

HC-STAK 25-2phi XE High Voltage Connector



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



HIGH-VOLTAGE - MORTAL DANGER

- This connector is intended for use in high-voltage applications. Special care must be applied to ensure that the connector functions as intended.
- If you suspect that the connector has been modified, damaged, contaminated, or otherwise compromised, please discontinue its use immediately.
- This connector should only be serviced by a trained and qualified technician.

1. INTRODUCTION

This specification covers the requirements for assembly and mating/un-mating of the HC-STAK 25-2phi XE Plug.



These high-voltage connectors must NOT be mated with any other type of connector.

When corresponding with TE Connectivity Personnel, use the terminology provided on this specification to help facilitate your inquiry for information. Basic terms and features of components are provided in Figure 1.

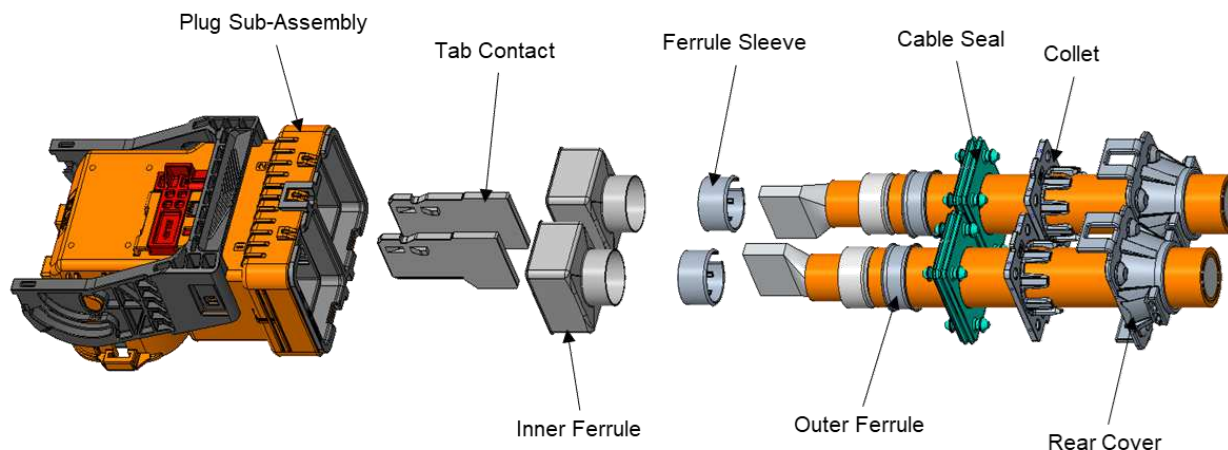


Figure 1: Exploded View HC-STAK 25-2phi XE

2. REFERENCE MATERIAL

2.1. Revision Summary

1. Initial release of document
2. Images updated
3. Figure 8A & 8B updated, Under Section 3.8 Note 6 updated.
 - A. Release to production
 - A1. Table 2 Dim Y and Z updated. Section 3.6 step 8, Figures 9A and 9B updated. Section 3.6 steps 9-12, figures and information updated. Figures 18 & 19 updated. Caution note added to 3.6 step 5. Section 3.6 step 7, 5th bullet point added. Section 3.8 step 5 updated, Figures 21a and 21b added.
 - A2. A new figure added under section 3.6 as Figure 13B, and Figure 13 has been renamed to Figure 13A. Section 3.11 corrected to section 3.10, and the corresponding figures, starting from Figure 28, have been renumbered beginning with Figure 25

2.2. Customer Assistance

Reference drawing 2843110 and Product Code L983 represent the HC-STAK 25 XE. Use of these base numbers and product code 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 TE Representative or after purchase, by calling the Product Information Center by the number at the bottom of page 1.

2.3. Drawings

2.3.1 Customer 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 Customer Drawing takes preference.

2.3.2 Reference drawings



Reference Drawing C-2843110 is available for part number relationships only and is not a saleable item. Refer to this drawing only for compatible part numbers for customer inquiry. For more information on Reference Drawings, call **PRODUCT INFORMATION** by the number at the bottom of page 1.

2.4. Cable and Subcomponent Specification

The following cable and subcomponent combinations must be used together to ensure optimum connector performance.

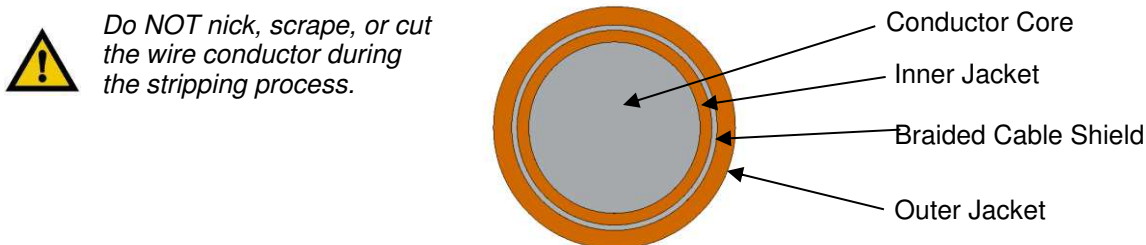


Figure 2: Single Conductor Cable

Table 1: TE Part numbers for cable assembly

RECOMMENDED SUBCOMPONENTS		
Part Numbers	Quantity	Description
Reference 2843110	-	Reference drawing
2843111-X	1	Plug sub-assembly
X-2843111-X		
2843125-1	2	Collet
2840450-3	2	Outer ferrule
2840451-3	2	Inner ferrule
2843129-1	2	Inner ferrule sleeve
2843126-1	2	Rear cover
2843128-1	2	Cable seal
2843127-1	2	Plug tab



See the reference drawing *C-2843110* for specific validated wire sizes and part numbers.

3. REQUIREMENTS

3.1. Safety

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

3.2. Shelf Life

The contacts should remain in the shipping containers until ready for use to prevent deformation to the contacts and/or damage to the housings. The products should be used on a first in, first out basis to avoid storage contamination that could adversely affect signal transmissions.

3.3. Chemical Exposure

Do not store contacts near any chemicals listed below, as they may cause stress corrosion cracking in the contacts.

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

3.4. Material

The connector assemblies are made of thermoplastic materials and the terminals, shields, and ferrules are tin- and silver-plated copper alloy.

3.5. Circuit Identification

The terminal cavities are numbered on the outer housing of the connector at the wire entry end.

3.6. Assembly Procedures

The following procedures show the details of the cable assembly and insertion instructions into the plug subassembly.



Refer to Table 1 for the various components of the cable as shown in an end view of the cable.

1. From the plug end of the cable, slide the rear cover, collet, and cable seal in the order and orientation as shown in Figure 3.

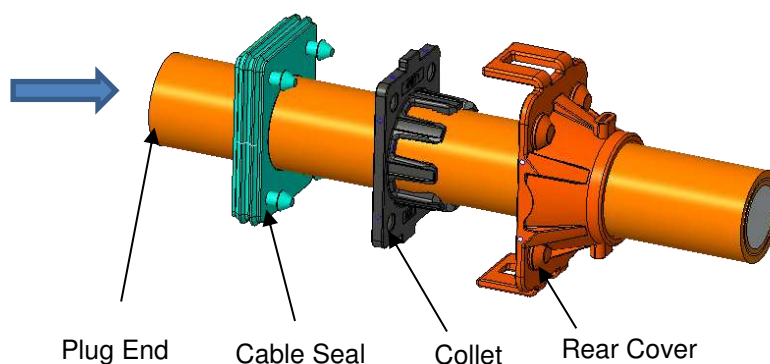


Figure 3: Rear cover, collet, and cable seal loaded on cable.



Do not cut the cable seal or contaminate with debris when sliding over the cut-end of the cable.

- Strip and remove the outer cable jacket, foil (if present), braided shield, and inner jacket from the plug end as shown in Figure 4.

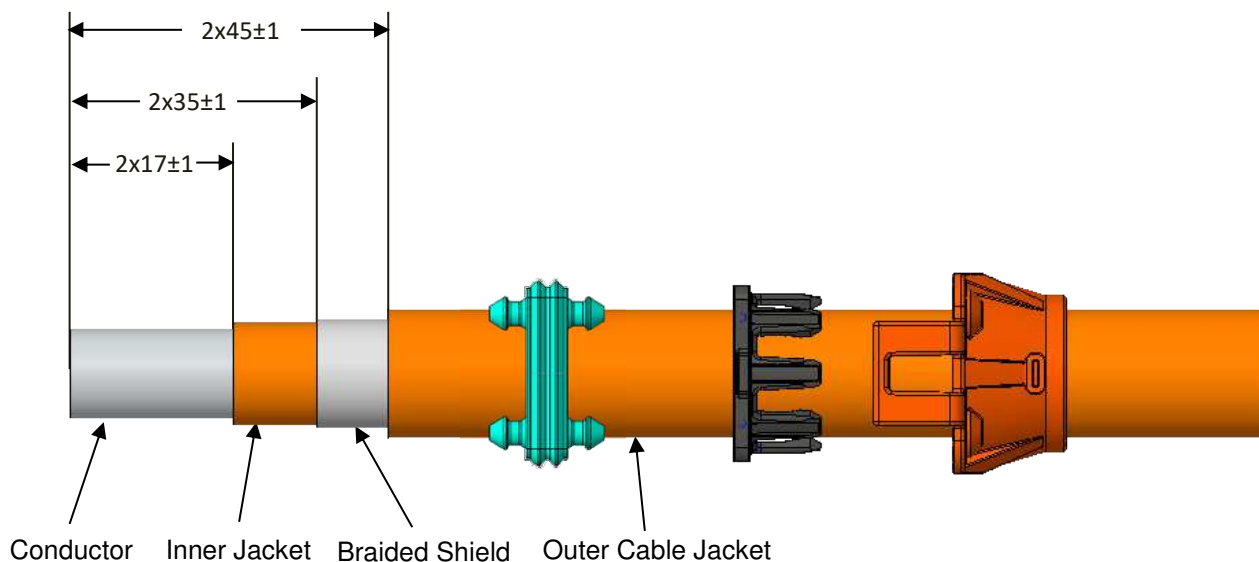


Figure 4: Cable Stripping



Do not cut, nick, or scrape the conductive wires during the stripping process.

- Slightly compress the inner ferrule sleeve and install into the inner ferrule from the cable end as shown in Figure 5.

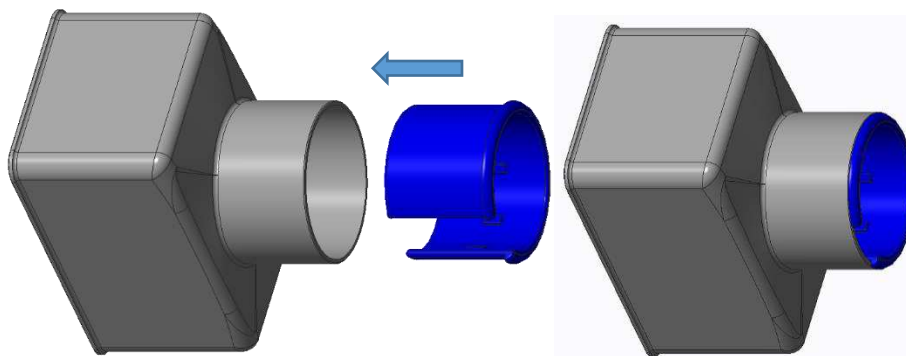


Figure 5: Inner ferrule sleeve into inner ferrule

4. Slide the outer ferrule over the outer cable jacket then the inner ferrule sub-assembly under the braided cable shield up as shown in Figure 6.

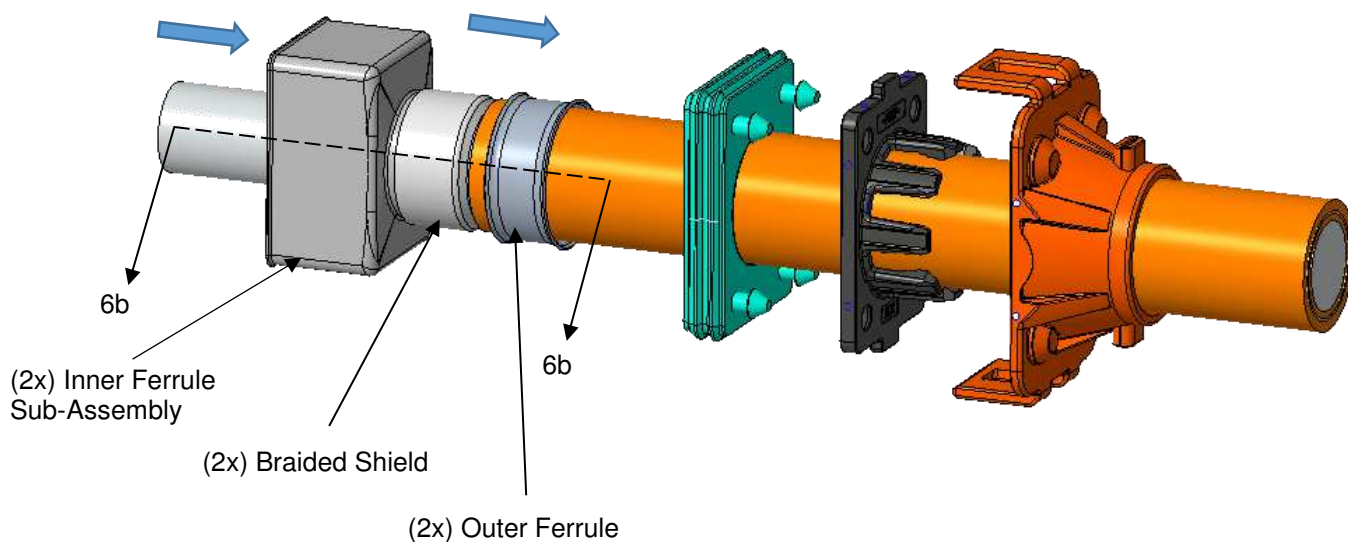


Figure 6a: Slide the outer ferrule over the outer cable jacket.

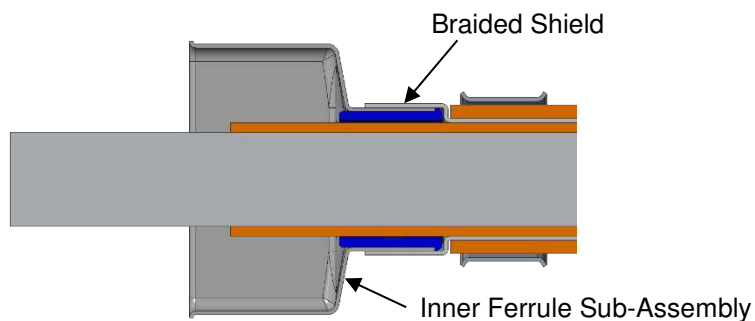


Figure 6b: Slide the inner ferrule under the braided shield.



The shielding braid must be spread uniformly on the circumference of the ferrule.

5. Slide the outer ferrule into position over the braided cable shield and crimp in place as shown in Figure 7 using dimensions in Table 2.

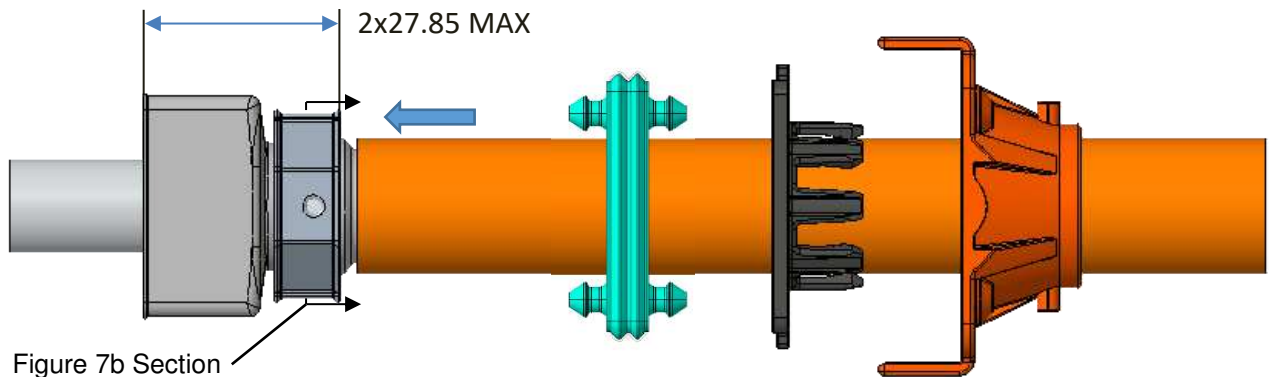


Figure 7a: Ferrule Crimp



Hex crimp dimple and crimp wings must be correctly oriented (Long sides of the inner ferrule box)

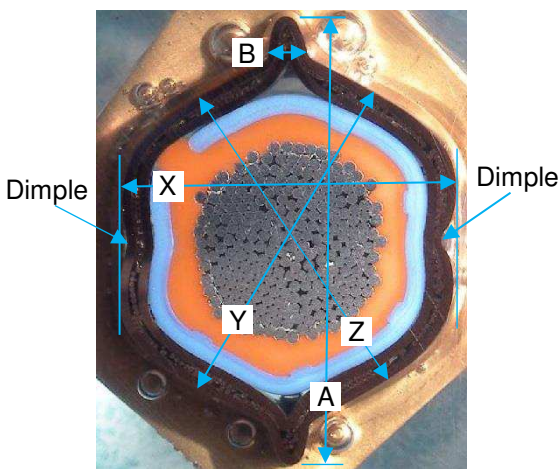


Figure 7b: Hex Crimp

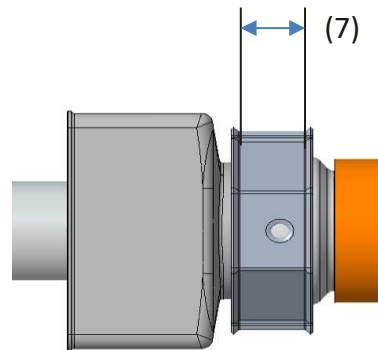


Figure 7c: Bellmouth

Table 2: Hex Crimp Dimensions

Cable	Dim X	Dim Y	Dim Z	Dim A	Dim B
Coroplast 9-2611 / 70 mm ²	17±0.2	17.4 MAX	17.4 MAX	23.0 MAX	1.6 MAX

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Wire insulation shall NOT be cut or broken during the crimping operation, nor shall the insulation be crimped into the ferrule.



Any loose strands of the braided cable shield seen protruding from the outer ferrule should be trimmed, taking special care not to leave any detached strands attached to the assembly.



All strands must be on the outside of the inner ferrule. Absolutely no shield strands are allowed inside the inner ferrule.



Periodic inspections must be made to ensure crimped contact formation is consistent as shown.

6. Ultrasonic weld the HV Tabs for terminal cavity 1 and terminal cavity 2 to the cables as shown in Figure 8. The welds are on different sides depending on the terminal cavity number. See SAE/USCAR-38 for weld bond appearance, mechanical, and electrical requirements. Ensure the keep-out zones are not violated. This is critical to ensure proper assembly.

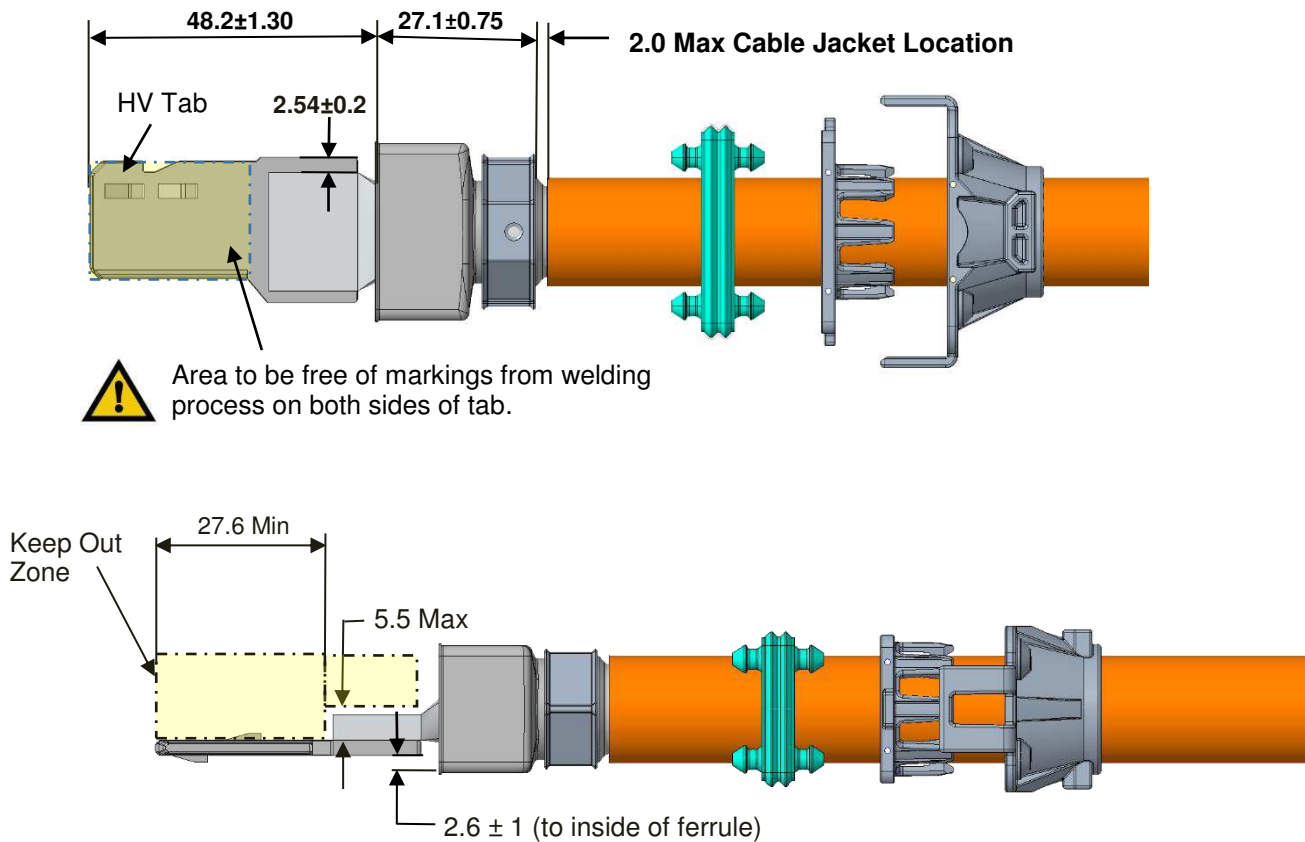


Figure 8a: HV Tab ultrasonic welding terminal cavity 1

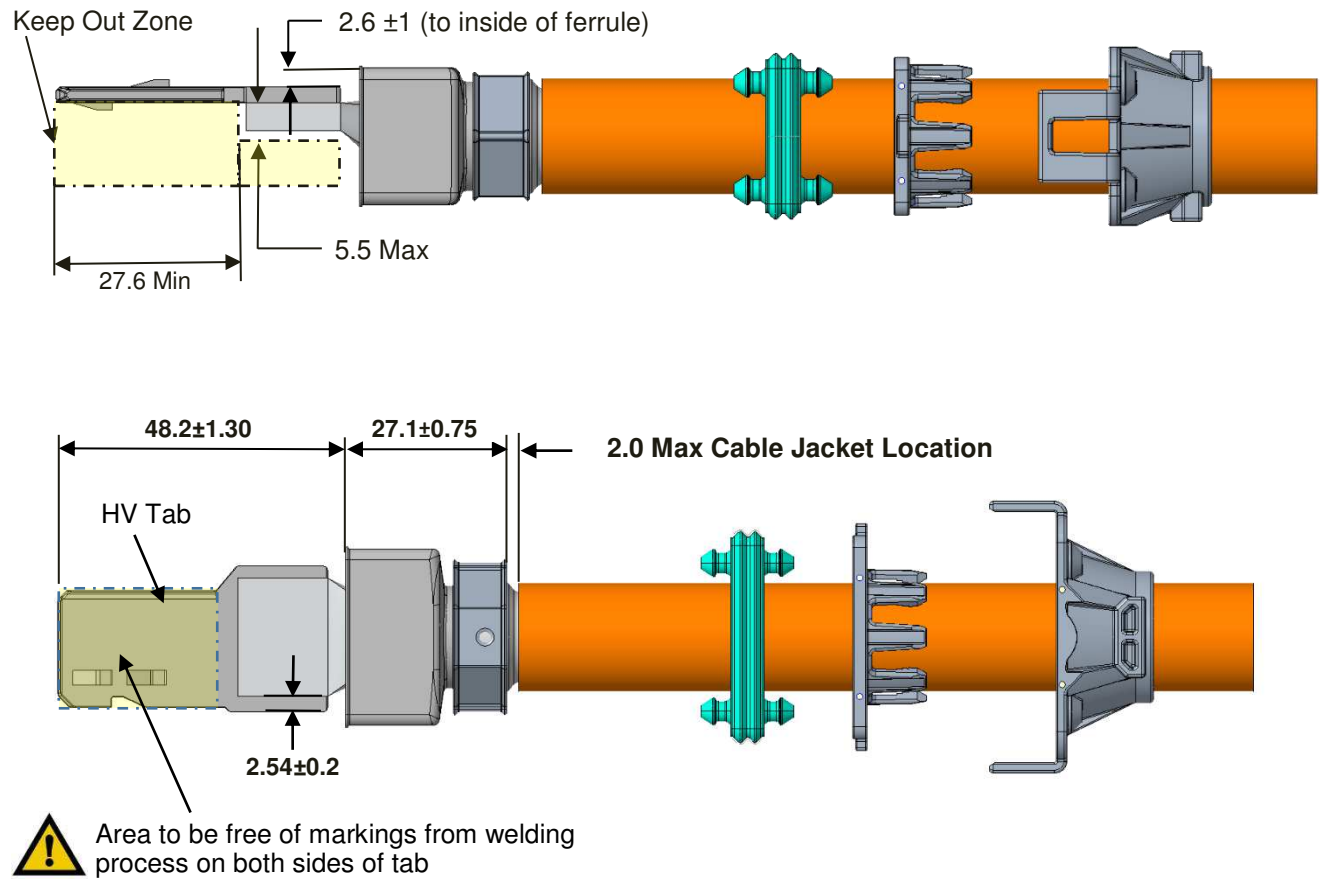


Figure 8b: HV Tab ultrasonic welding terminal cavity 2



Figure 8c: HV Tab ultrasonic welding to ferrule alignment

7. The following items at a minimum should be inspected and verified:
- Hex crimp dimensions per Table 2
 - No large burrs/flash on the ferrule crimp
 - No visible cracking of the ferrule or shields
 - No loose or detached shield braid strands
 - No shield braid strands inside the inner ferrule
 - The cable insulation is not pinched, abraded, or cut
 - The cable jacket to outer ferrule dimension
 - Weld Nugget, brush, conductor strands, etc. do not violate keep out zone dimensions
 - Presence and orientation of all components
 - No deformation to the rectangular section of the inner ferrule
 - No damage (scratches, etc.) to the HV tab contact surfaces



Verify cable jacket to outer ferrule dimension just prior to installation into plug assembly.

8. As shown in Figure 9A, identify the cavity ID on the plug sub-assembly and prepare to install the corresponding welded harness from step 6. Before installing, orient the plug sub-assembly and harness as shown in Figure 9B. Keeping the plug sub-assembly in this orientation, install the harness until it is fully locked as shown in Figure 9B. Verify that the cable assembly is completely installed by gently pulling back on the cable.

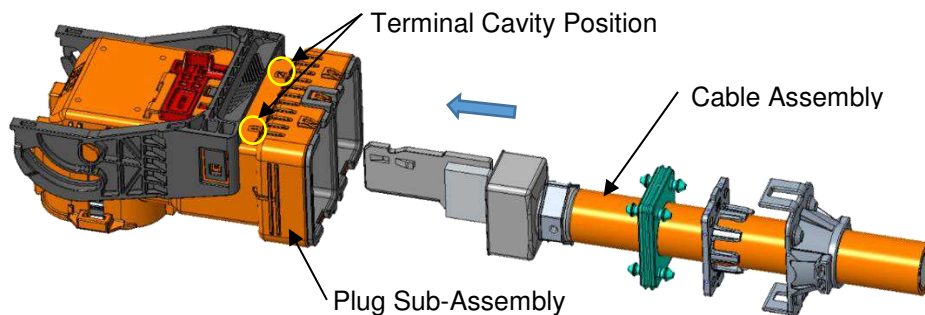


Figure 9A: Cable Assembly Cavity -1 insertion

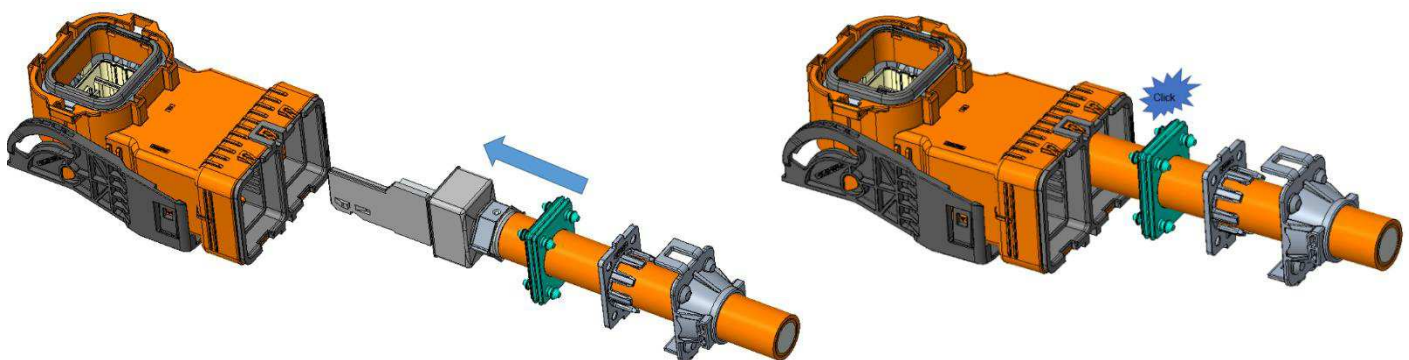


Figure 9B: Plug Assembly orientation for Cable Assembly insertion.

9. Slide the cable seal backward on the cable and into the collet end until 4X seal retainers properly seat as shown in Figure 10.

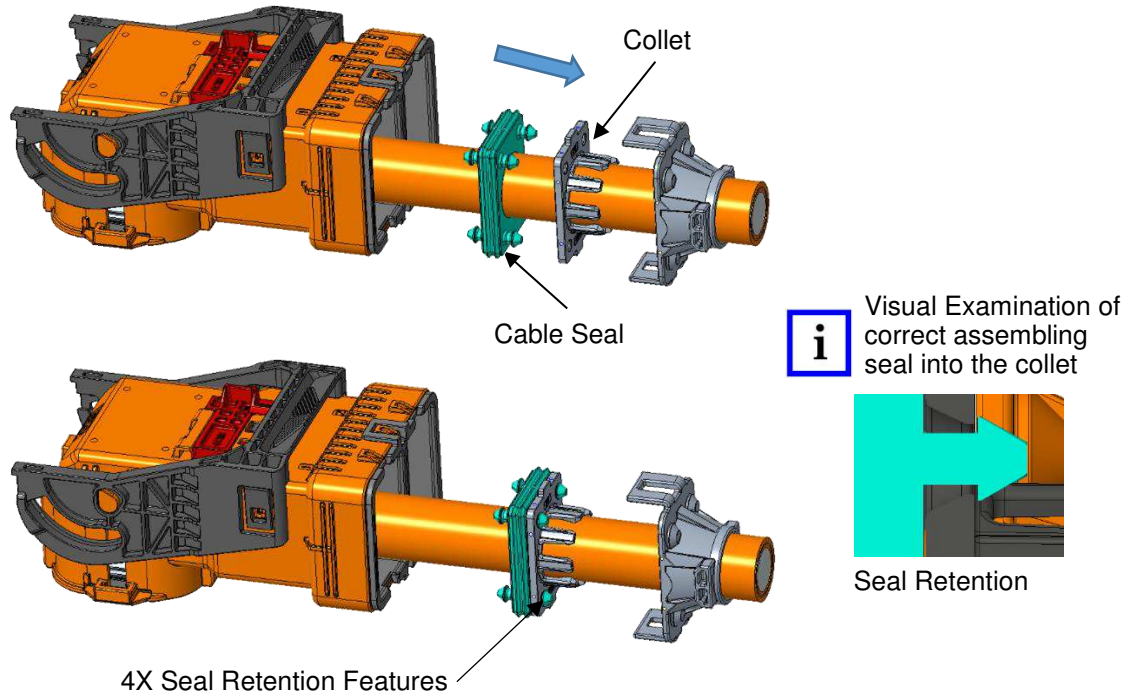


Figure 10: Seal and Collet sub-assembly

10. Slide the cable seal-collet sub-assembly forward on the cable and into the plug sub-assembly as shown in Figure 11.

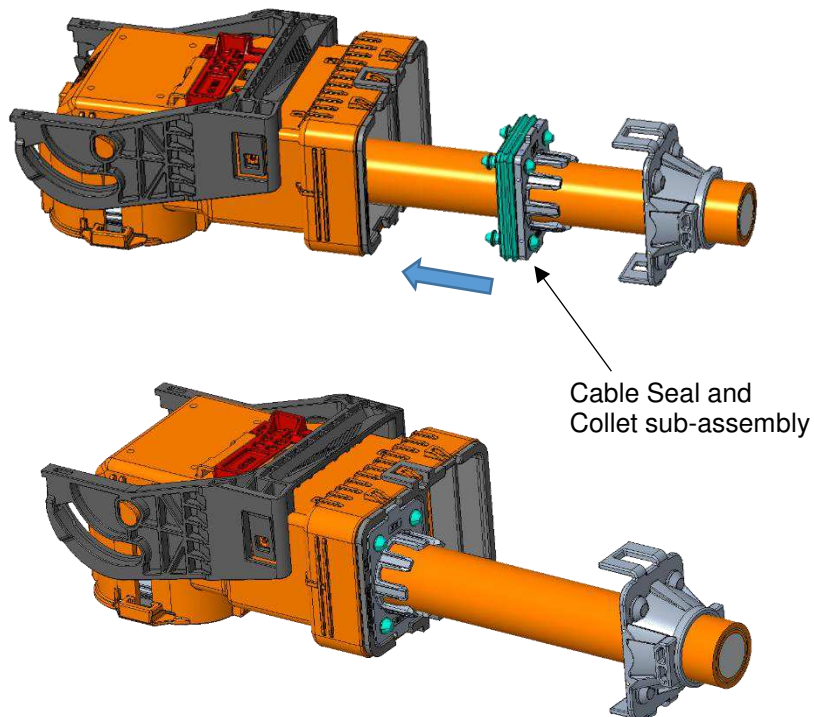


Figure 11: Cable Seal – Collet sub-assembly, Assembly

11. With HV Tab fully contacting the Plug Inner Housing (refer to Figure 9), slide the rear cover forward on the cable and latch to the plug sub-assembly as shown in Figure 12. Verify that both rear cover latches are fully locked.

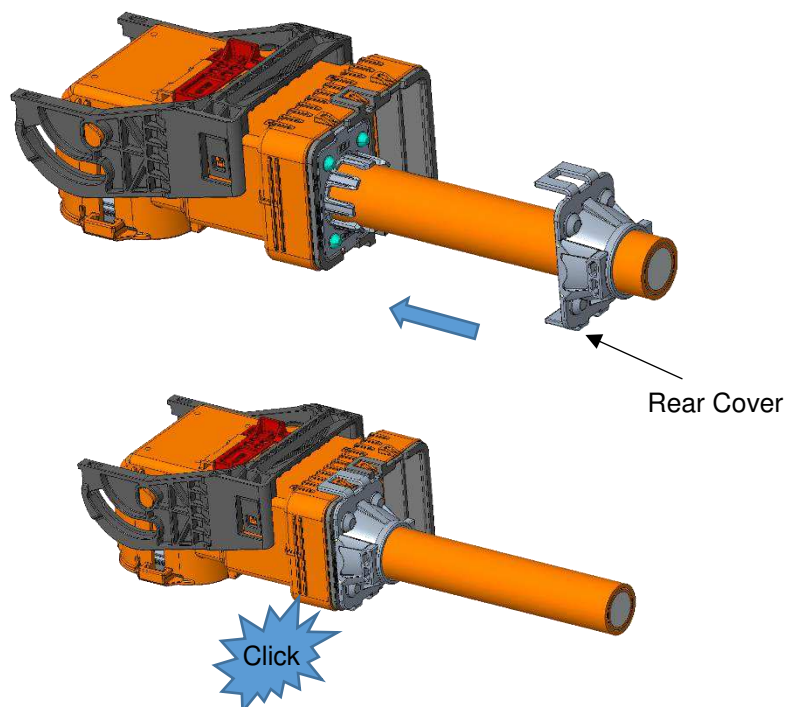


Figure 12: Rear Cover Assembly

12. Repeat steps 9 thru 12 for the other cable assembly (Terminal cavity 2 weld) to complete the plug-cable assembly as shown in Figure 13A.

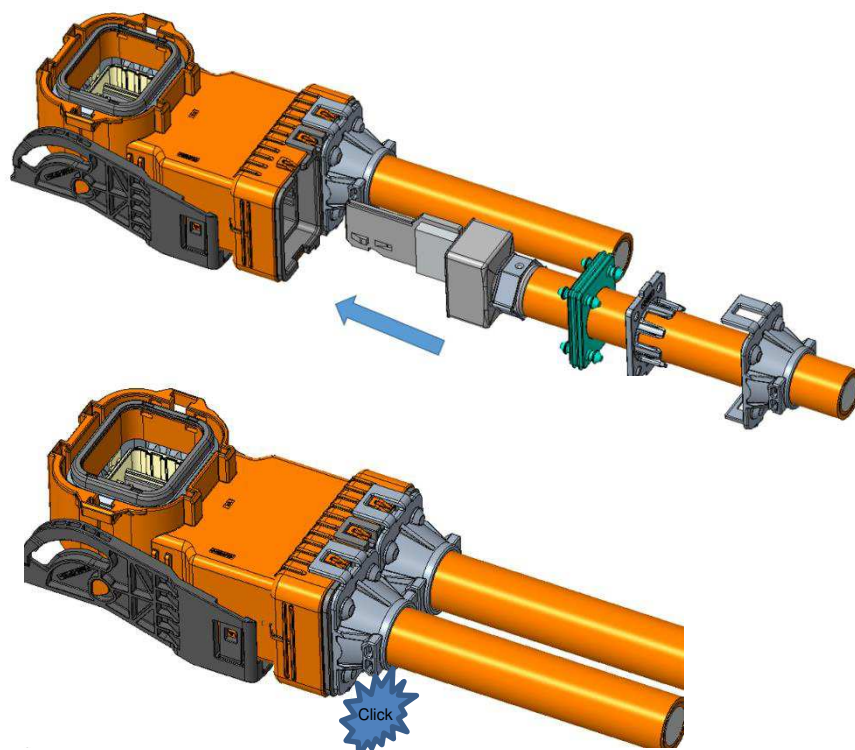


Figure 13A: Plug-Cable Assembly

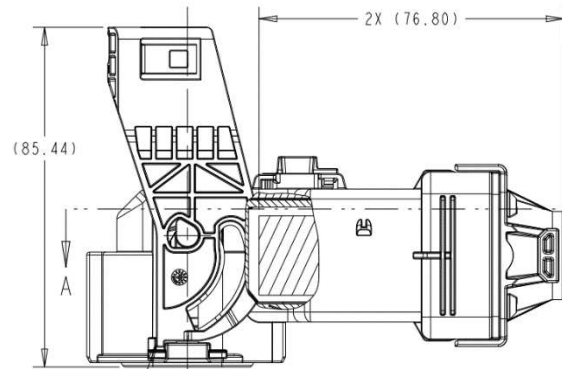


Figure 13B: Length of the cable inside the connector

13. Push TPA to final position as shown in Figure 14.

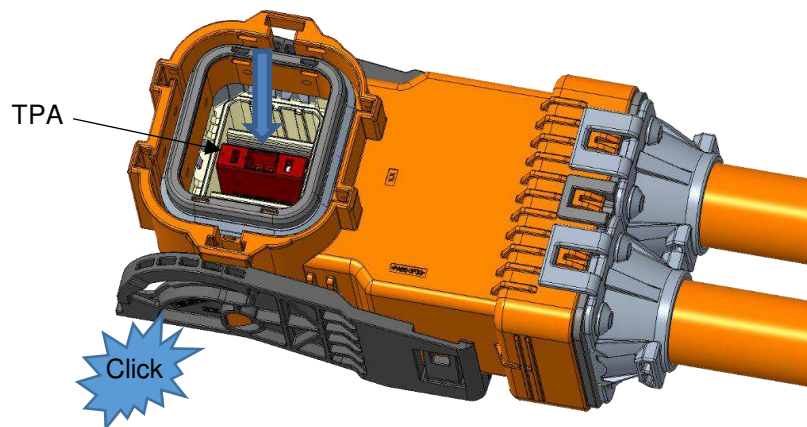


Figure 14: Close TPA

3.7. Contact Probing



Avoid probing the tabs in an area that could damage the plating.



Avoid probing the shunted receptacle contacts as shown in Figure 15. This could damage the contact geometry and/or plating.

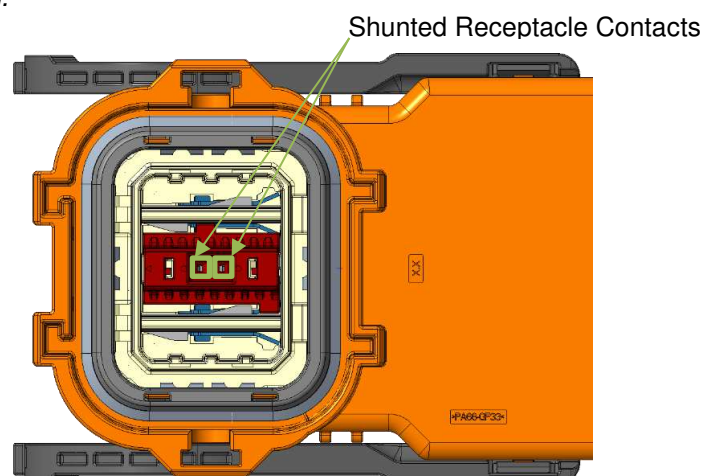


Figure 15: Shunted Receptacle Contacts

3.8. Connector Mating

1. If the assembly is shipped with the Lever and/or red Connector Position Assurance (CPA) in the closed position, first if necessary, actuate the CPA to the open position, then open the lever to the open position as shown in Figure 16.

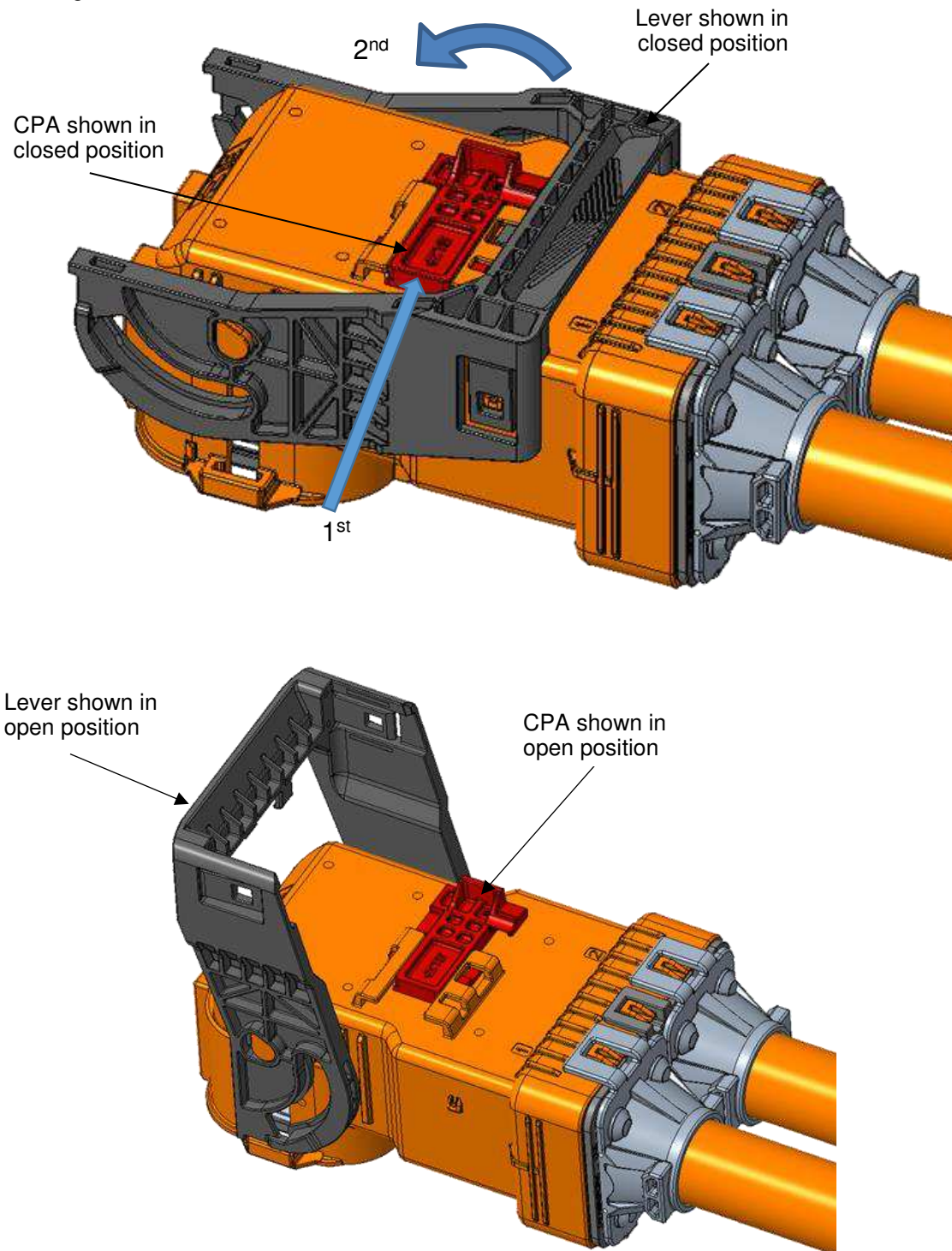


Figure 16: Assembly Lever and CPA Closed

2. Align the plug and header connectors as shown in Figure 17.



Make sure that the lever is still in the fully open position prior to engagement with the mating header.

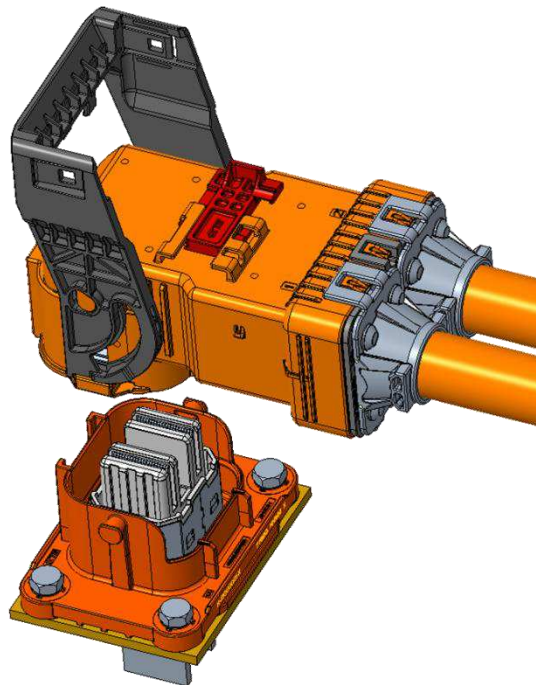


Figure 17: Plug and Header Alignment

3. Holding the plug connector body, push the connector halves together until the header posts completely engage with the lever as shown in Figure 18. Lever will start to rotate slightly at this point.

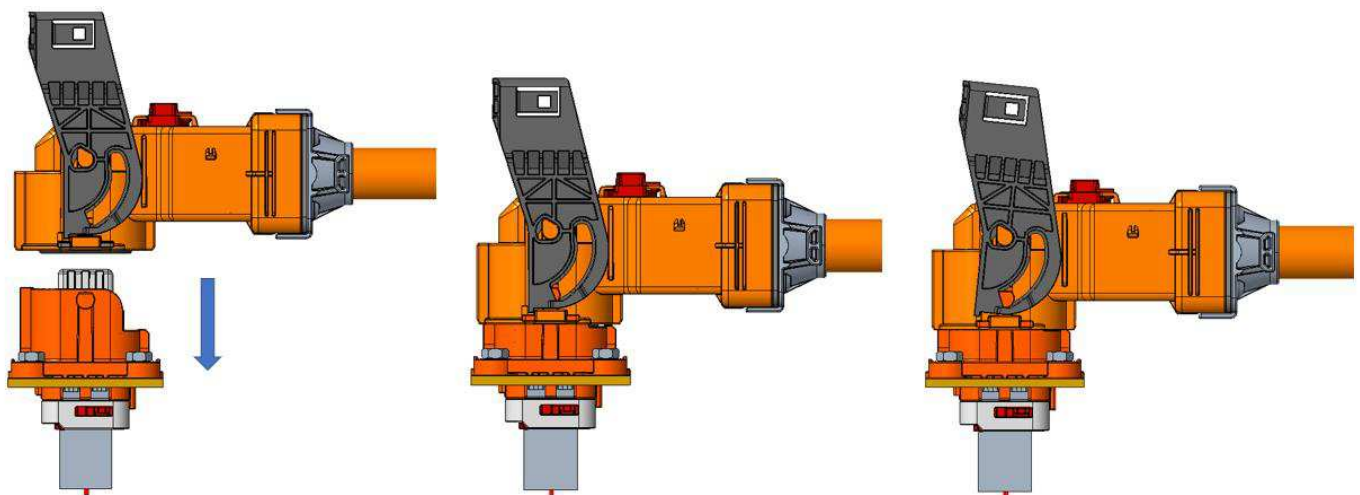


Figure 18: Plug and Header Pre-Lock

3. Rotate the lever towards the connector body until it is completely in the closed position as shown in Figure 19.

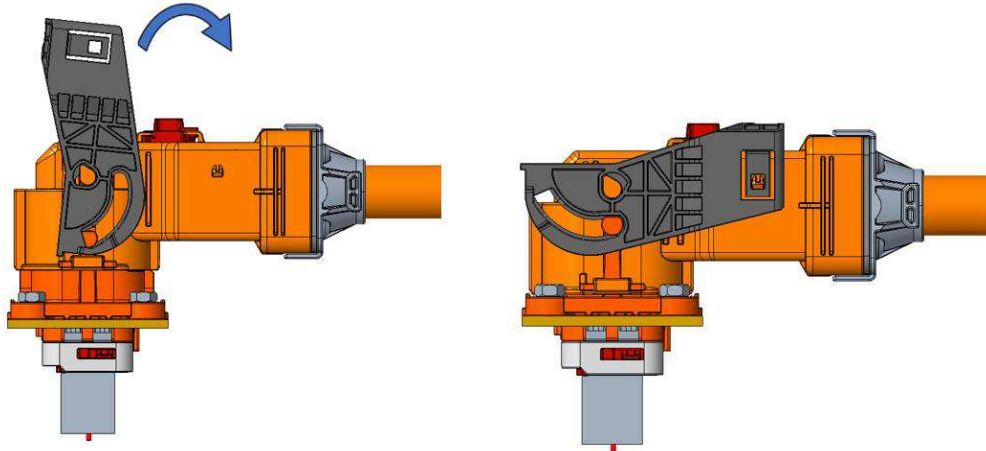


Figure 19: Lever Actuation from Open to Close

4. Bias the red CPA towards the black lever and push the red CPA forward in the direction of the blue arrow until it stops as shown in Figure 20.

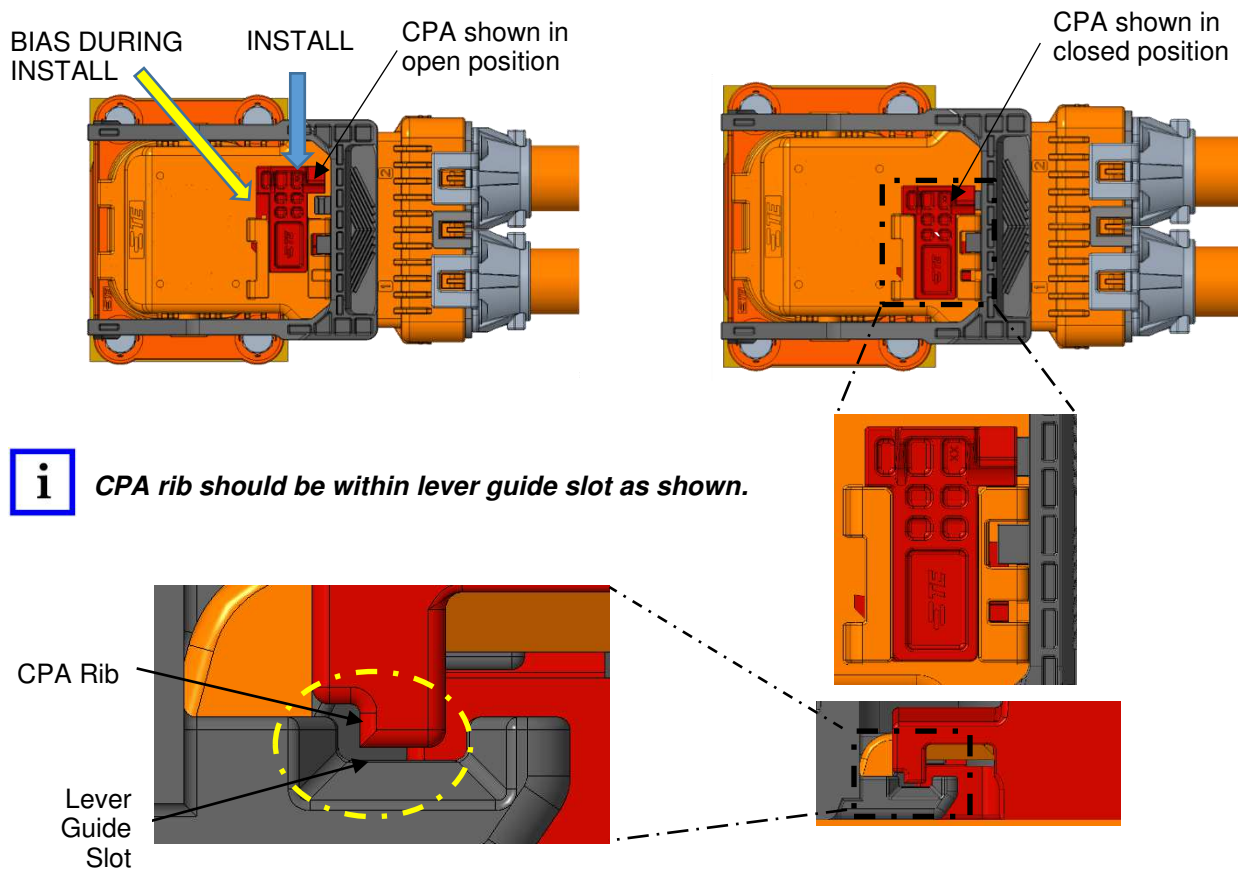


Figure 20: CPA Actuation from Open to Close

5. Ensure that the cables are rigidly secured at harness tie-down points, and that each tie-down point is static relative to the header mounting surface. A single tie-down point is required within 100mm or less from the cable exit of the connector, per USCAR-2 5.4.6.3, and at least one additional tie-down point is recommended within the 50mm range shown below in Figure 21a. Having strain relief, which is static to the header mounting surface and placed near the cable exit of the connector, will improve the vibration performance of the system. Applications requiring vibration performance exceeding USCAR-2 Vibration Class V1 will require validation with a stabilization component like what is shown in Figure 21b. See C-2843110 reference drawing for details.

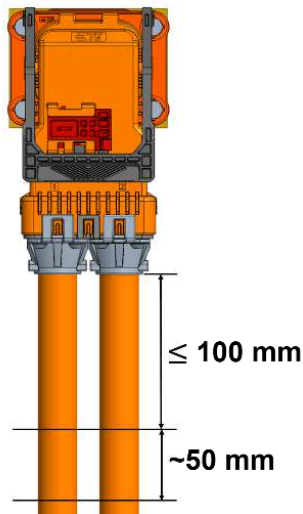


Figure 21a: Cable Fixation Points per USCAR-2, V1

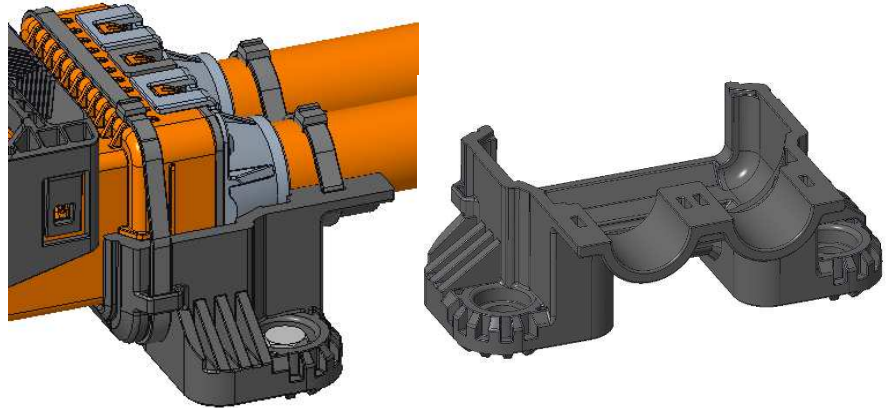


Figure 21b: Example of a stabilization component for applications requiring vibration harsher than USCAR-2 Vibration Class V1.

3.9. Connector Un-Mating

1. Push the red CPA forward until it stops as shown in Figure 22.

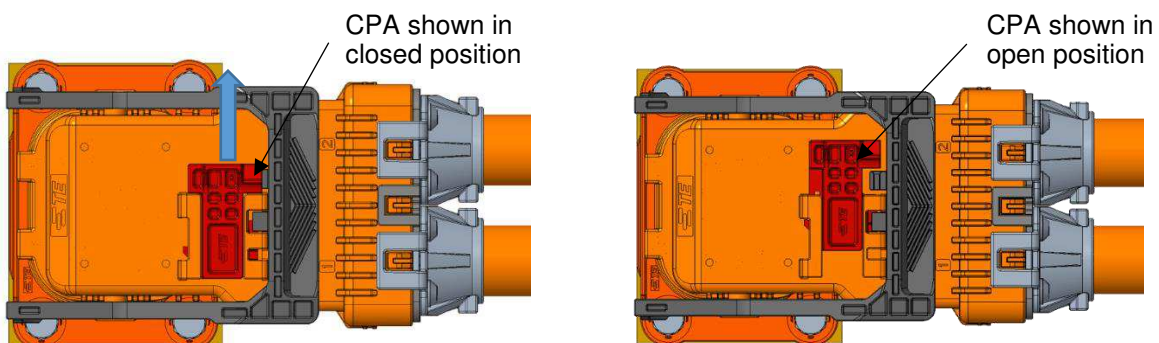


Figure 22: CPA Actuation from Close to Open

2. Rotate the lever away from the connector body until it is completely in the open position as shown in Figure 23.

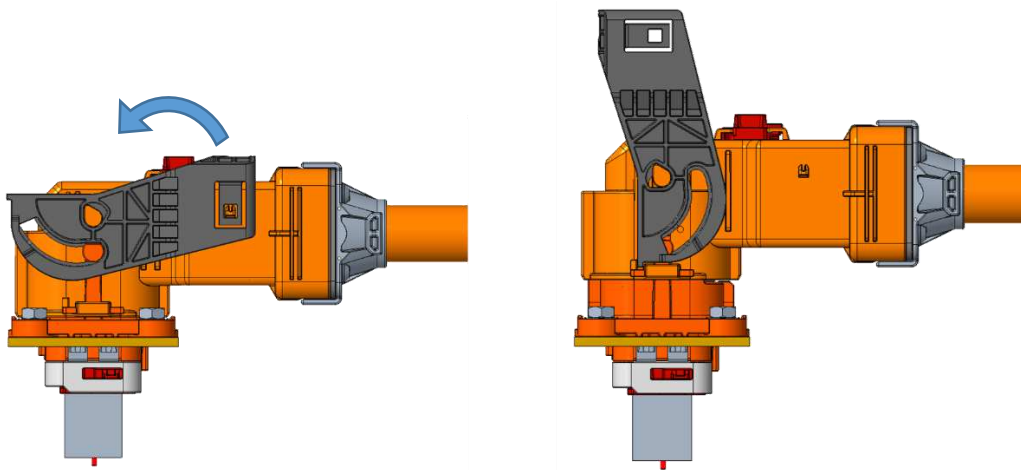


Figure 23: Lever from Close to Open

3. Holding the connector body pull the plug until it is completely separated from the header as shown in Figure 24.



Do not use the lever as a handle to pull the plug apart.

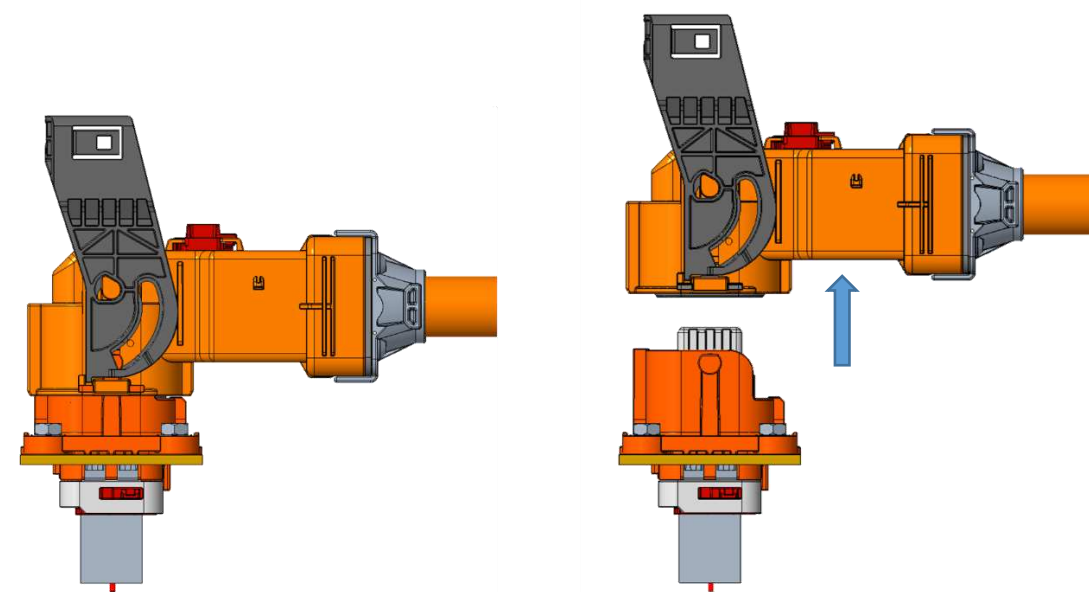


Figure 24: Plug and Header Un-Mate

3.10. Dimension of Complete Assembly

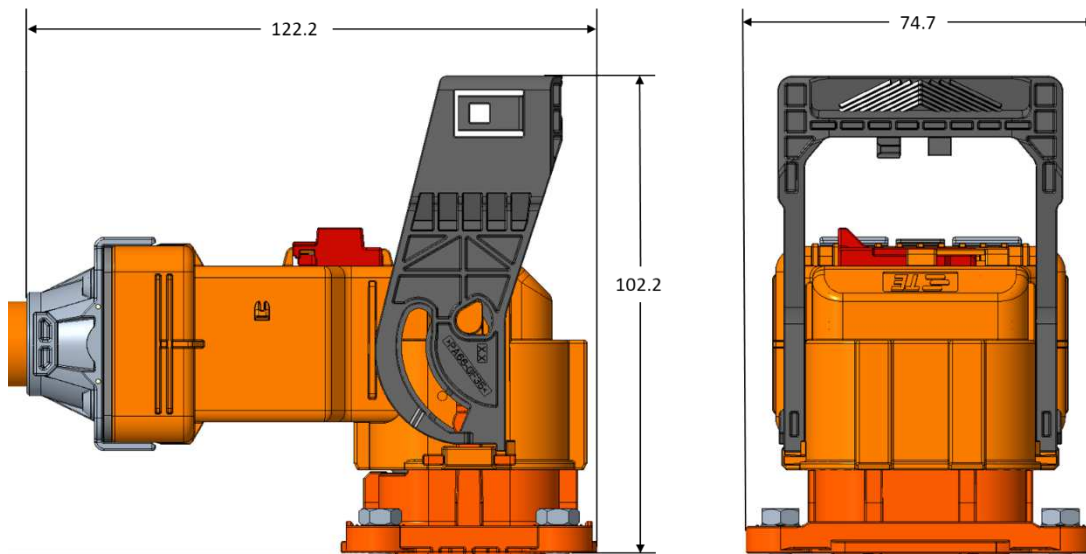


Figure 25: Complete Assembly in Pre-lock Position

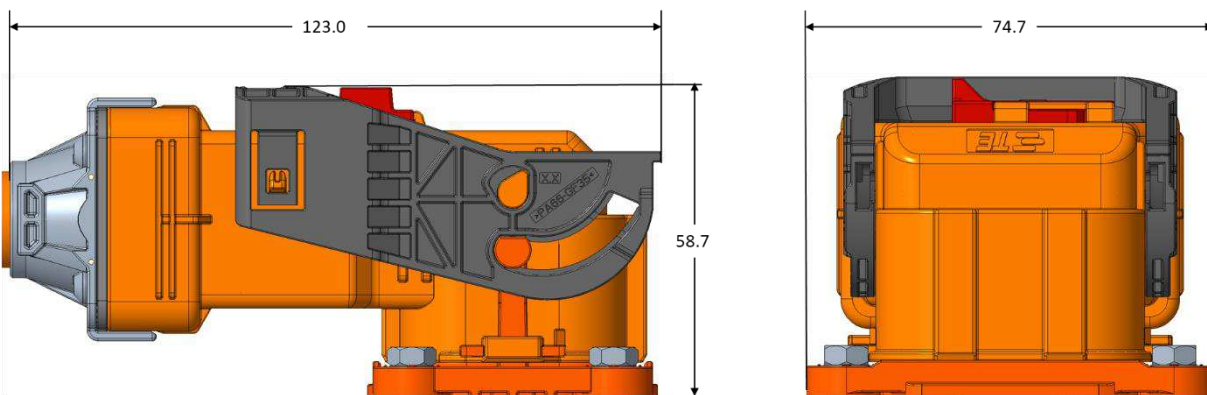


Figure 26: Complete Assembly in Locked Position

3.12. Keying Capability

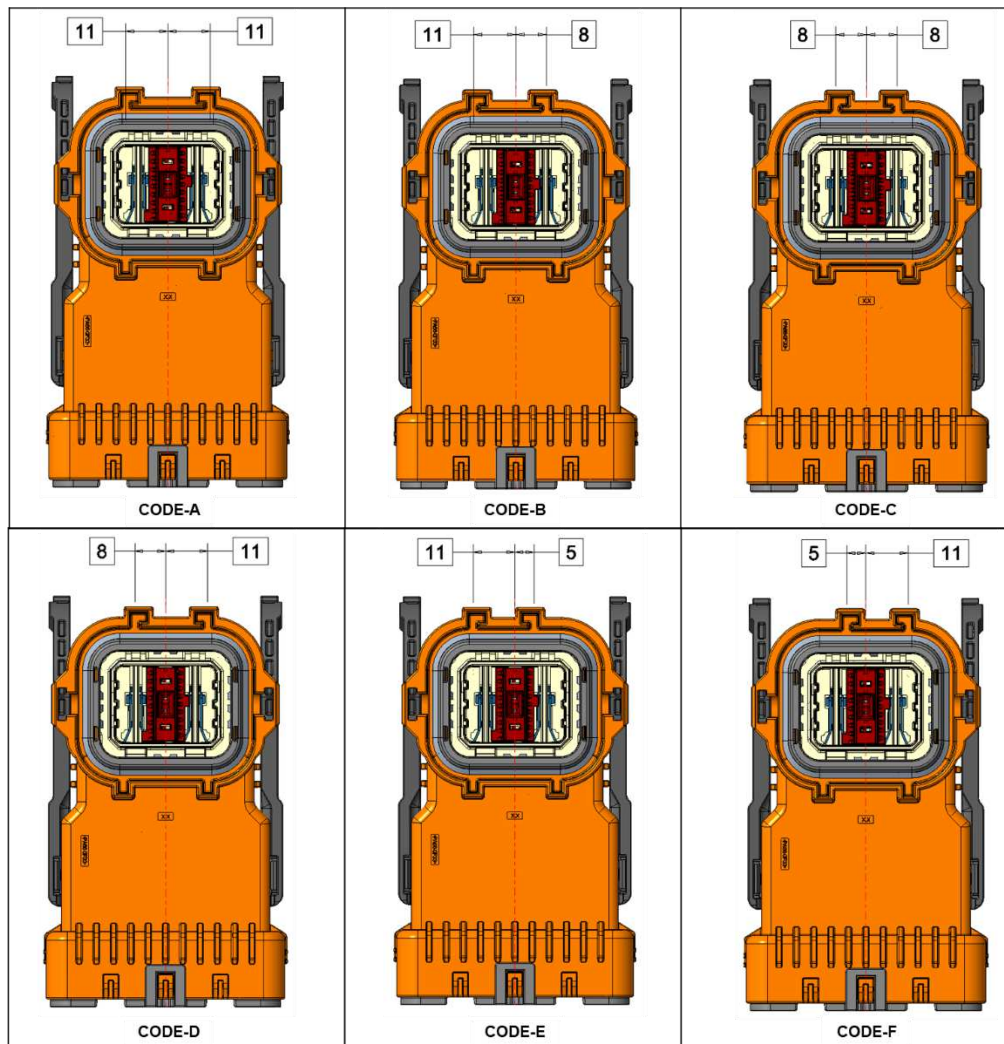


Figure 27: Keying Capability of Plug Sub-Assembly

3.13. Inspection

For inspection, refer to the customer drawing numbers 2843111-C, 2843125-C, 2843126-C, 2843127-C, 2843128-C, 2843129-C, 2840450-C, and 2840451-C.

4. TOOLING

A listing of tooling recommendations covering the full wire size range is provided in Figure 28. Modified designs and additional tooling concepts may be available to meet other application requirements. For additional information, contact one of the service groups at the bottom of page 1.

CABLE	DIE SET	MANUAL TOOLING	PNEUMATIC TOOLING				
			HAND ASSY	FOOT ASSY	TOOL HOLDER		
					RATCHET	NON-RATCHET	HEAD ASSY
Coroplast Part No.: 9-2611 / 70mm ²	2393215-1	X-XXXXXXX-X	X-XXXXXXX-X	X-XXXXXXX-X	X-XXXXXXX-X	X-XXXXXXX-X	X-XXXXXXX-X

* **Coroplast** is a trademark of its respective owners

Figure 28

5. END OF LINE TESTING

If pressure testing is used to validate sealing function, pressure shall not exceed 7 PSI [48 kPa].

6. NOTE, CAUTION, AND DANGER STATEMENTS



NOTE

Highlights special or important information.



CAUTION

Denotes a condition which may result in product or equipment damage.



DANGER

Denotes an imminent hazard which may result in moderate or severe bodily injury.