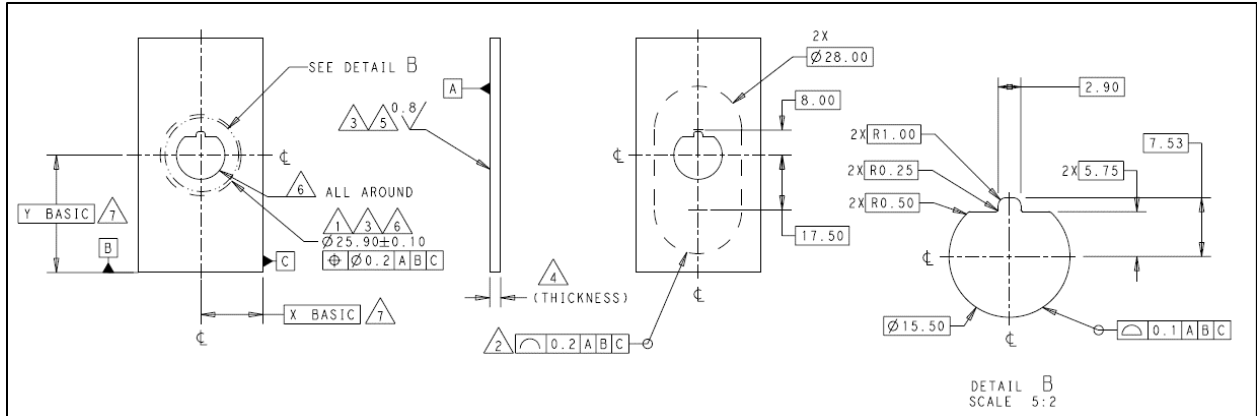


Figure 28: Alternative recommended panel/enclosure geometry for header 2325102-1.

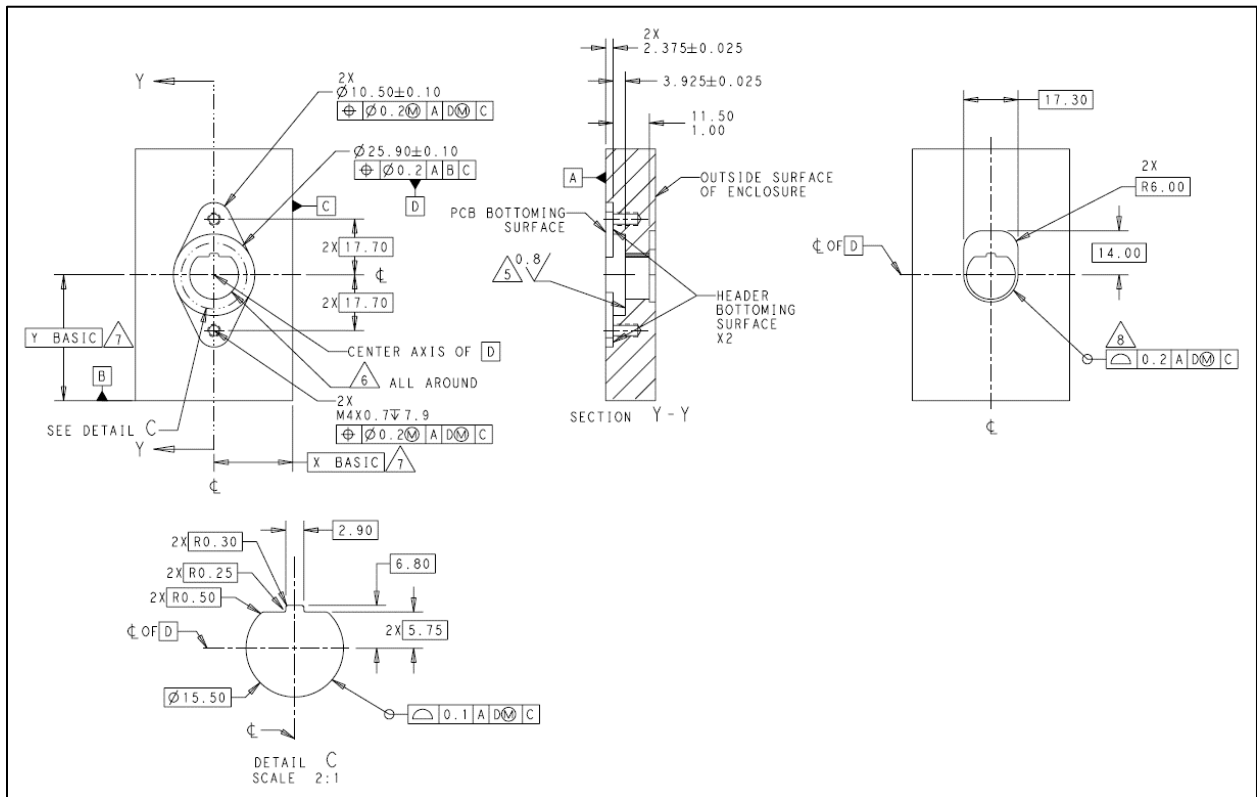


Figure 29: Recommended panel/enclosure geometry for header 2325102-7.

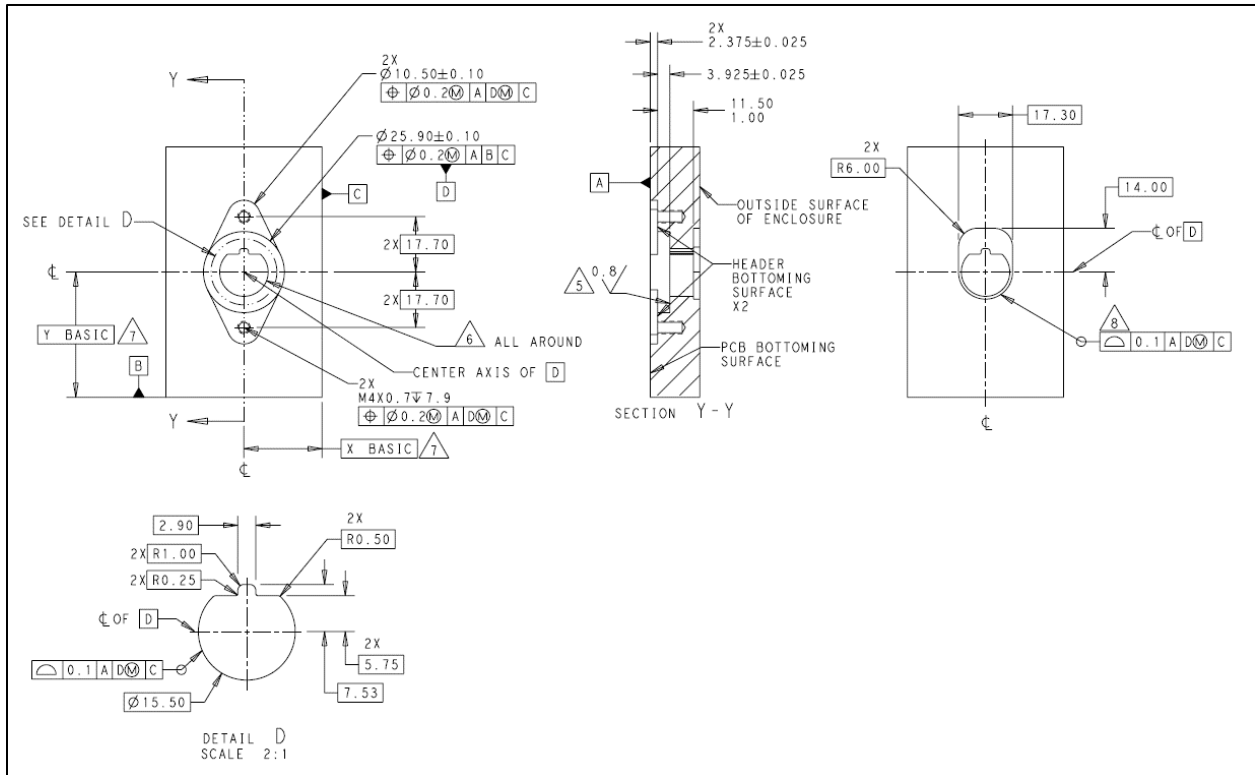


Figure 30: Alternative recommended panel/enclosure geometry for header 2325102-7.

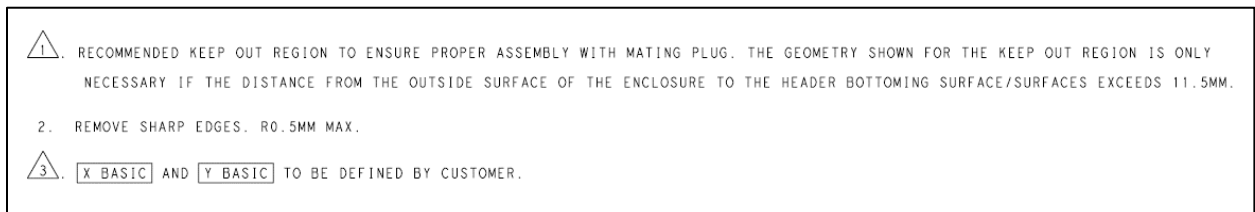


Figure 31: Notes regarding recommended panel/enclosure geometry for 2325103-X.

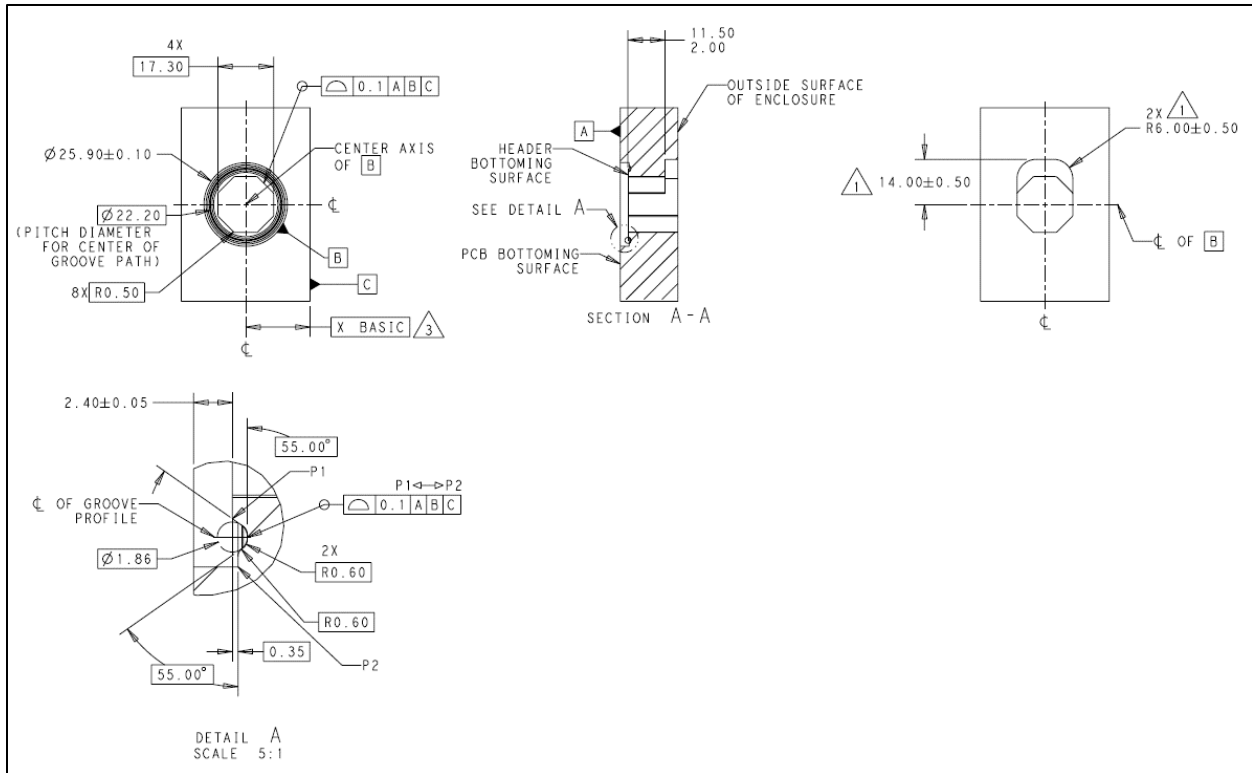


Figure 32: Recommended enclosure geometry for header 2325103-1.

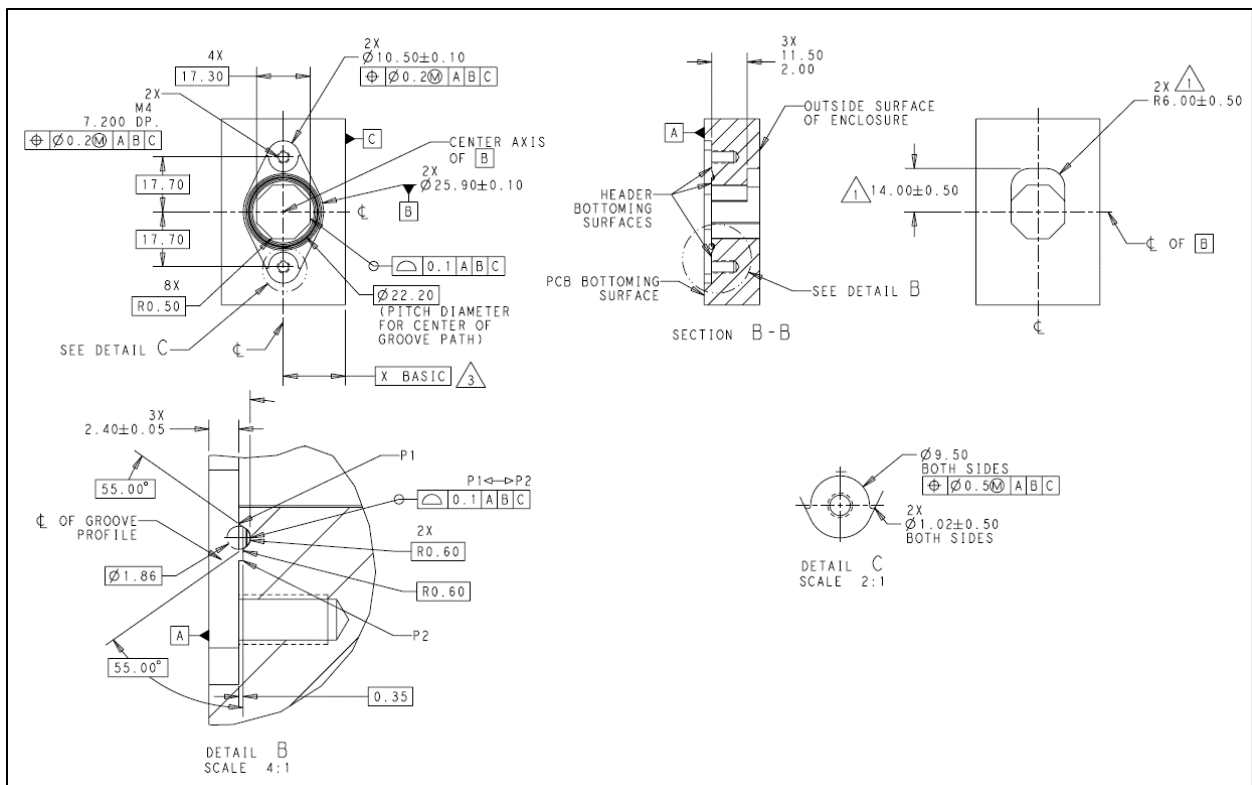


Figure 33: Recommended enclosure geometry for header 2325103-7.





 **X BASIC** AND **Y BASIC** TO BE DEFINED BY THE CUSTOMER.  
 HOLES ONLY NECESSARY FOR 2325102-7 AND 2325103-7 VARIANTS.

Figure 34: Notes regarding recommended PCB layout for headers 2325102-X and 2325103-X.

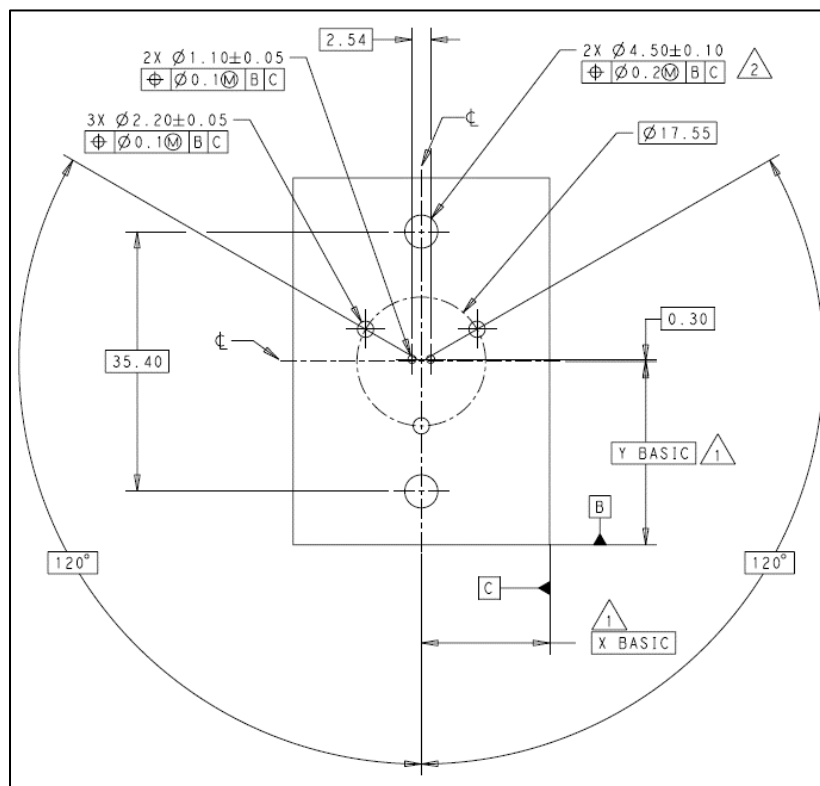


Figure 35: Recommended PCB layout for headers 2325102-X and 2325103-X.

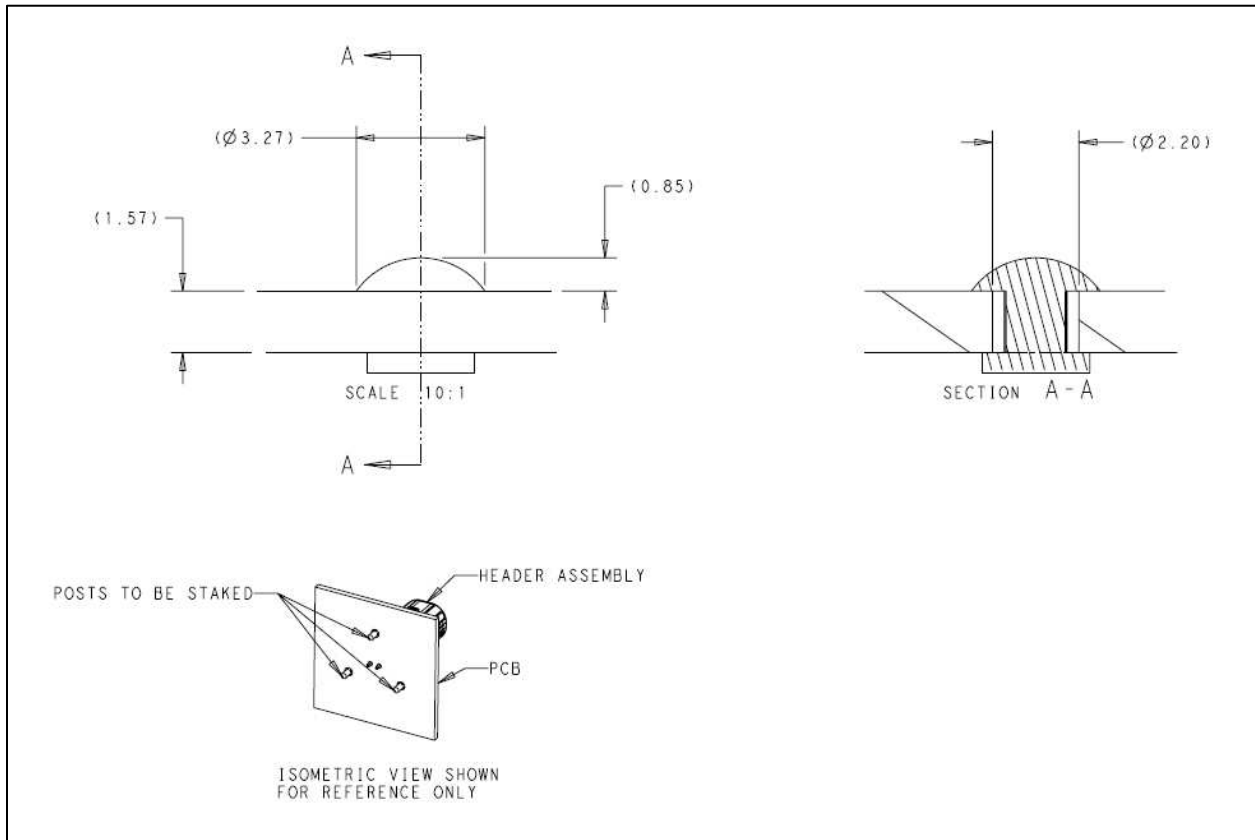


Figure 36: Recommended (optional) stake geometry for headers 2325102-X and 2325103-X

\*Note: Datum C is Customer Defined as per application

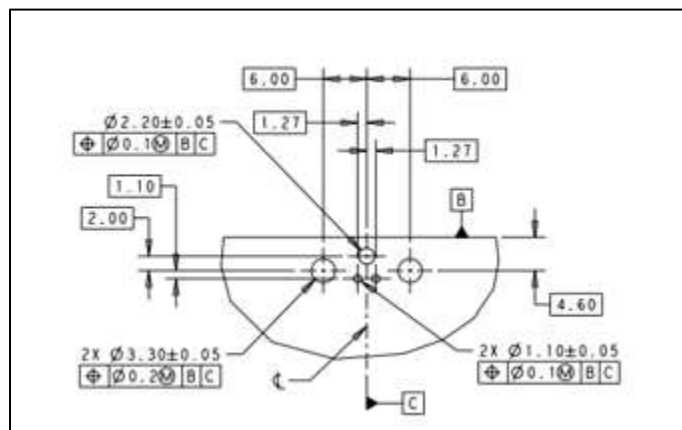


Figure 37: Recommended PCB layout for headers 2339032-X



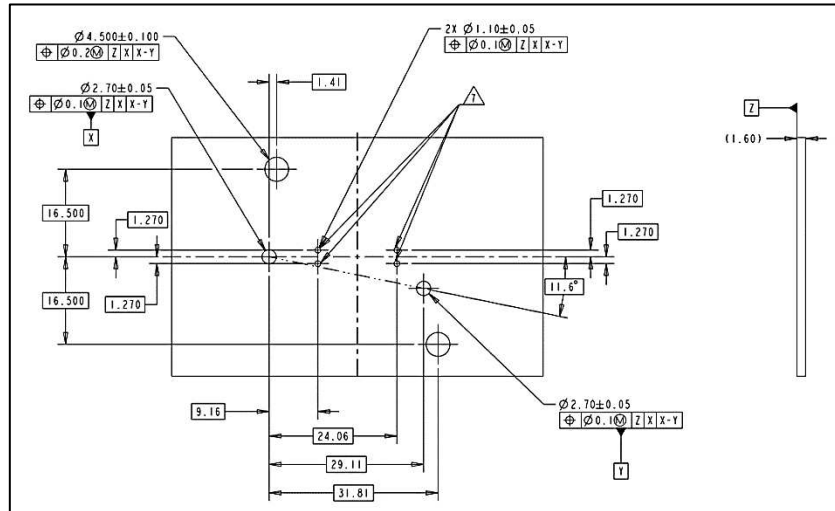


Figure 41: Recommended PCB layout for headers 2366735-2, -4