


HVP1100 90 deg 1pos Plug&Header Connector Assy

APPLICATION SPECIFICATION



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1. SCOPE

1.1 Content

This specification covers the requirements for application of the sealed 1 position HVP1100 high voltage connector. The HVP1100 system is designed to meet USCAR 2, USCAR 37 specifications and for a metric wire size 70mm² (HUBER&SUHNER). The connector incorporates conductive EMI shields to reduce radiated emissions in the application.

The HVP1100 90deg connector is available for six different keying or polarizing configurations for low mating / unmating forces. The connector system incorporates the 11mm power contacts and an integrated High Voltage Interlock (HVIL) System. The housings are molded in orange to denote a high voltage system.

1.2 Processing notes

The process engineer is responsible for ensuring the quality of the manufacturing process and the proper function of the system. The warranty and liability is excluded, if quality deficiency or damages occurs by failing compliance to this specification or using unspecified, unreleased tools and unreleased connector components.

2. APPLICABLE DOCUMENTS

The following mentioned documents are part of this specification. If there is a conflict between the information contained in the documents and this specification or with any other technical documentation provided, the latest valid customer drawings takes preference.

2.1 TE Connectivity Documents

This Application Specification is based on the latest valid customer drawings.

Table 1: Customer drawings

HVP1100 1 pos plug side		
1	2137702	HVP1100 1pos plug assy. sld 90deg
2	2137704	HVP1100 1pos plug hsg assy. sld 90deg
3	2137711	Cable seal assy.
4	2137722	Lower insert assy.
5	2137735	Upper insert assy.
6	2137715	Terminal Assy. 90DEG 11mm
7	2294655 (2209388)	Shielding ferrule
8	2294653 (2137710)	Cable enforce ring
HVP1100 1 pos header side		

1	2137740	HVP1100 1pos header 90deg assy. sld
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2.2 Specifications

2.2.1 TE documents

Table 2: TE-Specifications

114-18021	Application Specification for Micro Quadlock System
108-18030-0	Product Specification for Micro Quadlok System
108-101010	Product Specification for HVP1100 90 deg 1pos Plug&Header Connector Assy
114-18022	General Guidelines for Application of Contacts With Open Crimp Barrels

2.2.2 General documents

A. IEC 60352-2: 2006 Solderless connections, Part 2: Crimped connections - General requirements, test methods and practical guidance

B. Wire specification of tested high voltage (HV) cables, shielded, H&S /583965/Vers. D/Feb.09

Supplier: Huber&Suhner (H&S)

Supplier: Huber&Suhner Wire+Cable Division

Cross-section: 70mm²

Jacket diameter: 17.0±0.3mm

Cable description: H&S 1×70mm²/Radox Elastomer S, Cu blank(360×0.51 D), 600VAC

TE-Part-No. : 2209681-2

C. We also verify below 50mm² high voltage (HV) cable per customer XALT's request, but this is not a recommended cable:

Supplier: Champlain

Cross-section: 50mm²

Jacket diameter: 17.1±0.3mm

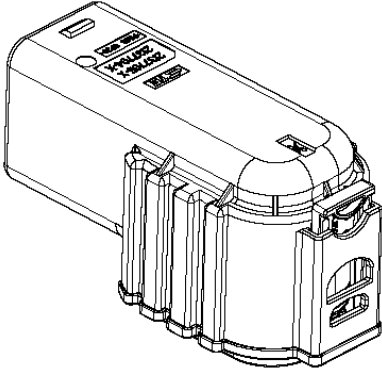
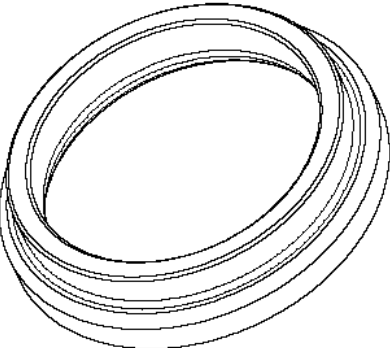
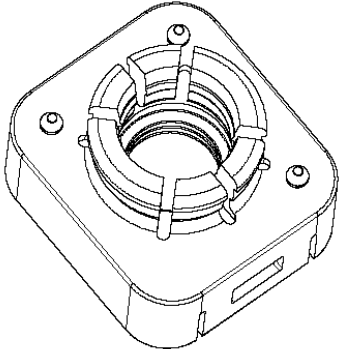
Cable description: EXTRAD 150 HVFX Shielded XLE Jacketed High Voltage Cable, Thick Wall

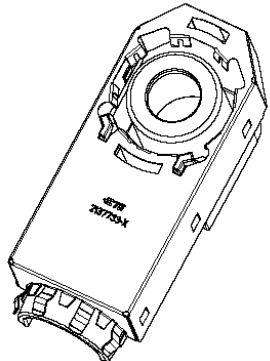
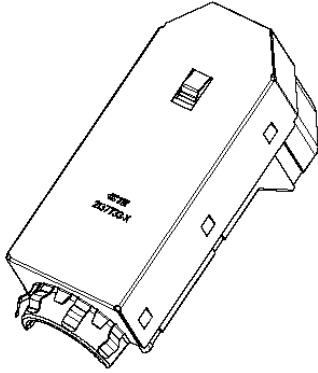
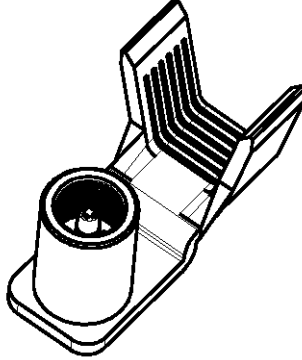
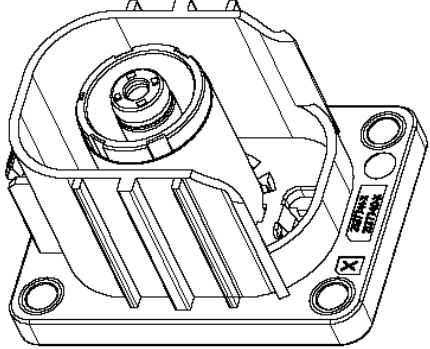
TE-Part-No. : /

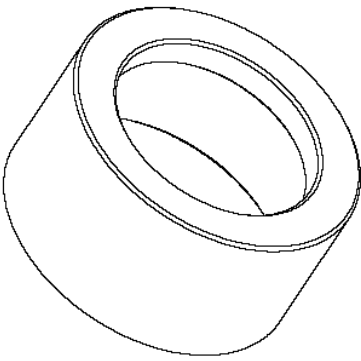
3. CONDITION OF DELIVERY AND PACKAGING

3.1 Components

Table 3: Components

TE-Part-No.	Description	Qty for 1pos	Picture
2137704-1 2137704-2 2137704-3 2137704-4 2137704-5 2137704-6	HVP1100 1pos plug hsg assy. sld 90deg	1x	
2294653-1 (same as 2137710-2)	Cable enforce ring	1x	
2137711-*	Cable seal assy.	1x	

<p>2137722-1</p>	<p>Lower insert assy.</p>	<p>1x</p>	
<p>2137735-1</p>	<p>Upper insert assy.</p>	<p>1x</p>	
<p>2137715-2</p>	<p>Terminal assy. 90deg 11mm</p>	<p>1x</p>	
<p>2137740-1 2137740-2 2137740-3 2137740-4 2137740-5 2137740-6</p>	<p>HVP1100 1pos header 90deg assy. sld</p>	<p>1x</p>	

<p>2294655-1 (same as 2209388-1)</p>	<p>Shielding ferrule</p>	<p>1x</p>	
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3.2 Packaging and Storage

The products should be used on a “first in, first out” basis to avoid storage contamination, see latest valid customer drawings too.

4. PROCESSING

The crimping is only valid for the specified cable indicated in chapter 2.2.2.

Cable Supplier:	Huber&Suhner Wire+Cable Division
Cross-section:	70mm ²
Jacket diameter:	17.0±0.3mm
Cable description:	H&S 1×70mm ² /Radox Elastomer S, Cu blank (360×0.51 D), 600VAC
TE-Part-No. :	2209681-2

4.1 HV 11mm Contact

4.1.1 Stripping dimensions

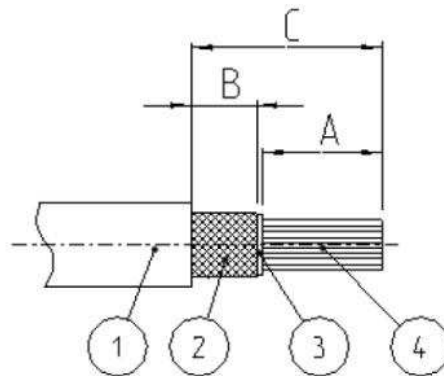


Figure 1

Item	Cable	A[mm]	B[mm]	C[mm]
1	Outer Jacket	--	--	36±1
2	Screen	--	18±1	--
3	Insulation	17±1	--	--
4	Conductor	--	--	--

4.1.2 Assembly Instructions

Step 1 Wire Processing

Prepare the shielded cable (Huber&Suhner) acc. to Figure1. The stripping operation must not cut any cable strands, insulation or jacket at places other than specified by the cable stripping dimensions. Take care that the individual strands of the cable are not be bent and that the insulation or jacket is not damaged. The surface must be clean and free of contamination.

Step 2 Apply the cable onto the crimping position

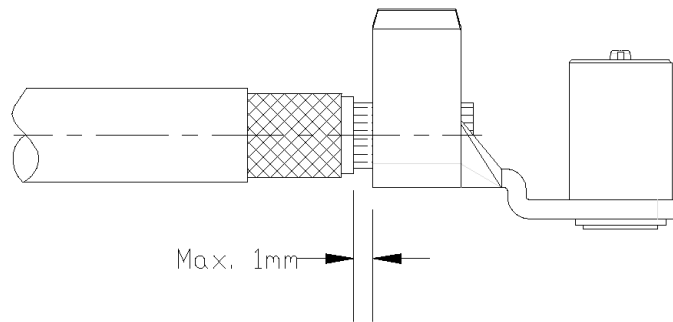


Figure 2

Before crimping, the center terminal must be positioned to fulfill following conditions:

- A max. air gap of 1 mm is allowed between the shoulder of the cable insulation and the rear end of crimp barrel shown in figure 2.
- All strands must be positioned in the crimp barrel.
-

Step 3 Crimping Process

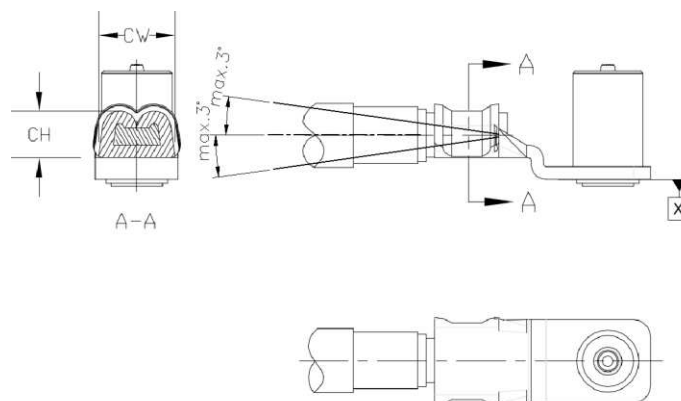


Figure 3

- After crimping, the end of the wire must extend beyond the front end of crimp barrel.
- The crimp height and width are shown as bellowing:

Crimp Height CH(mm)	Crimp Width CW(mm)	For Wire Size
-	-	35mm ²
11.65±0.1	18	50mm ²
11.75±0.1	18	70mm ²
-	-	95mm ²

- The bend of the terminal within the crimp area must not exceed 3° upwards or downwards (relative to datum X).

5. STRUCTURE AND ASSEMBLY OF PLUG

The following procedures show the details of the cable assembly and insertion instructions of the cable assembly into the receptacle housing subassembly. The processing is only valid for the specified cable and only these combinations have been validated by TE. Alternative cables may be used after ensuring performance through validation testing.

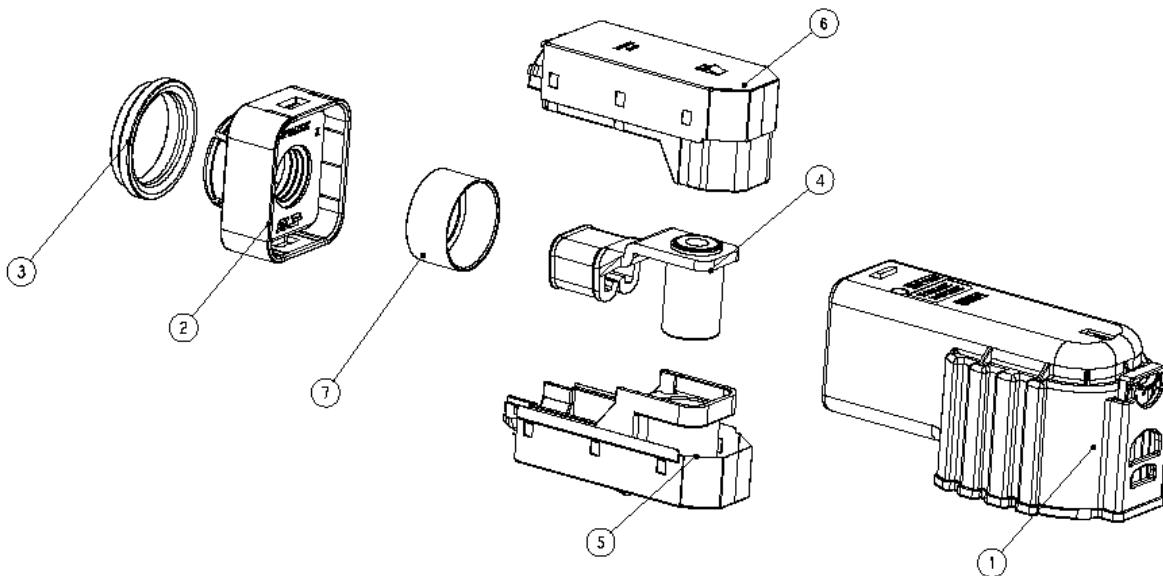


Figure 4: Exploded view plug assembly

Table 4: Components cable assembly

Item	TE-drawing No.	Description
1	2137704	HVP1100 1pos plug hsg assy. sld 90deg
2	2137711	Cable seal assy
3	2294653	Cable enforce ring
4	2137715	Terminal assy. 90deg 11mm

5	2137722	Lower insert assy.
6	2137735	Upper insert assy.
7	2294655	Shielding ferrule

5.1 Plug assy.

5.1.1 Assembly process of lower insert assy.

A. Hackle the shield back to make the braid shaped as a circle which is perpendicular with cable. as shown in figure 5



Figure 5: Hackle the shield braid

B. Slide lower insert assy. over terminal assy. as shown in figure 6 until it stops against the terminal as shown in figure 7.

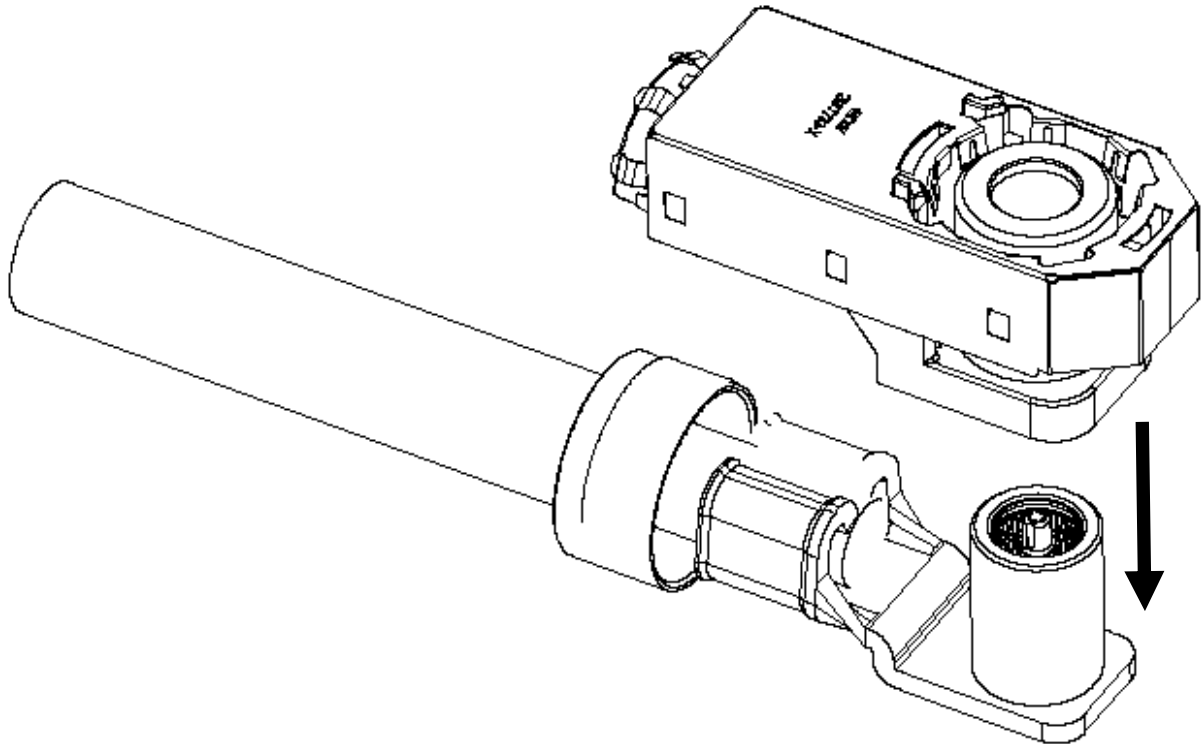


Figure 6: Slide lower insert assy.

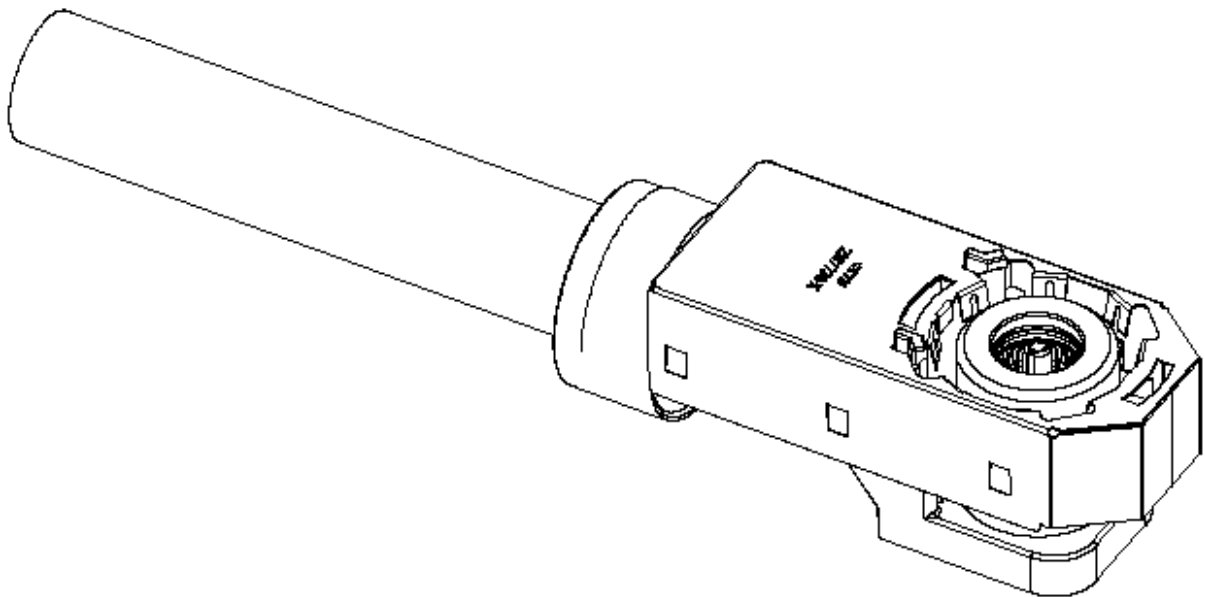


Figure 7: Slide lower insert assy.

5.1.2 Assembly process of upper insert assy.

Slide upper insert assy. over terminal assy. as shown in figure 8 until it is locked with lower insert assy. by audible latching as shown in figure 9.

Note: Make sure lower shield and upper shield overlap with the bend feature outside as shown in figure 10.

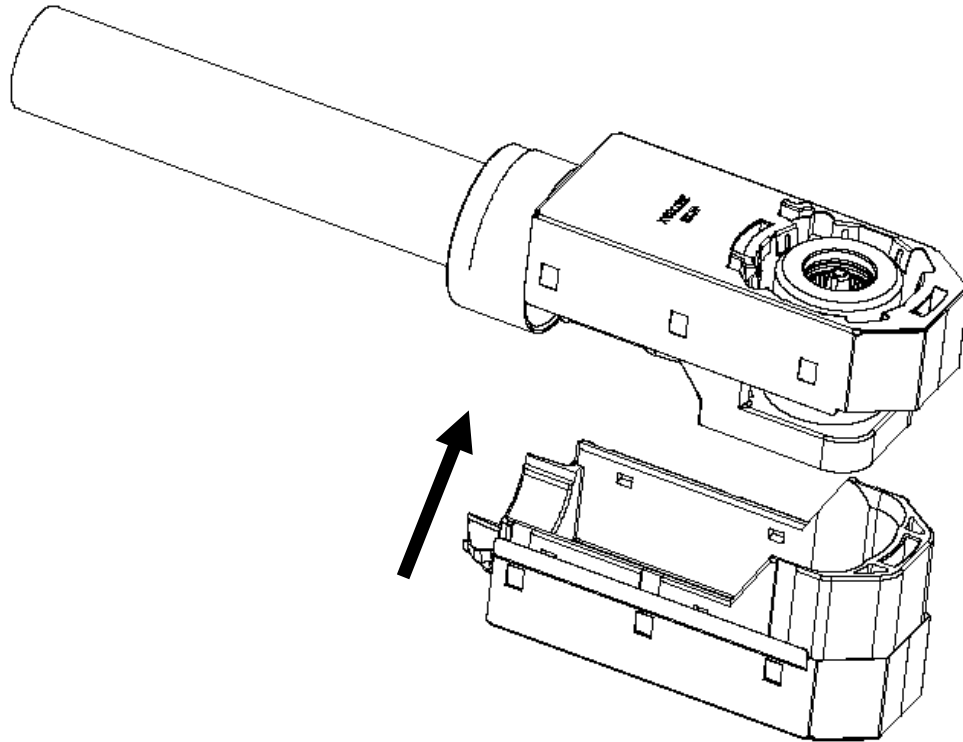
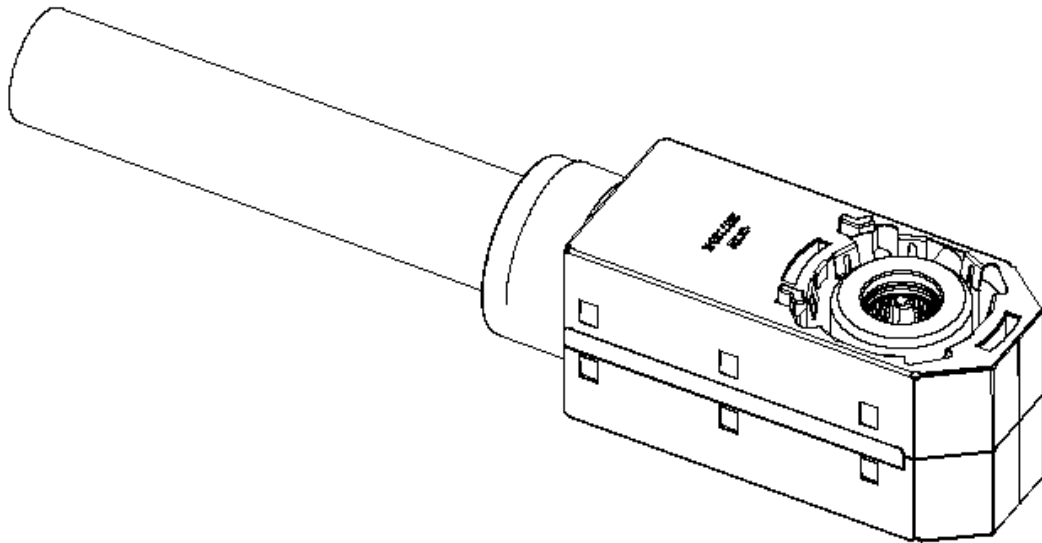


Figure 8: Slide upper insert assy. over terminal assy.



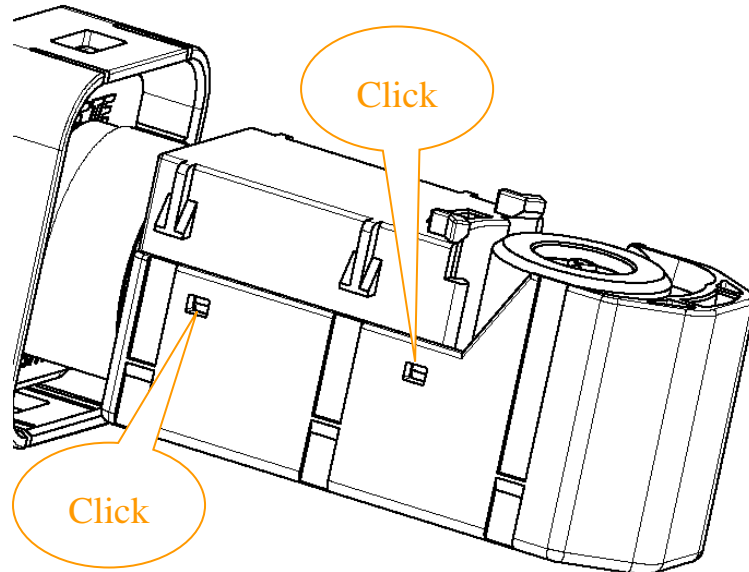


Figure 9: Audible latching



It is essential that there are no mistakes in this step because there will be no chance to re-work the parts

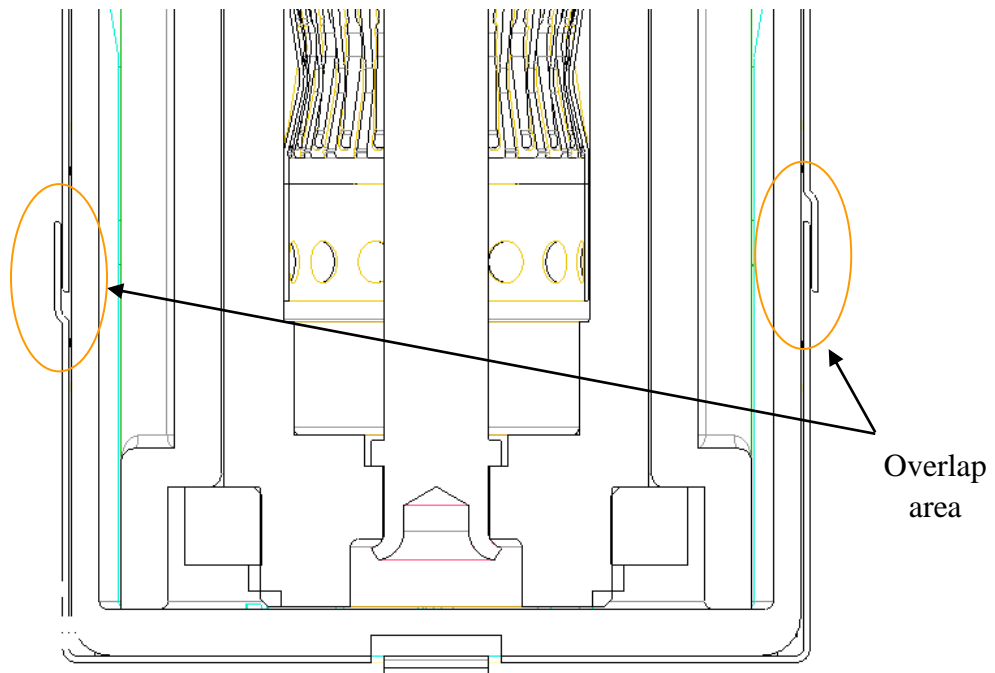


Figure 10: Shield overlap view

5.1.3 Shielding ferrule assembly

- A. Set the shielding braid over the tails of lower shield and upper shield as shown in figure 11.

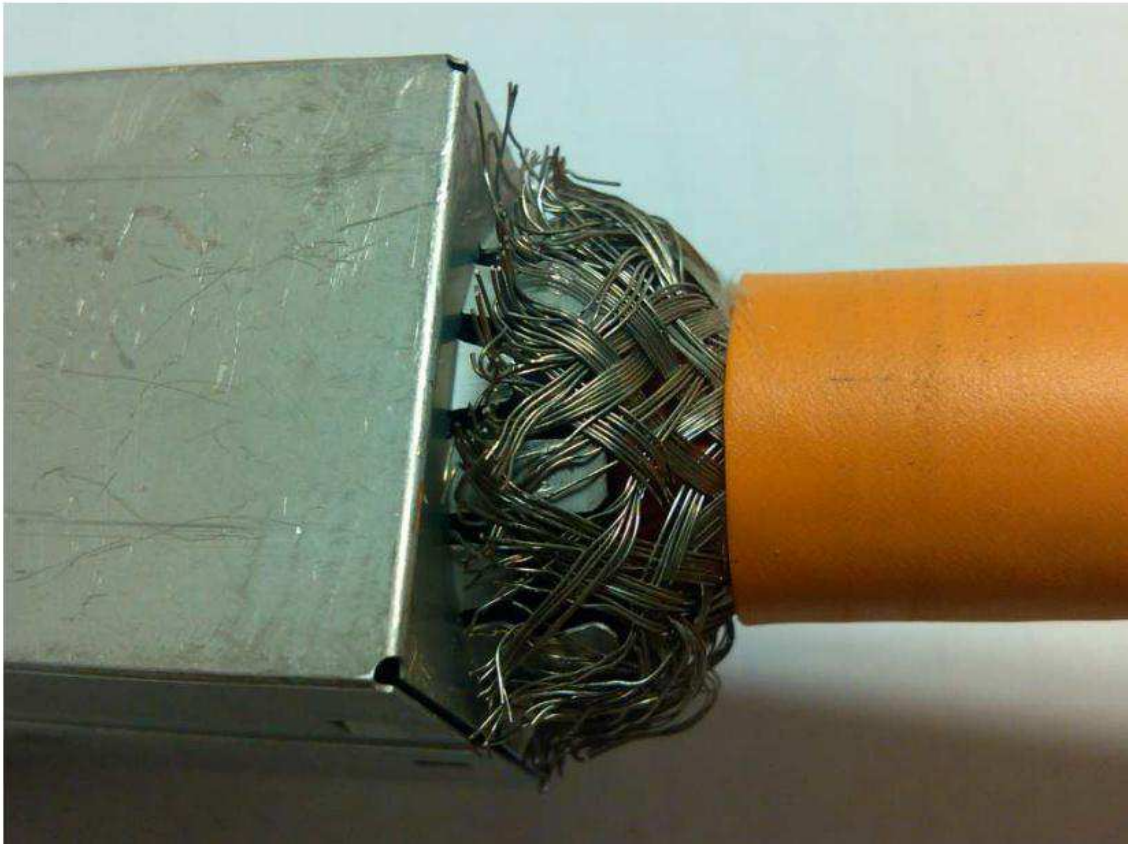
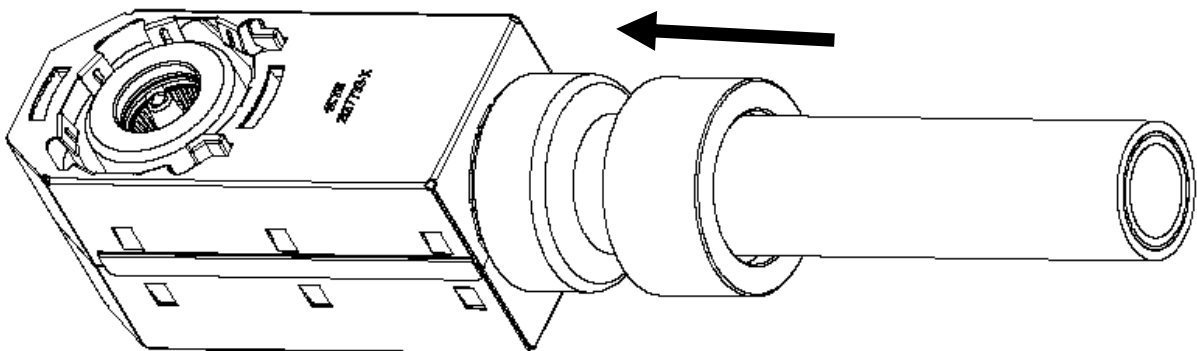


Figure 11: Set the shielding braid over tails of lower shield and upper shield

- B. Push shielding ferrule over tails of lower shield and upper shield as shown in figure12
- C. Inspection dimensions as shown in figure13.

NOTE:

Make sure the inside wall of shield ferrule match with all the beams around the shield circles.
Don't left any discrete shield braid into terminal assy.



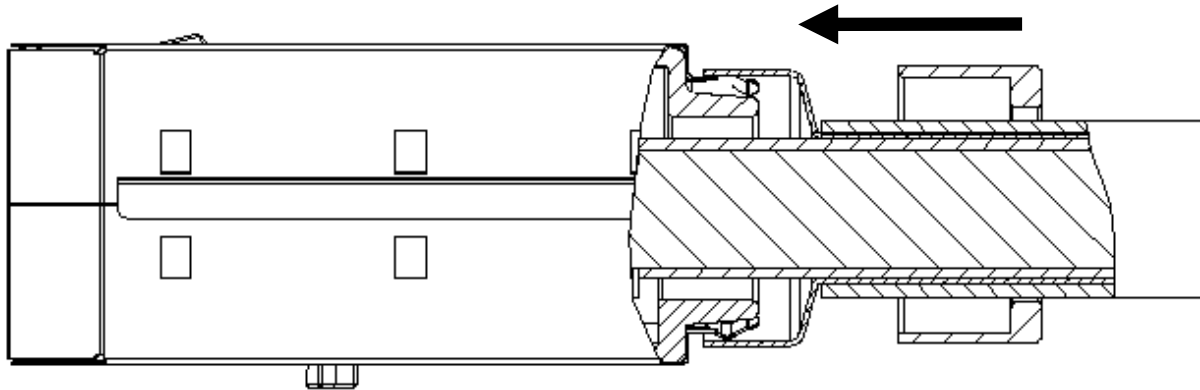


Figure 12: Assembly shield ferrule

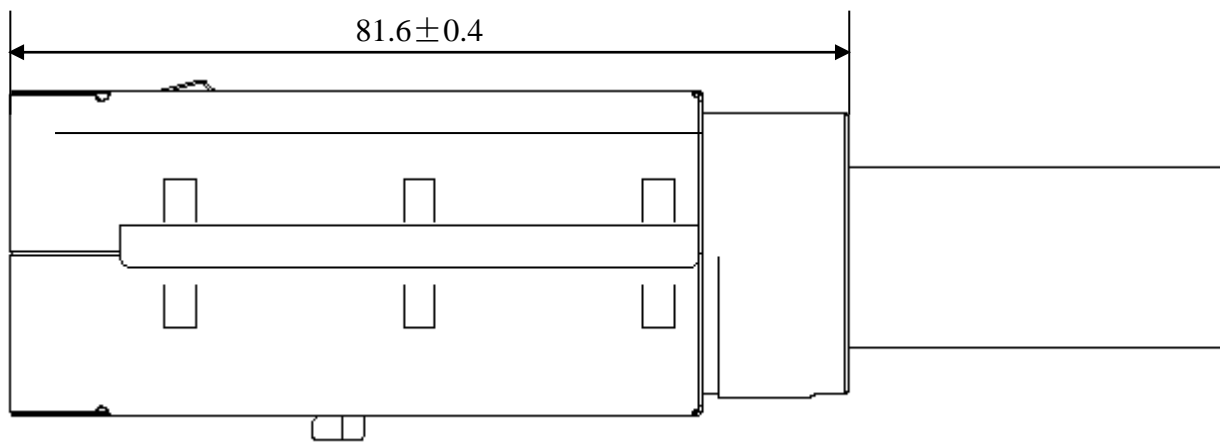


Figure 13: Inspection dimension of shielding ferrule assembly

The following items should be inspected and verified:

- All components are present and parts are crimped in correct orientation and location
- No visible cracking of the shielding parts and no loose cable shield strands

5.1.4 Assembly process of terminal insertion

A. Insert the terminal insertion into the plug housing assy. until it stops against the inside of the housing.

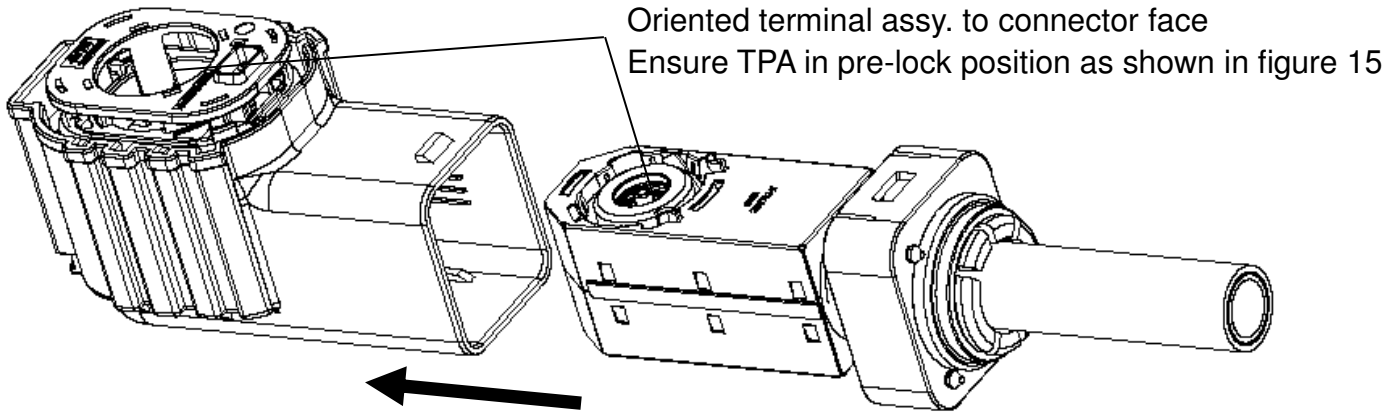


Figure 14: Oriented terminal assy. to connector face

B. Push TPA until it is in second lock position as shown in figure 15.

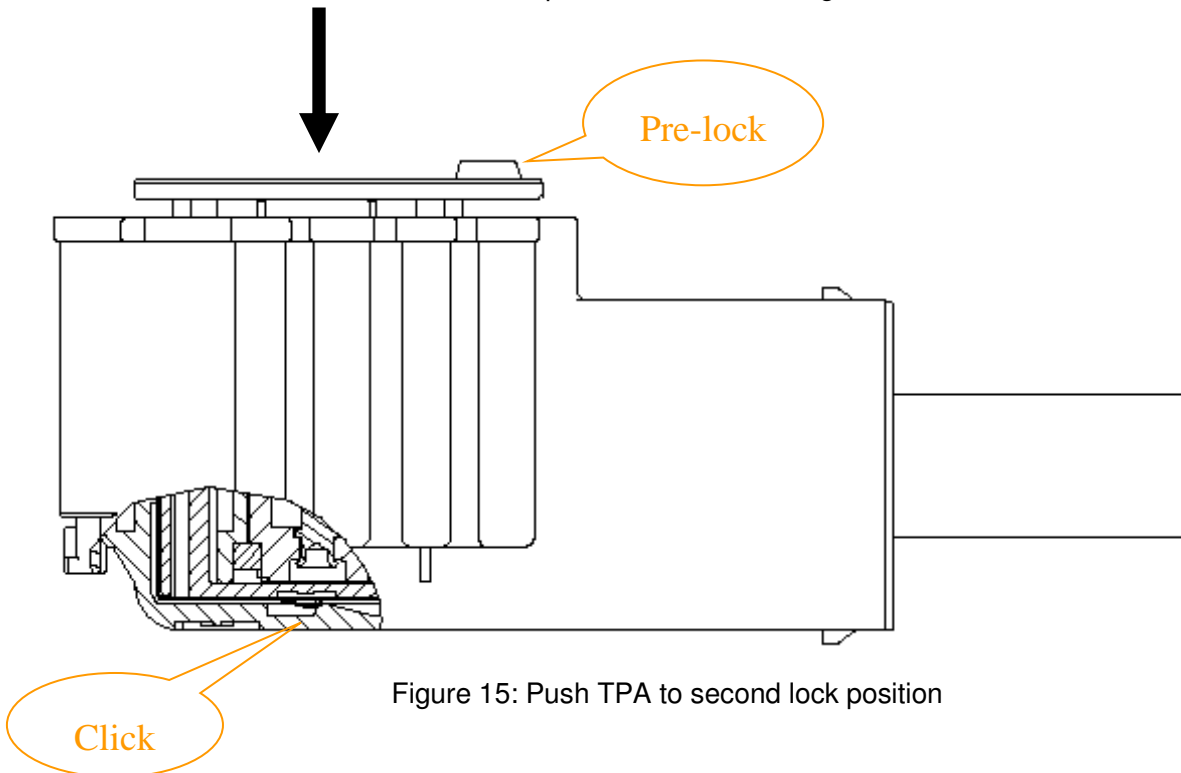


Figure 15: Push TPA to second lock position

5.1.5 Assembly process of cable seal assy.

A. Slide cable seal assy. onto plug housing as shown in figure 16, until it is fully locked by audible latching as shown in figure 17.

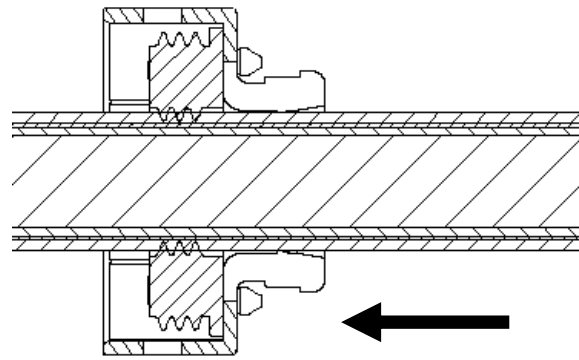


Figure 16: Mounting cable seal assy. on cable

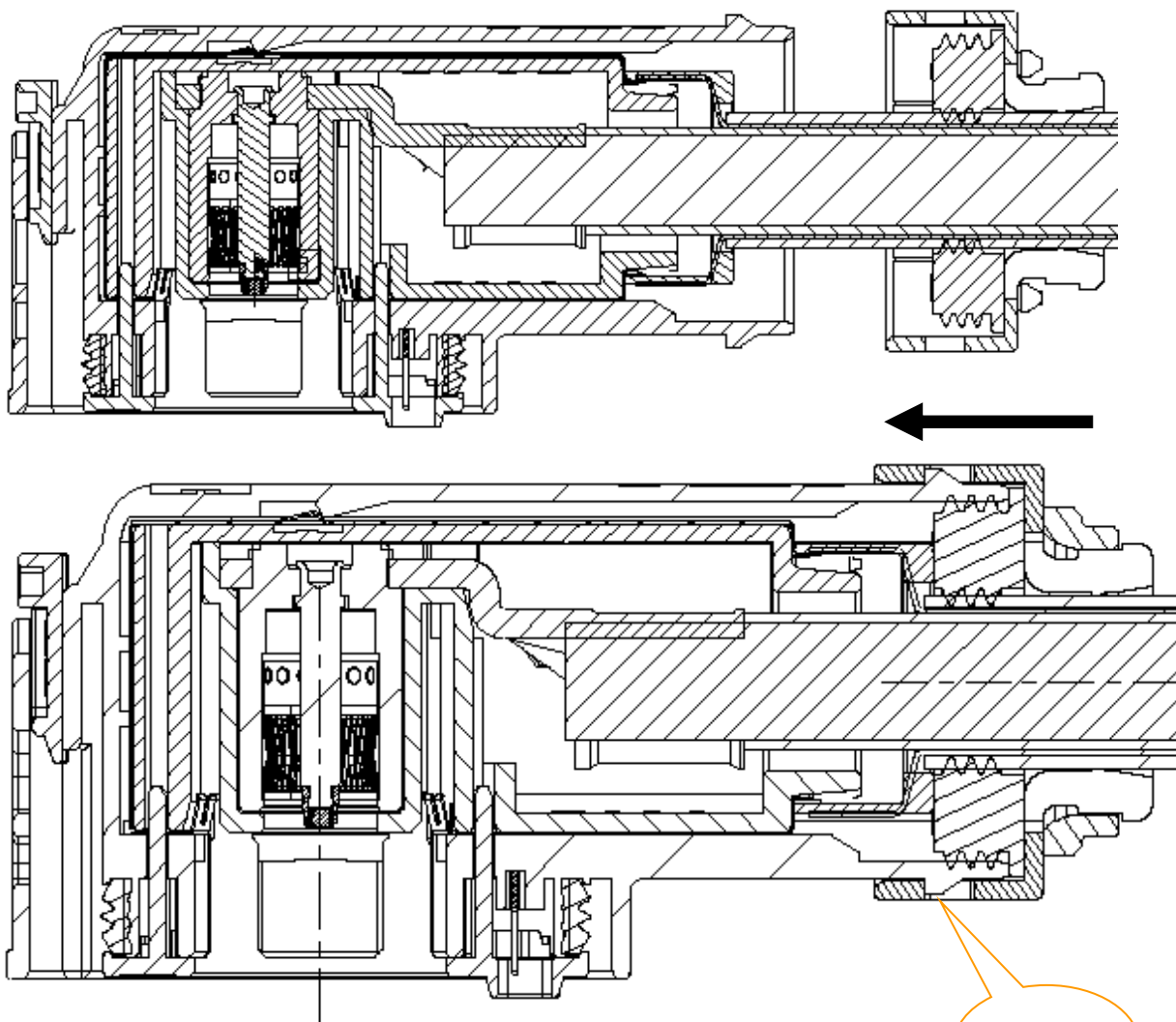


Figure 17: Assembly cable seal assy.

5.2. EXTRACTION OF TERMINAL ASSY

The following procedures show how to extract terminal insertion from the housing.

- A. Use special tool to move TPA from second lock to pre-lock position.
- B. Hold the cable tail and pullout the terminal insertion axially from housing as shown in figure 18.

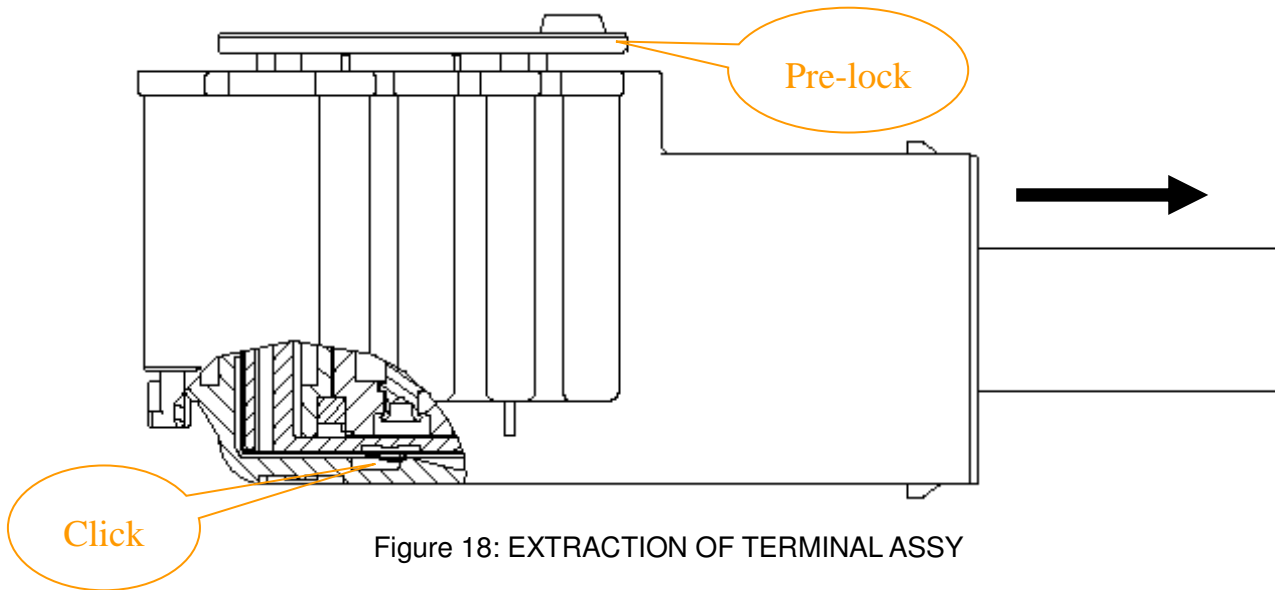


Figure 18: EXTRACTION OF TERMINAL ASSY

6. STRUCTURE AND ASSEMBLY OF HEADER

6.1. HEADER STRUCTURE OVERVIEW

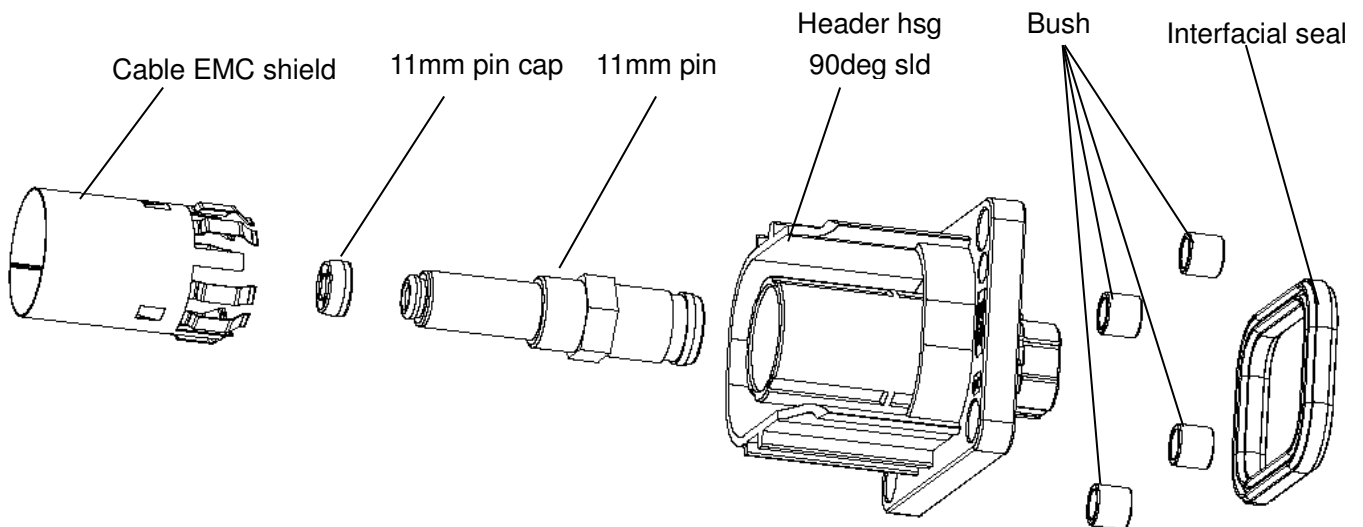


Figure 19

INTRODUCTION

This instruction sheet provides information on the assembly and installation of the HVP1100-1P header assembly to a device. It also provides instructions regarding the mating and unmating of the header assembly with the mating HV1100-1P plug assembly.

NOTE

All dimensions are in millimeters.

Figures and illustrations are for reference only and are not drawn to scale.

Read these instructions carefully before attempting any assembly procedures

COMPONENTS

Figure 19 provides the components required to make the assembly in this instruction sheet. The header assembly must be mounted to a device housing to complete the installation sequence.

TOOLING

For MQS contact crimping, see application specification 114-18021 for crimping information

CONTACT PROBING

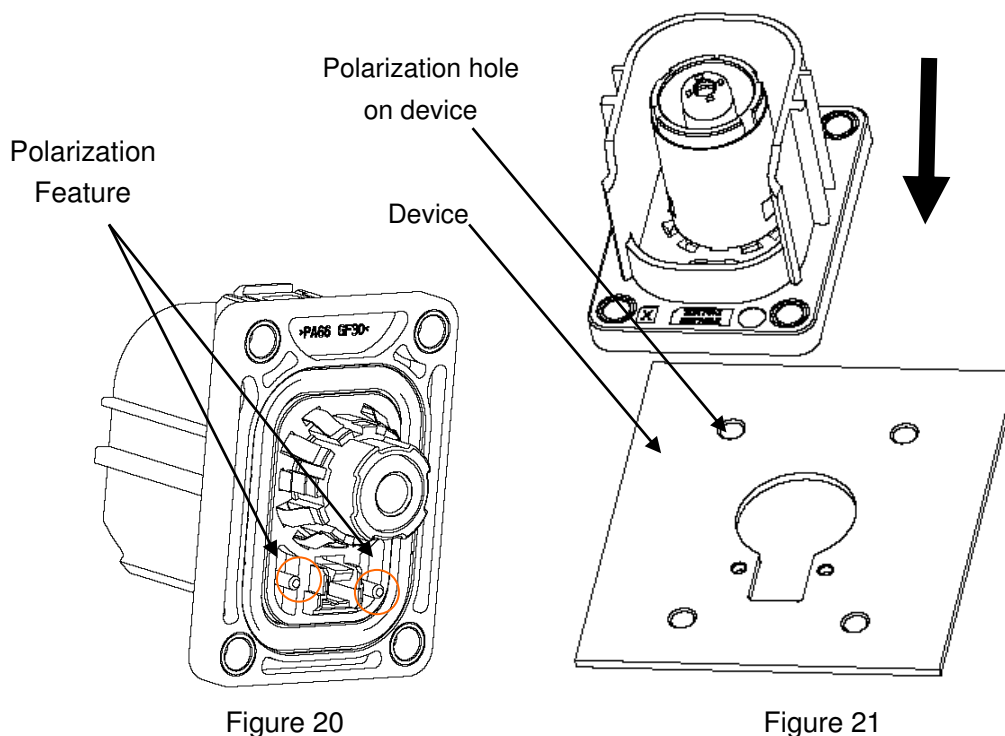
Contact probing is not recommended on the header due to the possible presence of high voltage! If continuity checks need to be done, the user must ensure the high voltage is disabled.

6.2 HEADER INSTALLATION ONTO DEVICE

ASSEMBLY

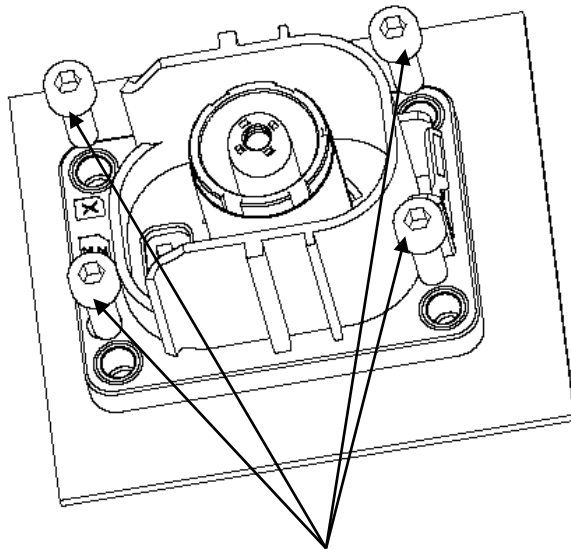
The following procedure shows the details of the header installation onto a device and the HVIL receptacle insertion into the header assembly.

- A. Note the polarization feature located on the back side of the header shown in Figure 20.

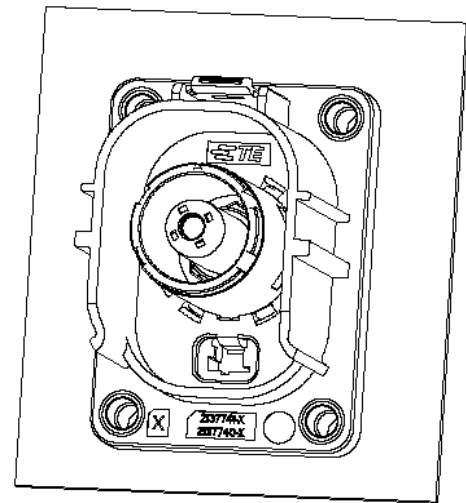


- B. Install the header assembly into the device mounting interface by aligning the header polarization feature and pushing the header into the mounting hole by hand until the header is seated against the face of the device as shown in Figure 22.
- C. Screw the header with four M5 fasteners (inner hexagon screw preference) through the flange mounting holes as shown in Figure 22, the standard M5 washer recommended if needed. Torque all fasteners to $6 \pm 0.5 \text{ Nm}$. The user must ensure that the device and fasteners are compatible and capable of meeting the above torque requirements.

NOTE: See customer drawing C2137740 for mounting interface definition and requirements.



Screw header with four M5 fasteners



Header seated against device

Figure 22 Mounting the header to device

NOTE: User must ensure that the header are installed into the correct location.

6.3. HVIL RECEPTACLE OPTION

6.3.1 Insert the HVIL receptacle before header fastening onto device

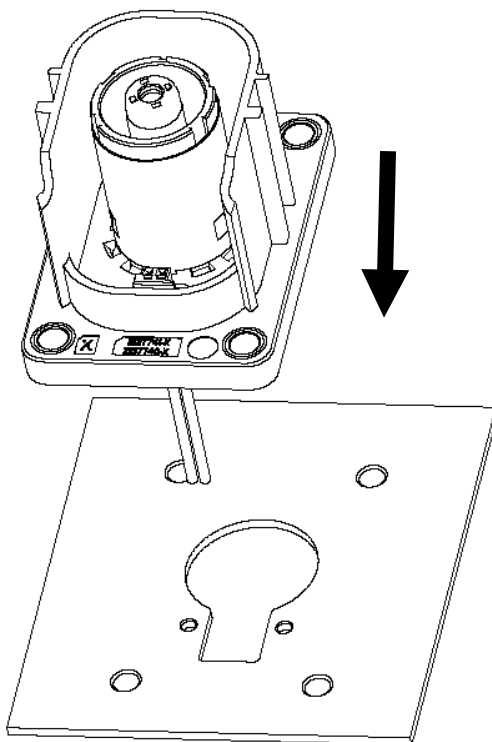


Figure 23

Insert the HVIL receptacle before header assembly onto the device.

Install the header assembly onto the device, mounting interface by aligning the header polarization feature and pushing the header into the mounting hole by hand as shown in Figure 23, until the header is seated against the face of the device.

NOTE: User must ensure that the HVIL receptacle is installed into the correct location.

6.3.2 Insert the HVIL receptacle after header fastening onto device

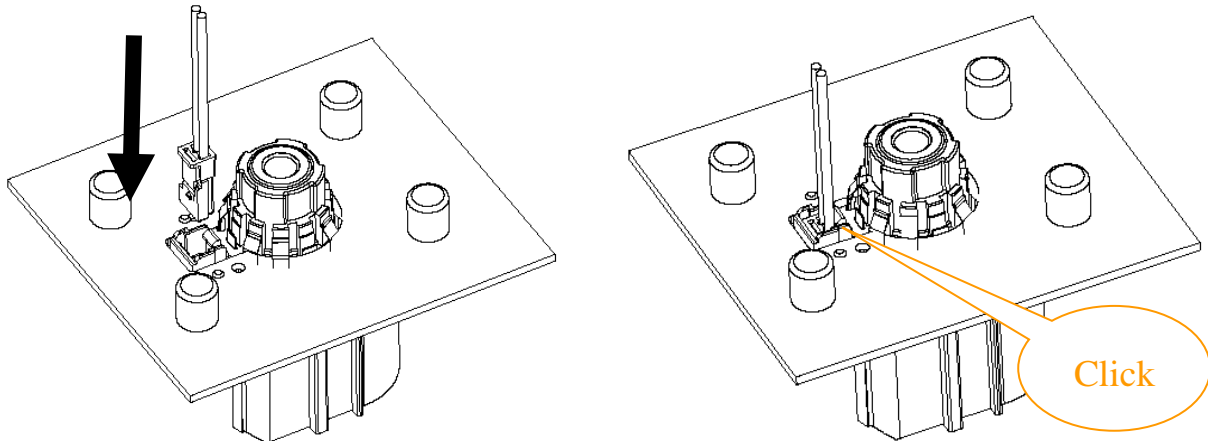


Figure 24

NOTE: User must ensure that the HVIL receptacle is installed into the correct location as shown in figure 24.

7 Connector mating and unmating

7.1 Connector mating

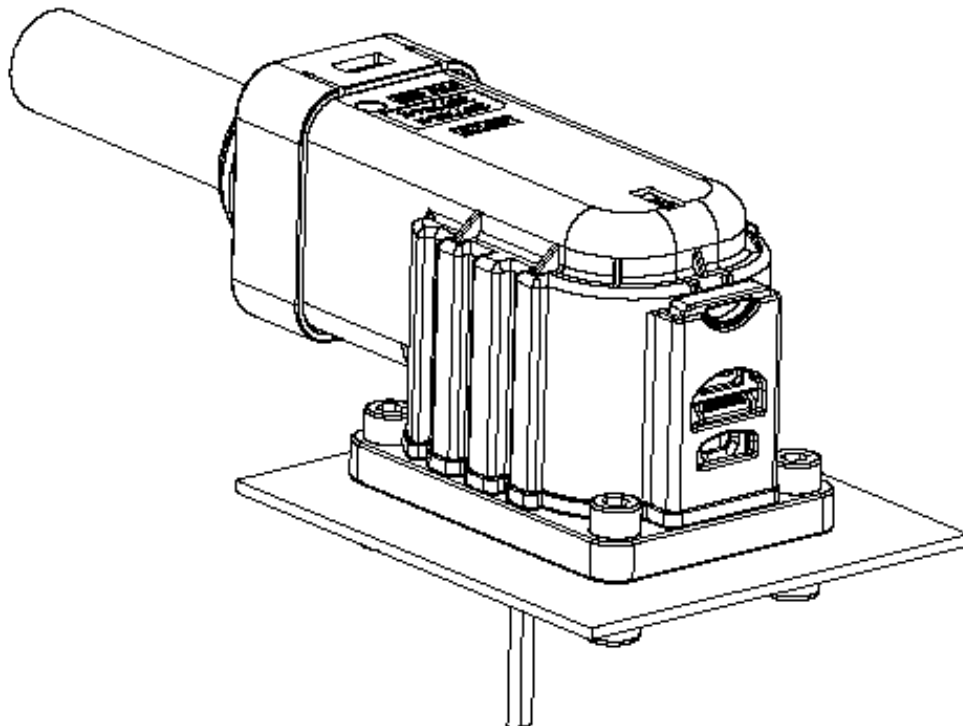


Figure 25

- A. This plug is designed to mate with authorized interface only.
- B. The releasing sound of locking lever and interface clamp feature should be audible when plug is fully seated.
- C. For needed hand clearance, reference as shown in figure 26~27.

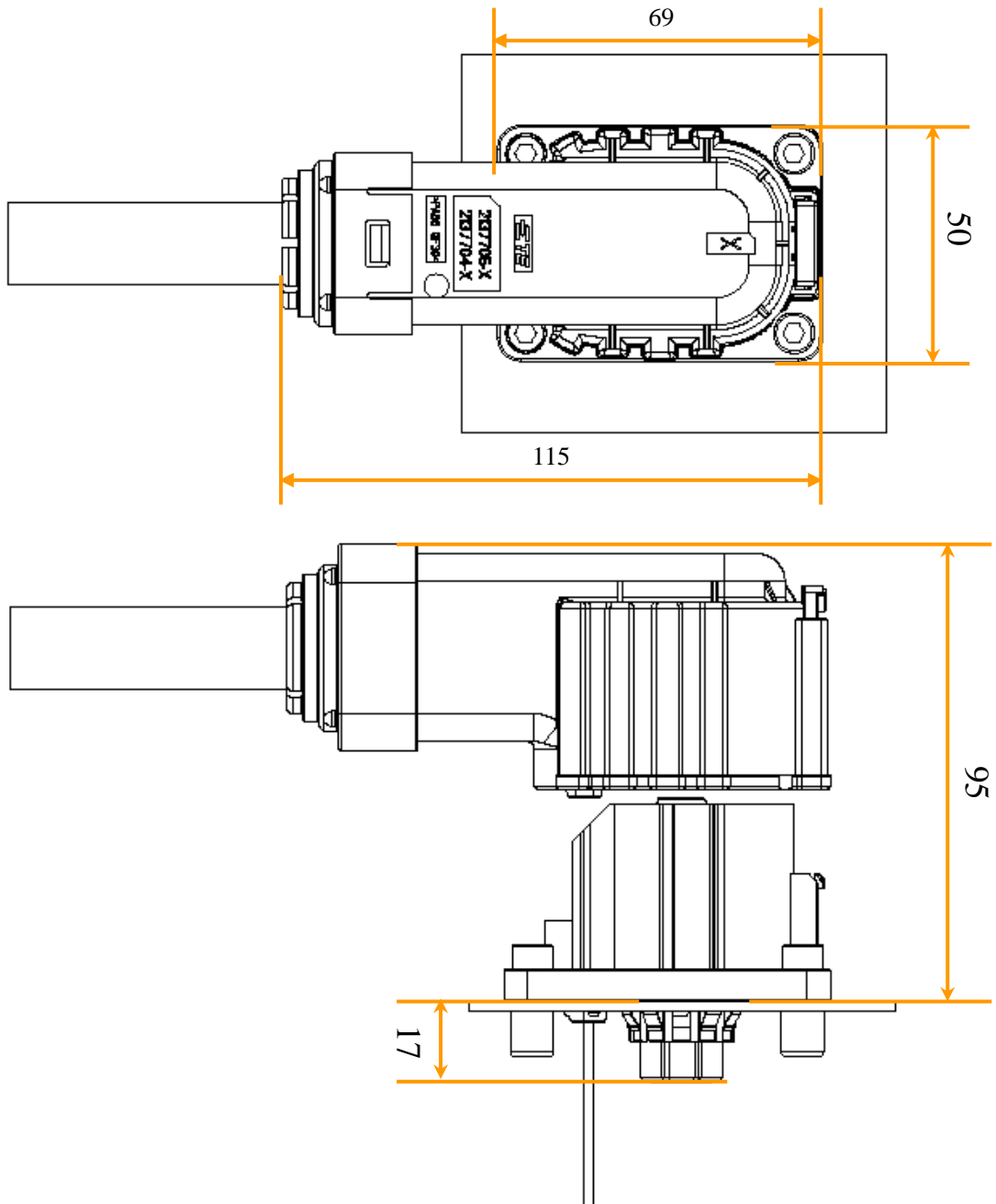


Figure 26

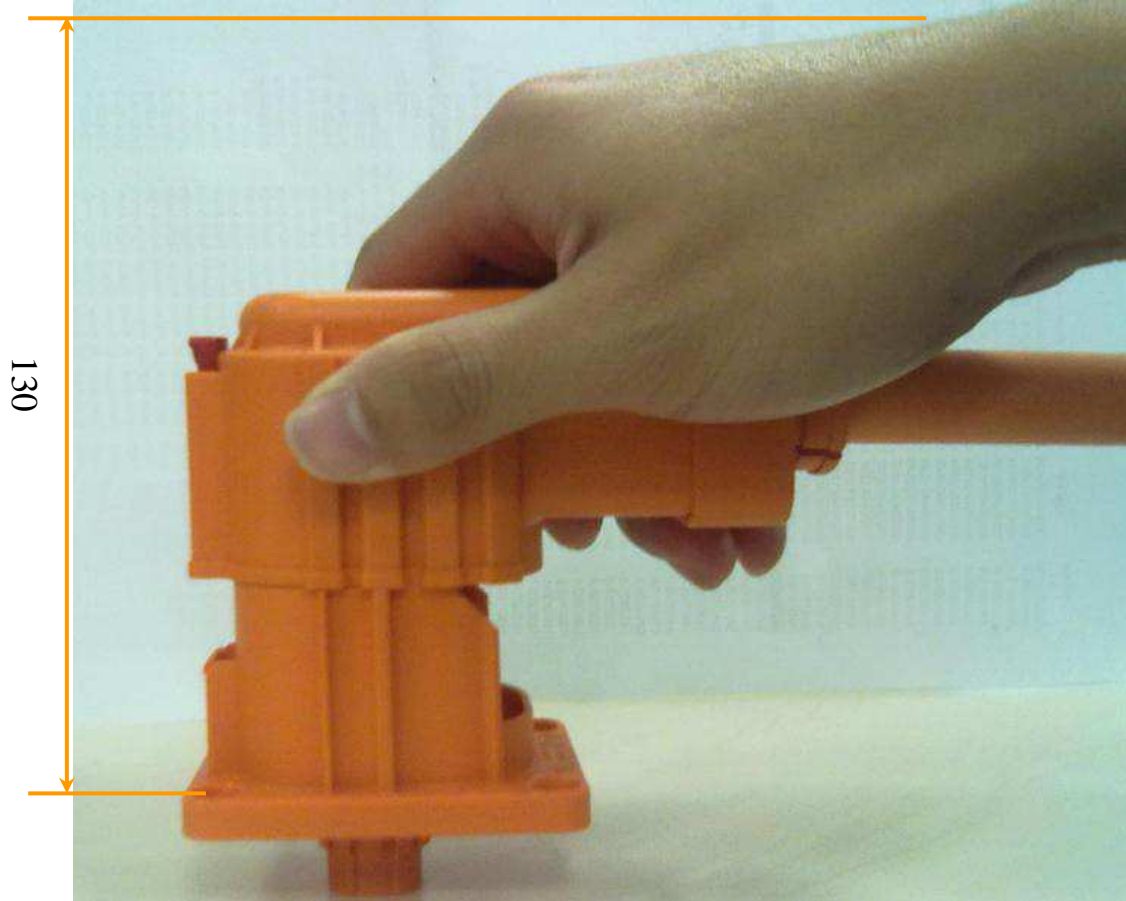


Figure 27

The following procedures provide steps to mate the high voltage plug assembly and header assembly.

- A. Make sure CPA of plug assembly is in pre-lock position (see Figure 28).

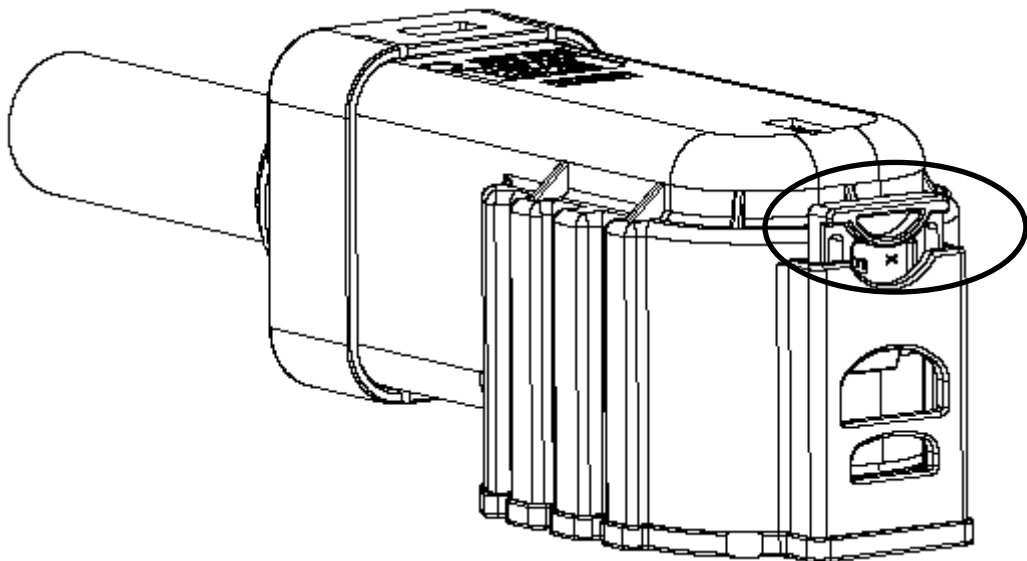


Figure 28

B. Align the plug assembly with header assembly, and push the plug assembly and header assembly together until the main latch engages with two clicks as shown in figure 29. If the connector halves do not fit together easily, check the following:

- Keying options on the HVP1100-1P plug assembly matches the HVP1100-1P header assembly
- HVP1100-1P plug and header assemblies are correctly oriented (90°)

C. Press CPA to second-lock position until engages with a click as shown in figure 30. Pull lightly on the HVP1100-1P plug assembly to verify that the plug and header are fully latched.

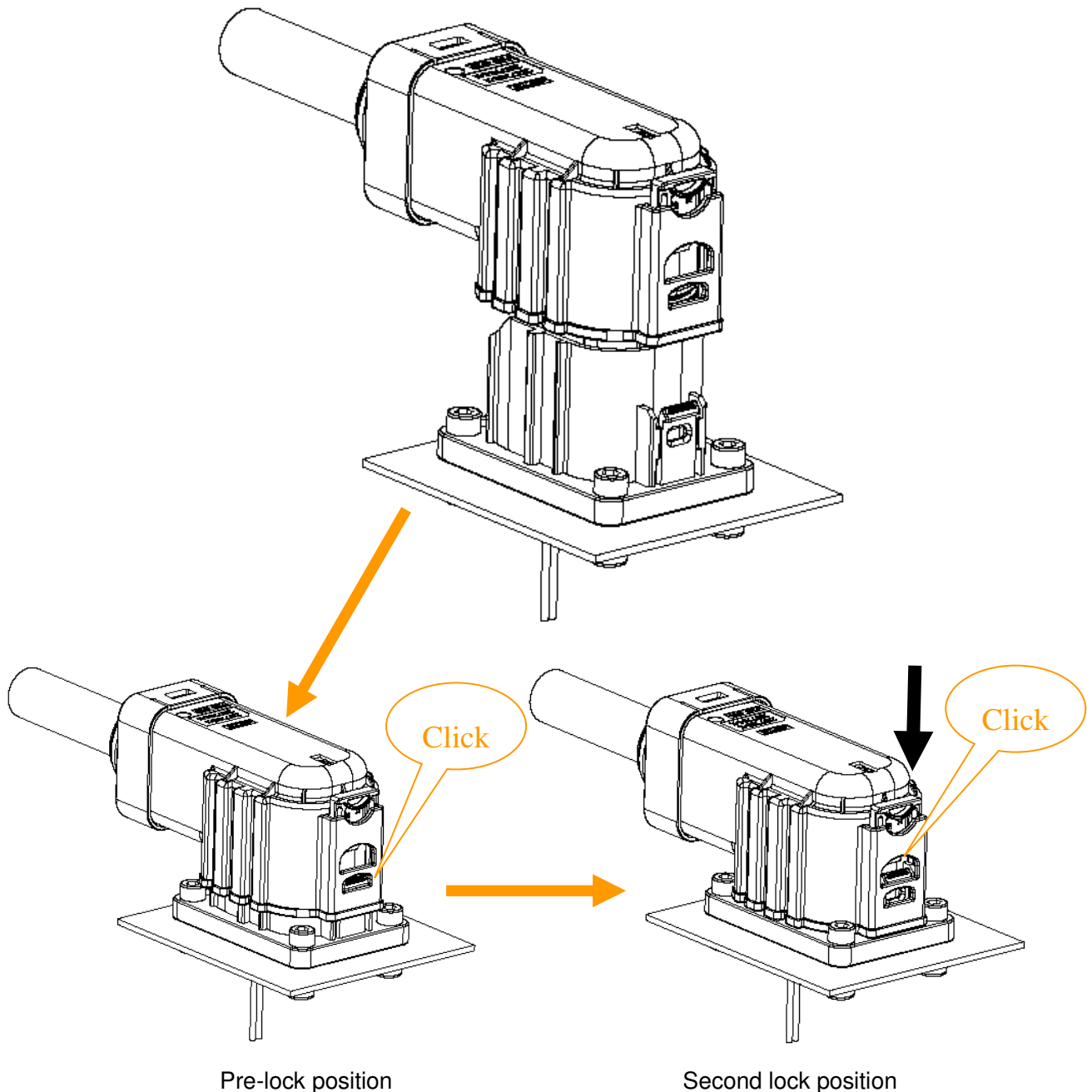


Figure 29

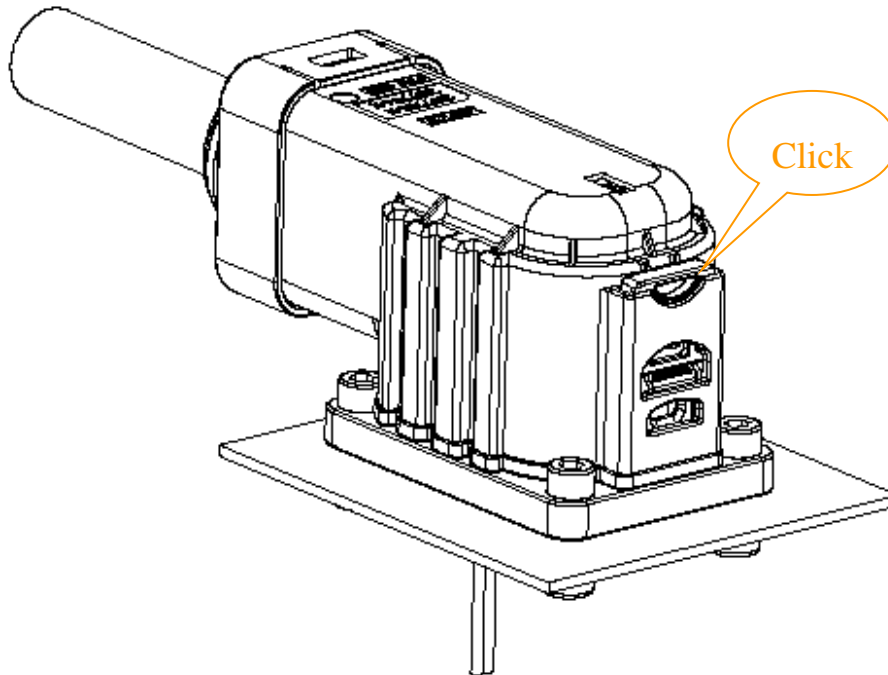


Figure 30: Connector totally mated view

7.2 Connector unmating

CAUTION: User must exercise extreme caution to verify high voltage is powered off before unmating the header and plug.

The following procedures provide steps for unmating the high voltage plug assembly and header assembly

- A. Release CPA to pre-lock position of the plug assembly manually as shown in Figure 31.

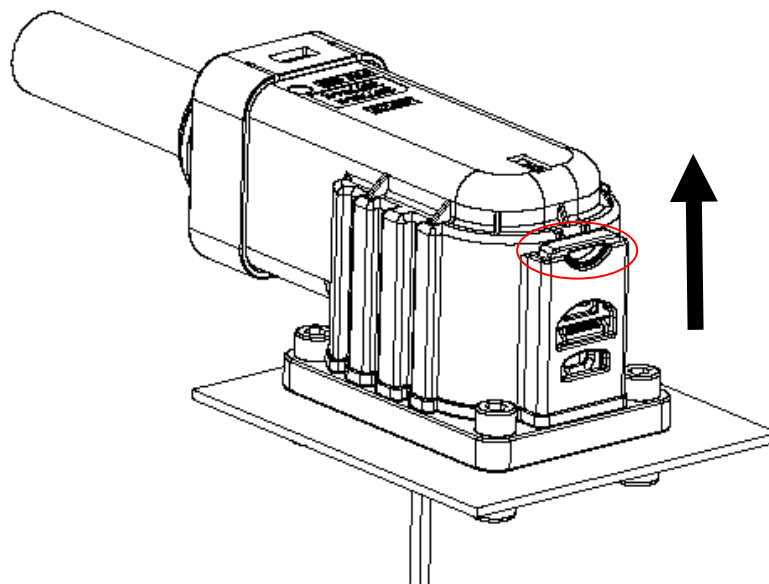


Figure 31

- B. Then press lock latch in pre-lock area with finger or other tool, at the same time, pull the HVP1100-1P plug assembly and header apart axially as shown in Figure 32. Do **NOT** pull on the cable

or cable seal retainer. The plug and header assemblies are now disconnected from its pre-lock position to second lock position.

C. Press lock latch in second-lock area with finger or other tool, at the same time, pull the HVP1100-1P plug assembly and header apart axially as shown in Figure 32. Do **NOT** pull on the cable or cable seal retainer.

D. The plug and header assemblies are now totally disconnected as shown in Figure 32.

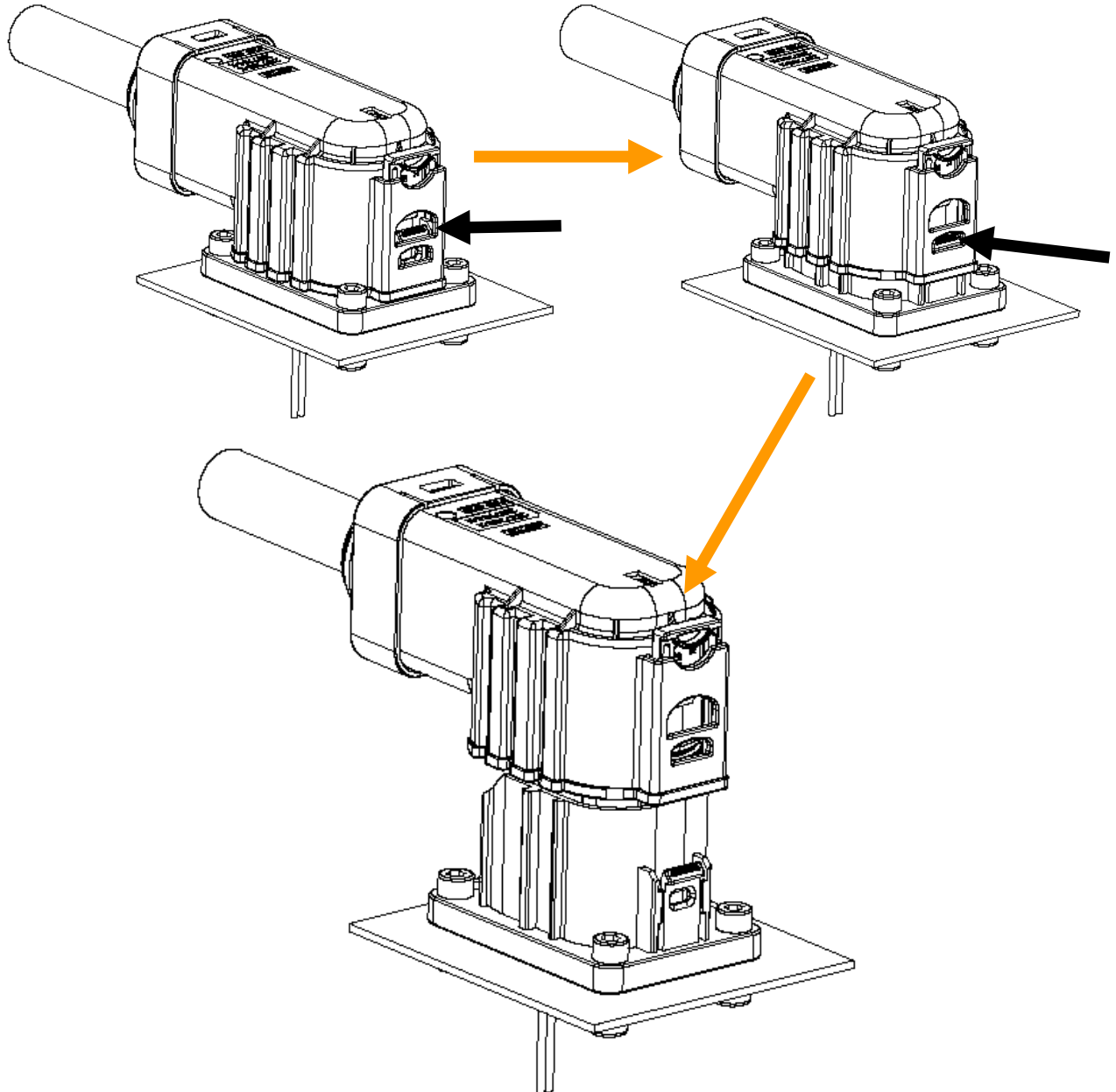


Figure 32: Connector totally released view