




HVP-HD1400 Plug Connector (Standard Cable) Application Specification

HVP-HD1400 母端高压连接器（标准线）应用规范



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- ◆ **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 other wise compromised, please discontinue it use immediately.**
- ◆ **This connector should only be serviced by a trained and qualified technician.**

1. SCOPE 适用范围

1.1 Content 内容

This specification covers the requirements for application of HVP-HD1400 High Voltage connector. The HVP-HD1400 connector system is designed to meet LV215 specifications (vibration refers to ISO16750-3 while salt spray refers to VDA233-102), there are 70mm²、95mm² and 120 mm² three kinds of metric standard wire size (acc. to ISO 6722-1 class D, ISO 19642-9 class D). The connector incorporates conductive EMI shields to reduce radiated emissions in the application.

The HVP-HD1400 header can be divided into two parts: 90Deg and 180Deg. All of them have 1POS、2POS、3POS, equipped with twelve different keying or polarizing configurations. The connector system incorporates the 14mm round contacts, integrated High Voltage Interlock (HVIL) System and High Voltage Finger Protection(IPXXB). The plastic housing is molded in orange to denote a high voltage system.

该规范涵盖了HVP-HD1400高压连接器的应用要求。HVP-HD1400连接器系统的设计符合LV215规范(振动符合ISO16750-3, 盐雾符合VDA233-102), 有70mm²、95mm²以及120 mm²三种公制标准线径(符合ISO 6722-1 class D, ISO 19642-9 class D 标准)。该连接器采用导电EMI屏蔽, 以减少应用中的辐射。

HVP-HD1400连接器有90° 以及180° 两大类, 可分为1POS、2POS、3POS三种, 有12种不同的键位。连接器系统包含14毫米圆形电源连接系统和高压互锁 (HVIL) 系统和高压手指防护 (IPXXB) 要求。外壳采用橙色模制, 表示高压系统。

1.2 Processing notes 加工说明

The processor 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 not specified, not released tools or not released connector components.

加工者负责确保制造过程的质量和系统的正常功能。如果由于未遵守本规范或使用未定义的、未发布的工装或未发布的连接器组件而导致质量异常或损坏, 则不承担保修和责任。

2. APPLICABLE DOCUMENTS 适用文件

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 supplied, the last valid customer drawings takes preference.

以下提到的文件是本说明书的一部分。如果文档中包含的信息与本规范或提供的任何其他技术文档之间存在冲突, 则以最新有效的客户图纸优先。



2.1 TE Connectivity Documents 泰科电子文件

This Application Specification based on the latest valid customer drawings.

本应用规范基于最新的有效客户图纸。

2.1.1 Customer drawings 客户图纸

Table 1: Customer drawings / 客户图纸

Header side (Include interface) / 公端(包括应用面板)	
2399606	HVP-HD1400 1POS HEADER ASSY,180DEG
2399607	HVP-HD1400 2POS HEADER ASSY,180DEG
2399608	HVP-HD1400 3POS HEADER ASSY,180DEG
2399609	HVP-HD1400 1POS HEADER ASSY,90DEG
2399610	HVP-HD1400 2POS HEADER ASSY,90DEG
2399611	HVP-HD1400 3POS HEADER ASSY,90DEG
2407804	HVP-HD1400 HEADER SHIPPING CAP
Plug side / 母端	
2399663	HVP-HD1400 PLUG SUB-ASSY
2446256	HVP-HD1400 PLUG SUB-ASSY WITHOUT TPA
2399679	PLUG TPA
2407799	HVP-HD1400 PLUG SUB-ASSY SHIPPING CAP
2386340	CONTACT ASSY
2399666	SPACER
2387548	SHIELD SLEEVE
2387549	CRIMP ANVIL
2399667	SINGLE WIRE SEAL (SWS)
2399668	CABLE CLIP
2399669	CABLE COVER

2.1.2 Specifications 规范

Table 2: TE-specifications / 泰科规范

Specifications	Description
108-18030	Product specification MQS contact system
108-160407	Product specification HVP-HD1400 connector
114-18021	Application specification MQS contact system
114-160223	Application specification HVP - HD1400 plug
114-160222	Application specification HVP - HD1400 header
114-94737	Application specification EMPT
122-160021	Technical information on shelf life

2.2 Cable specification 线缆规格

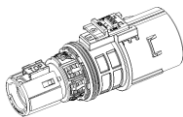
The connector is designed and qualified with LV 215, there are 70mm²、95mm²、120 mm² three kinds of metric standard wire size (acc. to ISO 6722-1 class D, ISO 19642-9 class D). Cable Specification acc. to the appendix.

连接器设计符合LV 215标准规范, 有 70mm²、95mm²、120mm² 三种公制标准线径电缆 (符合ISO 6722-1 class D, ISO 19642-9 class D)。线缆规格见附录。

3. CONDITION OF DELIVERY AND PACKAGING 交货和包装状态

3.1 Components 零部件

Table 3: components of HVP-HD-1400 Plug ASSY / HVP-HD1400母端线缆零件

Description 描述	Picture 图片	PN for 70mm ² 70mm ² 线零 件号	PN for 95mm ² 95mm ² 线零 件号	PN for 120mm ² 120mm ² 线 零件号
HVP-HD1400 PLUG SUB-ASSY (FINGER ACCESS)		2399663-* 1-2399663-* (Definite PN see customer drawing)		

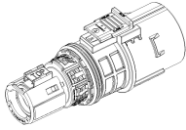
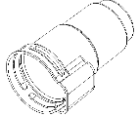
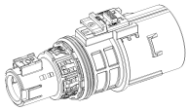
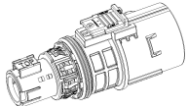

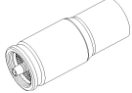

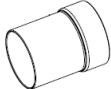




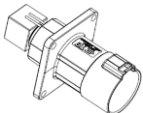
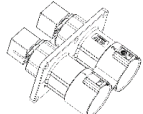
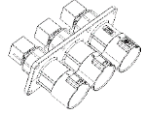
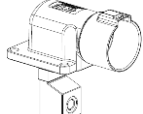
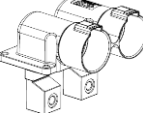
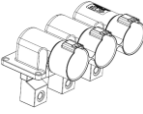

HVP-HD1400 PLUG SUB-ASSY (TOOL ACCESS)		2-2399663-* 3-2399663-* (Definite PN see customer drawing)		
HVP-HD1400 PLUG SUB- ASSY SHIPPING CAP		2407799-1		
HVP-HD1400 PLUG SUB-ASSY WITHOUT TPA (FINGER ACCESS)		2446256-1		
HVP-HD1400 PLUG SUB-ASSY WITHOUT TPA (TOOL ACCESS)		2446256-2		
PLUG TPA		2399679-* 1-2399679-* (Definite PN see customer drawing)		
CONTACT ASSY		2386340 -1	2386340 -2	2386340 -3
SPACER		2399666-1	2399666-2	2399666-3
SHIELD SLEEVE		2387548-1		
CRIMP ANVIL		2387549-1	2387549-2	2387549 -3
(SINGLE WIRE SEAL) SWS		2399667-1	2399667-2	2399667-3
CABLE CLIP		2399668-1	2399668-2	2399668-3
CABLE COVER		2399669-1	2399669-2	2399669-3

Table 4: HVP-HD1400 header ASSY / HVP-HD1400公端

Description 描述	Picture 图片	Base Number 基础料号
HVP-HD1400 1POS HEADER ASSY,180DEG		2399606
HVP-HD1400 2POS HEADER ASSY,180DEG		2399607
HVP-HD1400 3POS HEADER ASSY,180DEG		2399608
HVP-HD1400 1POS HEADER ASSY,90DEG		2399609
HVP-HD1400 2POS HEADER ASSY,90DEG		2399610
HVP-HD1400 3POS HEADER ASSY,90DEG		2399611
HVP-HD1400 HEADER SHIPPING CAP		2407804

Variant part numbers for header, please refer to this specification.

The specific variant part number can be obtained through the local TE representative or by calling the product information center.

变种料号可参照该规范。

具体变种料号可通过当地 TE 代表获得，或者拨打产品信息中心电话。

3.2 Packaging and storage 包装和贮存

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

为避免存储污染，产品应以“先进先出”的原则使用，也请参见最新的有效客户图纸。

Store condition: Temperature: +5°C~+40°C, humidity: 5%~85%.

储存条件：温度：+5°C~+40°C，湿度：5%~85%

Reference shelf life: 2 years

参考保质期：2年

Silver surfaces are provided with a protective anti-tarnish layer. This protective layer loses its protective effect after 6 months to 2 years, depending on the respective ambient conditions. This leads to tarnishing of the silver and the product can take on a yellow or blank tint. This tarnish layer is composed of silver sulphide that is disrupted during insertion upon final assembly of the contact system, so that the electrical properties generally continue to be comparable with those of a new part.

镀银产品表面有一层保护性的防变色层。根据各自的环境条件，该保护层在6个月至2年后失去保护作用。这会导致银失去光泽，产品可能会呈现黄色或空白色调。这种失去光泽的层由硫化银组成，在接触系统的最终组装过程中，硫化银在插入过程中会被破坏，因此电性能通常与新零件的电性能相当。

NOTE it is recommended: If these silver-plated products are not used up on the production line after the packaging is opened, any unused products should be promptly repackaged and stored to prevent the silver coating from tarnishing and discoloring over time.

建议：如果这些银镀产品在打开包装后没有在生产线上用完，应将未使用的产品尽快包装储存，以防止银镀层随着时间的推移发生硫化和变色。

4. APPLICATION TOOLS 应用工装

The Application tools are only valid for the specified cables at appendix. More tooling information can be obtained through a local TE Representative, or calling the product information Center after purchase.

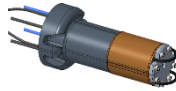
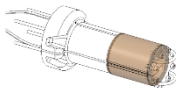
应用工装仅对附录中的指定电缆有效。可通过当地TE代表获取更多工装信息，或者在购买后，拨打产品信息中心电话。

4.1 14MM round contact / 14MM 圆形端子

The following table contains the required order numbers for application tools.

下表包含所需应用工装的订货号。

Table 5 : Required application tools contact crimp / 端子压接所需设备

PST products GmbH					
Blue Wave Industrial system					
PS48-16 with coil Ø 90mm					
Parameter Guideline for EMPT HVP-HD1400 (70-95-120mm ²) - standard cable					
Interface			Power contact		
Cable Size			70mm ²	95mm ²	120mm ²
Cable Type		Standard cable	H+S (84 100 298)	H+S (84 100 299)	H+S (84 103 410)
Fieldformer assembling (need extra insulation) standard assembling	5)		PST: 801355 (with contact offset) (PST: 801167) (PST: 801107)	PST: 801357 (PST: 801168) (PST: 801108)	PST: 801359 (PST: 801169) (PST: 801109)
only Fieldformer for customize; (need extra insulation) Note: Positioning of the crimp components (see note 7) must be guaranteed according to the Fieldformer Assembling (see note 5), agreement with the supplier.	8)		PST: 8010465 (PST: 8007754) (PST:8005863)	PST: 8010466 (PST: 8006873) (PST:8005862)	PST: 8010486 (PST: 8005903) (PST:8005861)
proposed energy value (to pass the defined discharge current I _{peak+}); depends on the used equipment	1)	Energy (Pulsenergie) [kJ]	22.5	28.5	30.5
resulting value	2)	I _{peak+} (max. Strom positive Halbwelle) [kA]	254	284	293
		min [kA]	251	281	290
		max [kA]	257	287	296
	3)	f frequency [kHz]	10.5		
		min [kHz] tolerance value	9.5		
		max [kHz] tolerance value	11.5		
Distance L1: currently specified distance plane for measuring the pressed contact surface	4)	[mm]	38.6 (for contact offset) 39.0 (old assembling)	39.4	39.4
Pressure index: the crimped strand area [mm ²] should be smaller than the value specified here for the uncrimped strand area	6)	pressure index [%]	<96	<96	<96
Contact	7)		2386340-1	2386340-2	2386340-3
Description			CONTACT (70mm ²)	CONTACT (95mm ²)	CONTACT (120mm ²)

NOTE



1) This value setting was taken from only one machine system (6 capacitors); however, a different installation was used for each cable size; is intended as a guide

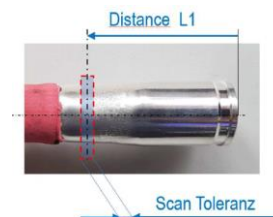
The parameters mentioned are indicative starting point guidelines for equipment set up.

For each installation, the fitting energy setting must be found by own tests in order to get the required discharge current. Depending on the system requirements (e.g. used cable length coil-capacitors,...) there may be slight deviations.

2) The positive discharge [kA] current is important for the deformation.

3) The frequency can be considered as the duration of the presser loading time on the crimping area.

4) Recommended distance L1 for the measuring section: distance from the front edge to the cutting edge; at this point it is recommended to start the micrograph analysis.



5) Tools shown in brackets are replaced by new tools; however, the existing tools can still be used.

6) The pressed area [mm²] should only have the value of the original 100% value specified here

7) This applies to the components shown here

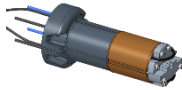
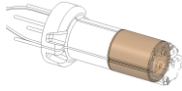
8) Field former solo

4.2 Shield sleeve 屏蔽

The following table contains the required order numbers for application tools.

下表包含所需应用工装的订货号。

Table 6: Required application tools shield crimp / 屏蔽压接所需设备

PSTproducts GmbH Blue Wave Industrial system PS48-16 with coil Ø 90mm Parameter Guideline for EMPT HVP-HD1400 (70-95-120mm²) - standard cable						
Interface				Shielding		
Cable Size				70mm²	95mm²	120mm²
Cable Type			Standard cable	H+S (84 100 298)	H+S (84 100 299)	H+S (84 103 410)
Fieldformer assembling (need extra insulation)		4)		PST: 801364 (PST: 801177) (PST: 801110)		
only Fieldformer for customize; (need extra insulation) Note: Positioning of the crimp components (see note 6) must be guaranteed according to the Fieldfomer Assembling (see note 4), agreement with the supplier.		7)		PST: 8010483 (PST: 8007761) (PST: 8005909)		
proposed energy value (to pass the defined discharge current I_peak+); depends on the used equipment		1)	Energy (Pulsenergie) [kJ]	8.5		
resulting value	limit values to be complied at crimping (quality criterion)	2)	I_peak+ (max. Strom positive Halbwelle) [kA]	144	144	144
			min [kA]	141	141	141
			max [kA]	147	147	147
	limit values to be complied at machinery process monitoring (quality criterion)	3)	f frequency [kHz]	10.5		
			min [kHz] tolerance value	9.5		
			max [kHz] tolerance value	11.5		
Pull-out force		5)	[N]	>450		
Distance S1: currently specified distance plane for measuring the pressed contact surface		8)	[mm]	5		
Contact		6)		2387548-1 2387549-1	2387548-1 2387549-2	2387548-1 2387549-3
Description				SHIELD SLEEVE CRIMP ANVIL	SHIELD SLEEVE CRIMP ANVIL	SHIELD SLEEVE CRIMP ANVIL

NOTE



1) This value setting was taken from only one machine system (6 capacitors); however, a different installation was used for each cable size.

The parameters mentioned are indicative starting point guidelines for equipment set up.

For each installation, the fitting energy setting must be found by own tests in order to get the required discharge current. Depending on the system requirements (e.g. used cable length coil-capacitors,...) there may be slight deviations.

2) The positive discharge [kA] current is important for the deformation;

3) The frequency can be considered as the duration of the presser loading time on the crimping area;

4) Tools shown in brackets are replaced by new tools; however, the existing tools can still be used

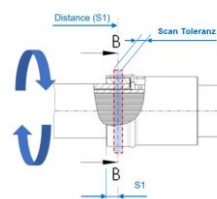
5) Min. holding values or until the strands break (destroy the contact or the cable, conductor breaks outside the crimp) for combed or uncombed shield wires: *) combed process is needed for 120mm²

6) This applies to the components shown here

7) Field former solo

→ It is recommended to start the micrograph analysis at the highest point of the wave imprint from the screen/anvil

8) Recommended distance S1 for the measuring section: distance from the crimp anvil edge to the cutting edge; at this point it is recommended to start the micrograph analysis.



5. ASSEMBLY INSTRUCTIONS 组装说明

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

下述步骤显示了线缆组件的细节和线缆组件插入母端塑壳子组件的插入说明。该制程仅对附录中的指定线缆有效，并且仅这样的组合通过TE验证。在通过验证测试性能之后，可以使用替代电缆。

5.1 Overview of all parts should be assembled 全部部件总览

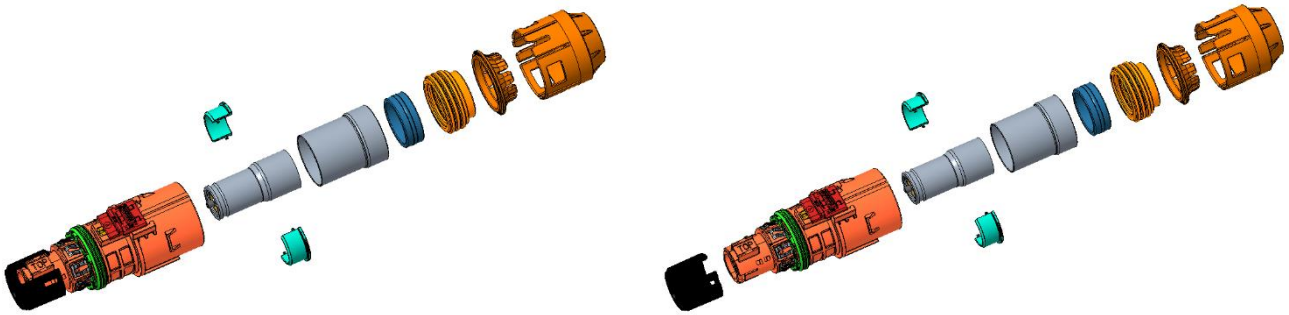


Figure 1: HVP-HD1400 Plug Assy (Finger Access) overview

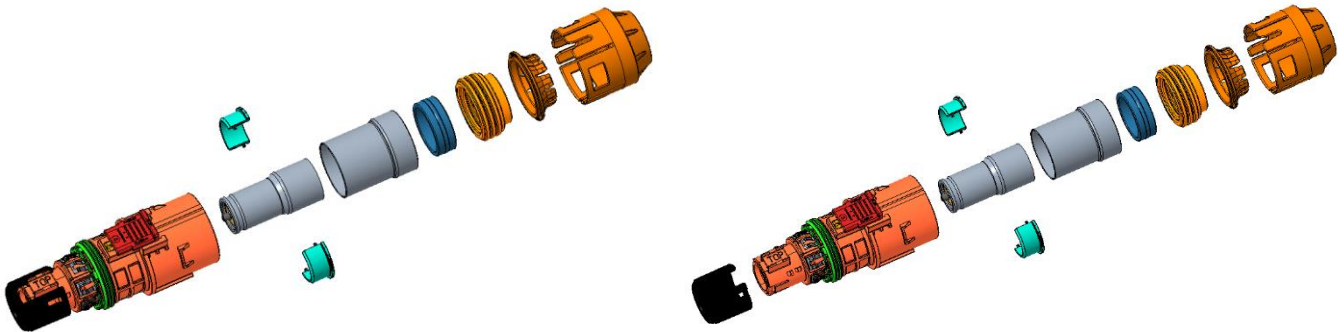


Figure 2: HVP-HD1400 Plug Assy (Tool Access) overview

For more details please check the draft NO. 2400957.

请查询编号2400957图纸获得更多信息。

5.2 Cable components assembly 线缆组件组装

Safety information, avoid prolonged or repeated skin contact with conductor or shieldings (wear protective gloves).

安全提醒，避免皮肤长时间或重复与导体或屏蔽接触（戴防护手套）。

In addition to specific handling and assembly guidelines throughout this specification, it should be emphasized that care shall be employed in handling all individual components and assemblies during the cable assembly process. Special care needs to be taken when handling components such as the seals and conductive metal components as any damage or contamination of these components may lead to issues in the final assembly. It is advisable that the components are handled and stored individually to minimize any risks: some seals are self lubricated and contact with other components is not advised, bulk storage & handling of components may lead to damage to other components (e.g. scratches), particle generation due to rubbing, etc. Please ensure that the process layout consider these factors.

除了本规范中的具体搬运和组装指南外，还应强调，在电缆组装过程中，搬运所有单独的部件和组件时应小心。处理密封件和导电金属部件等部件时需要特别小心，因为这些部件的任何损坏或污染都可能导致最终组装出现问题。建议单独处理和储存部件，以最大限度地降低风险：一些密封件是自润滑的，不建议与其他部件接触，大量储存和处理部件可能会导致其他部件损坏（如划痕），摩擦产生颗粒等。请确保工艺布局考虑到这些因素。

5.2.1 Pre-load parts 预组零件

In order shown in figure 3, slide cable cover, cable clip, single wire seal and crimp anvil onto cable sheath, so that they are not in crimp work area.

按照图3所示的顺序，滑动线缆尾盖、线缆卡夹、线缆密封圈和内屏蔽环到电缆护套上，使它们不在压接区域。

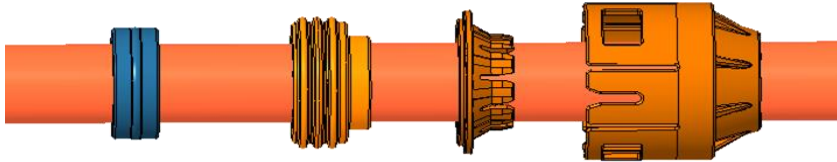


Figure 3: Before processing slide components onto cable

5.2.2 Cable strip 线缆裁切

Strip and remove outer sheath, screening braid (if present screening foil), inner sheath and conductor from the end as shown in figure 4.

如图4所示，从末端切开并去除外护套，屏蔽编织物（如果存在屏蔽箔），内护套和铜芯线。

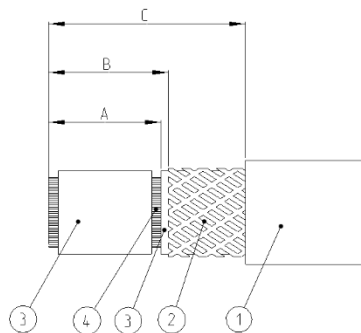


Figure 4: Cutting cable to length



Attention: Cable sheath and shielding braid shall not be cut or broken during the cutting procedure.

注意：切割过程中不得切割或破坏电缆护套和屏蔽编织层。

Table 7: Cutting dimensions 剥线尺寸

(ID)	Cable Design	A [mm]	B [mm]	C [mm]
1	Outer sheath	--	--	44.5±1
2	Screening braid	--	(~22) ¹⁾	--
3	Inner sheath	--	--	--
4	Conductor	21±1	--	--



Attention: Shielding braid shall not be broken.

注意：屏蔽编织不得被破坏



1) The braided shield has a flexible end position; however, this depends on the combing process. This note is only to point out that the braided shield must not protrude/overlap the anvil / shield crimp sleeve. The individual screen wires can be located within the area shown here (the end of the screen must behind the design retaining element of the rib, reference to picture 9 and 12). The shield length given here in brackets should only be regarded as an orientation; the harness maker can define the shield length for his own process.

The following specifications must be met:

- Shield strands must not protrude beyond the anvil / shield crimp sleeve.
- The end of the shade must behind the design retaining element of the rib, reference to picture 9 and 12.

1) 编织屏蔽具有柔性末端位置；然而，这取决于梳理过程。本注释仅用于指出编织屏蔽不得突出/重叠内屏蔽环/外屏蔽环。单独的屏蔽线可以位于此处所示的区域内（屏蔽的末端必须盖住内屏蔽环的凸筋，图9和图12供参考）。括号中给出的屏蔽长度应仅视为一种方向；线束制造商可以为自己的工艺定义屏蔽长度。

必须满足以下规范：

- 编织屏蔽不得伸出内屏蔽环/外屏蔽环之外。
- 编制屏蔽的末端必须盖住内屏蔽环的凸筋，图9和图12供参考。

5.2.3 Pre-process of the braided shield 屏蔽层的预处理



The crimp sleeve must be able to be installed without tools; If necessary, the crimp braid must be combed out accordingly.

外屏蔽环必须能够无需工具安装；如有必要，线缆屏蔽线必须相应梳理。

5.2.3.1 Option1: Fold back the shield strands with comb-out process 带梳理的屏蔽层翻折



Comb-out process for shield mesh is needed, see figure 5.

需要对屏蔽网进行梳理处理，见图5。

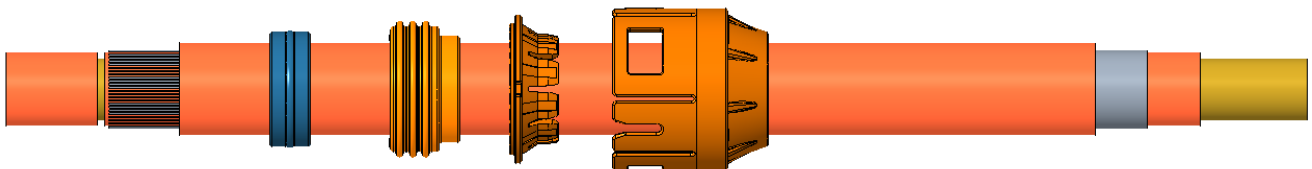


Figure 5: Comb-out for braided shield

Push the crimp anvil until the top surface flush with the cutting surface of outer jacket shown in figure 6.

如图6所示，推动内屏蔽环直到内环顶面与外绝缘皮的切面平齐。

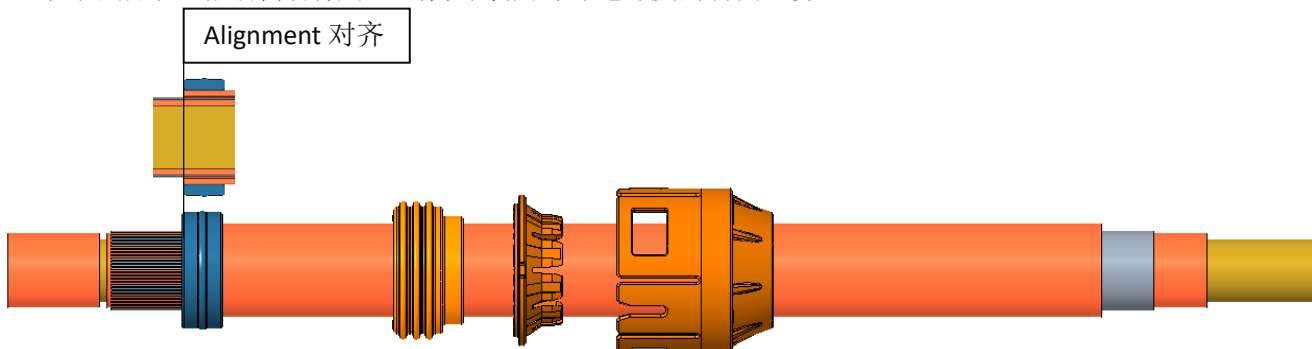


Figure 6: Alignment

Fold the braided cable shield back over the crimp anvil, taking care to try to keep crimp anvil positioned such that its edge is flush with the stripped edge of the outer jacket as shown in Figure 7.

沿内屏蔽环方向往回翻折屏蔽编织，如图7所示，小心地将内屏蔽环定位在线缆外绝缘皮边缘齐平处。

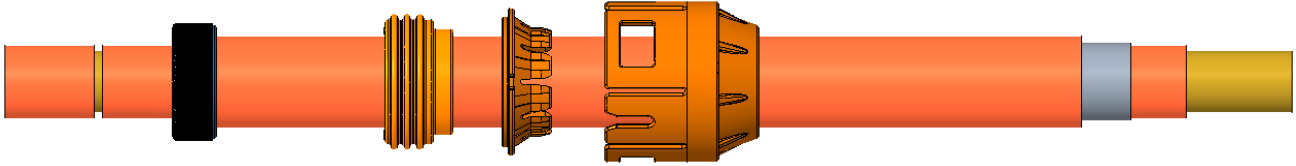


Figure 7: Fold the braided cable back



Comb-out process for shield mesh is needed, see figure 8.

Specification for the combing quality, see chapter 5.2.3.

需要对屏蔽网进行弯折处理，见图8。

梳理质量规范，请参见第5.2.3章。



Figure 8: Comb-out

Trim the excess braided cable shield.

修剪多余的屏蔽线。

Visually check “Length to end of crimp anvil”. Needs to be 0.1 to 4mm, see figure 9.

目视检查屏蔽网到内屏蔽环边缘的距离是0.1-4mm，见图9。

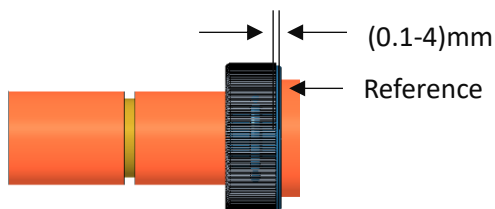


Figure 9: Braided shield comb-out length

See also the information in chapter 5.2.6

另见章节5.2.6信息

5.2.3.2 Option2: Fold back the shield strands with non-comb-out process 不带梳理的屏蔽层翻折



While TE recommends to comb-out the shield strands (option1) , there is a possibility of not combing the strands before folding (option 2).

Please refer to the requirement as described in chapter 5.2.3 and chapter 4.2,table 6,note 5.

In both options, shield stands shall not be damaged or broken, to insure full shielding functionality performance.

虽然TE建议在折叠之前梳理屏蔽线束（选项1），但在折叠之前不梳理线束也是一种可能性（选项2）。

请参阅第5.2.3章和第4.2章表6注释5中描述的要求。

在这两种选项中，屏蔽线束不得损坏或断裂，以确保完全的屏蔽功能性能。

Push the crimp anvil until the top surface flush with the cutting surface of outer jacket shown in figure 10.

如图10所示，推动内屏蔽环直到内环顶面与外绝缘皮的切面平齐。

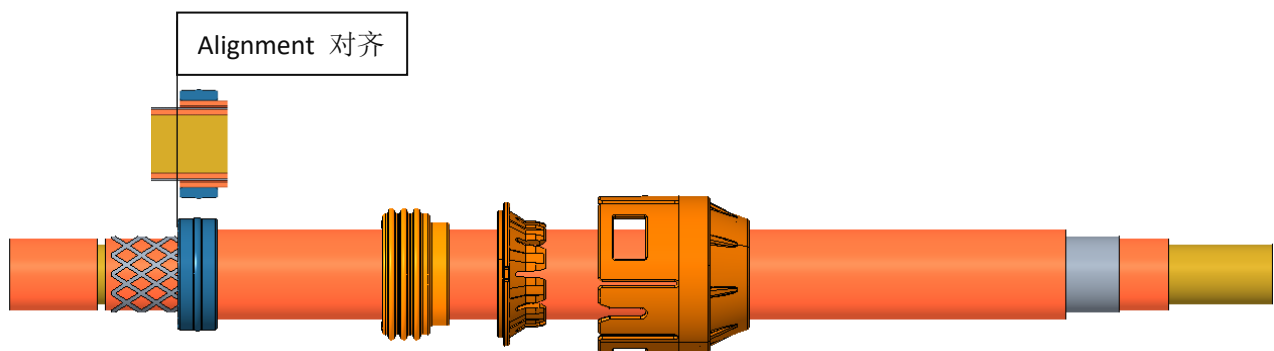


Figure 10: Alignment

Fold the braided cable shield back over the crimp anvil, taking care to try to keep crimp anvil positioned such that its edge is flush with the stripped edge of the outer jacket as shown in Figure 11.

沿内屏蔽环方向往回翻折屏蔽编织，如图11所示，小心地将内屏蔽环定位在线缆外绝缘皮边缘齐平处。

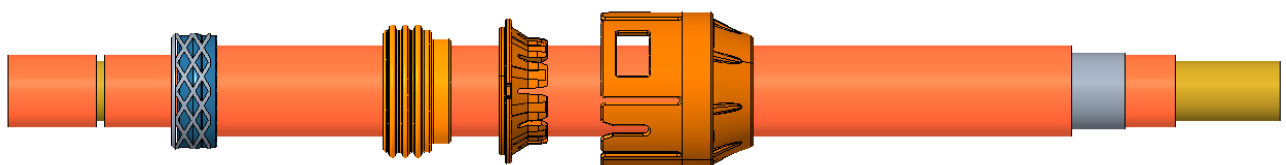


Figure 11: Fold the braided cable back

Visually check “Length to end of crimp anvil”. Needs to be 0.1 to 4mm, see figure 12.

目视检查屏蔽网到内屏蔽环边缘的距离是0.1-4mm，见图12。

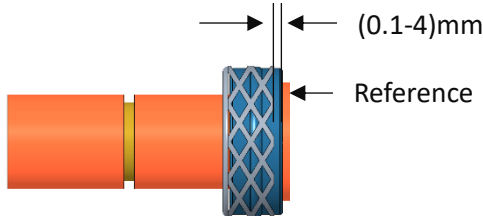


Figure 12: Braided shield non-comb-out length

See also the information in chapter 5.2.6

另见章节5.2.6信息

5.2.3.3 Protect the shield braid during operation 在操作过程中保护屏蔽编织层

When crimping the HV terminals using the EMPT process, it's essential to protect the shield braid to prevent damage during the operation.

The shielding braid can be protected using various auxiliary structures on the EMPT tools or by using protective tubes or non-glue tape to avoid being affected from EMPT crimping energy during HV terminal EMPT crimping. The image below is for reference only, customers can select protection methods based on their actual needs.

在使用EMPT工艺对高压端子进行压接时，有必要保护屏蔽编织层，以防在操作过程中受到损坏。

可以通过在EMPT工具上使用各种辅助结构，或使用保护管或不含胶水的魔术贴来保护屏蔽编织层，以避免在高压端子EMPT压接过程中受到EMPT压接能量的影响。下图仅供参考，客户可以根据实际需求选择保护方法。



Figure 13a: Protection tube

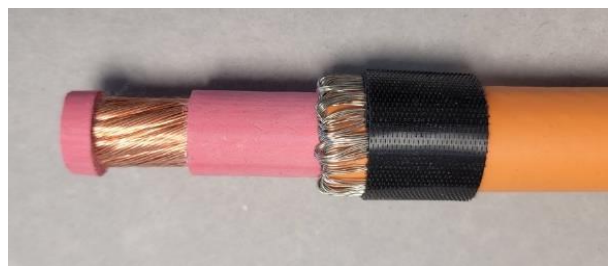


Figure 13b: Non-glue tape

5.2.4 Contact crimp 端子压接

Remove the separable inner sheath on the head.

移除头部处的内绝缘皮。

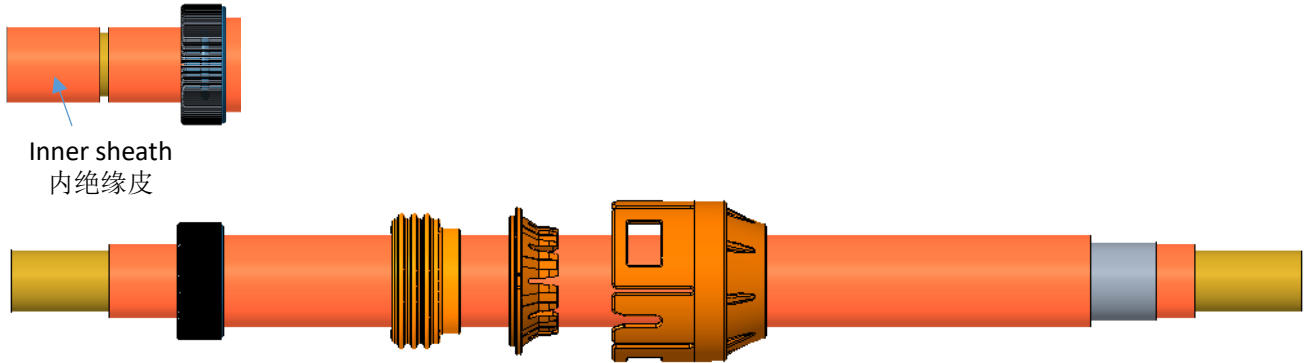


Figure 14: Remove the inner sheath

Prepare the cable, then crimp the contacts according to TE-Application specification 114-160223. Only wire and contacts that meet the requirements of the application specification can be used.

根据最新的泰科应用规范114-160223准备线缆裁切以及压接端子。只有满足该应用标准的导线及端子才能被使用。

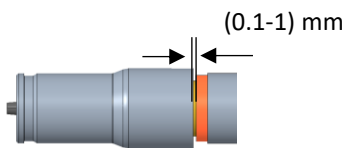


Figure 15: Before Contact crimping

Visually check “Length to end of insulation before crimping”. Needs to be 0.1 to 1mm, see figure 15.

目视检查压接前导线装到端子内的距离是0.1-1mm，见图15。

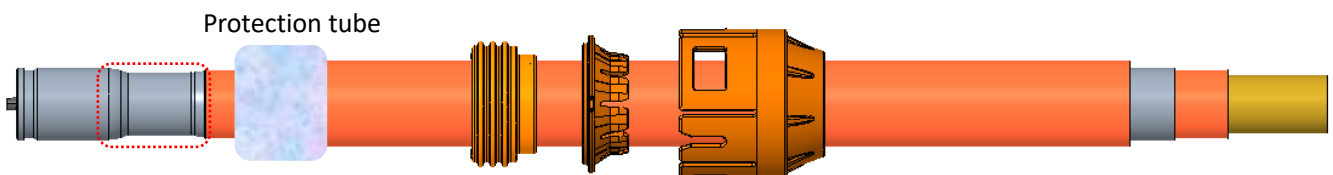


Figure 16: After Contact crimping

The performance after crimping shall comply with TE 114-94737 specification.

压接后性能符合TE 114-94737规格。

The whole crimp area must fit into the housing; it must not destroy/deform the housing when plugged in.

整个压接区域必须能安装在塑胶外壳内；插入时不得使塑胶外壳损坏或变形。

5.2.5 Install shield sleeve 安装屏蔽环

Remove the protection tube

移除保护套

Mating two spacers at the position shown in figure 17, the spacers shall expose to the braided cable shield tightly, uniform distribution.

在图17所示位置装配两个垫片，垫片应和屏蔽编织紧贴，均匀分布。

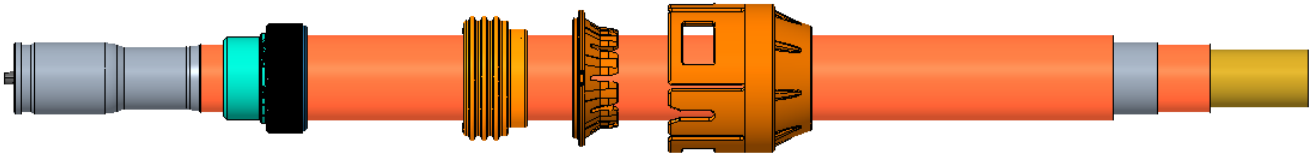


Figure 17: Install spacers

Insert shield sleeve onto cable over the crimp anvil, as shown in figure 18.

如图18所示，组装外屏蔽环到线缆上,盖住内屏蔽环。

The crimp sleeve must be able to be installed without tools. If necessary, the crimp braid must be combed out according.

外屏蔽环必须能够无需工具安装；如有必要，线缆屏蔽线必须相应梳理。

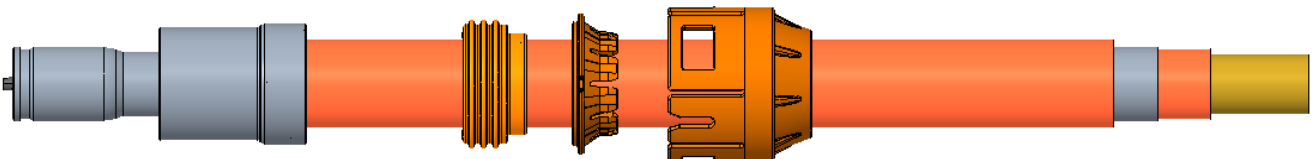


Figure 18: Insert the shield sleeve

5.2.6 Shield sleeve crimp 屏蔽压接



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

在这一步中没有错误是至关重要的，因为无法重新加工。

Specification of the positioning before the crimping process

to align the shield crimp sleeve + anvils before shield crimp; the distance between 1.2 and 1.3 includes a minimum gap of 0.4mm ahead. This gap is intended to assist in inserting the two components (clearance fit).

压接工艺前的定位规范。

在屏蔽压接之前对准外屏蔽环+内屏蔽环；1.2和1.3之间的距离包括前方0.4mm的最小间隙。此间隙旨在帮助插入两个部件（间隙配合）。

压接后性能符合TE规格。

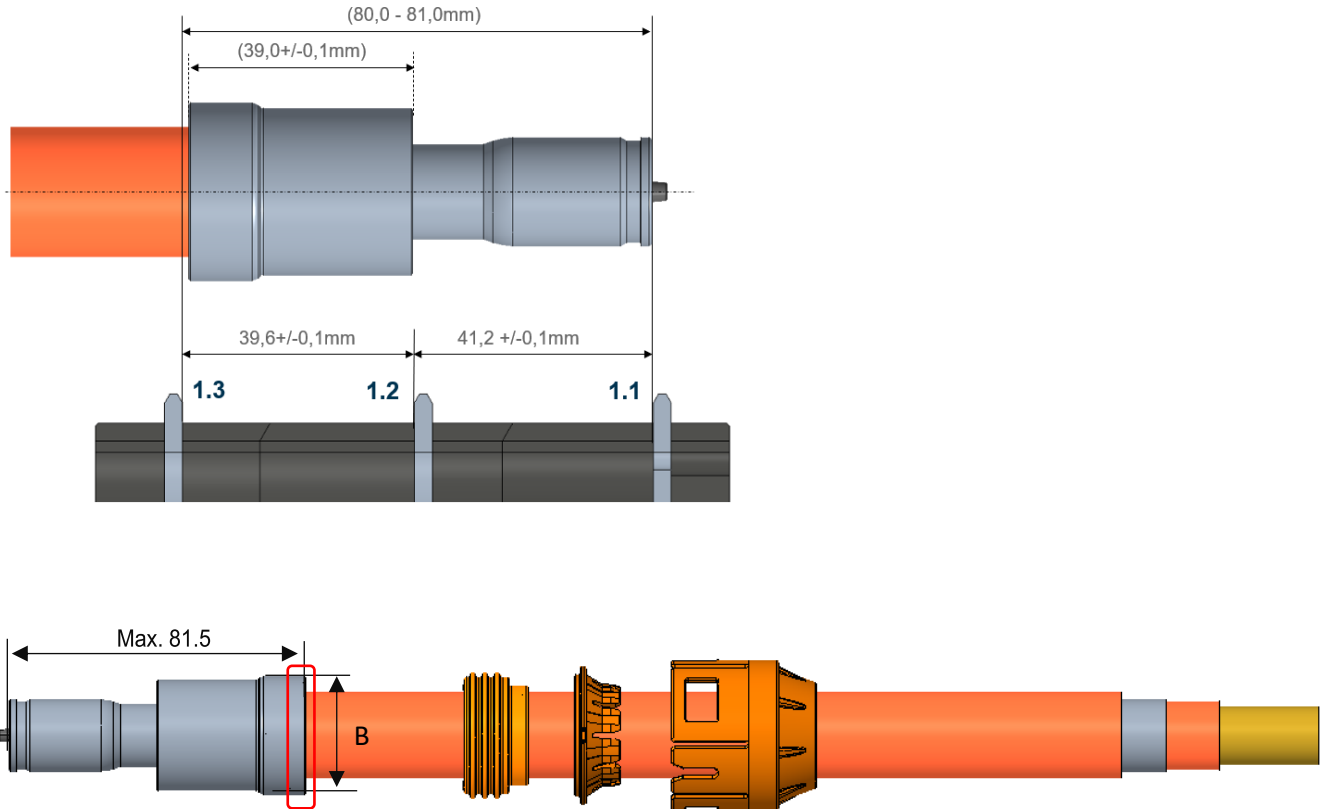


Figure 19: Shield sleeve Crimp

The performance after crimping shall comply with TE 114-94737 specification.

压接后性能符合TE 114-94737规格。

The recommended diameter B of the shield sleeve after crimping is less than or equal to 30mm, see figure 19.

压接后屏蔽直径B推荐小于等于30mm，见图19。

Trim the excess braided cable shield (red area) if needed.

如需要，修剪多余的屏蔽线（红色区域）。

5.3 Plug Housing Assy 母端塑壳组装

5.3.1 Insert cable assembly into the Plug Housing 线缆组件装入母端塑壳

Note: Align the alignment of plug housing sub-assembly and cable assembly as shown in figure 20.

注意，如图20所示，线缆组件与母端塑壳组件方向对齐。



When handling the plug or the plug without TPA, avoid touching the radial seal area and wipe off the lubricant on the surface (red area).

当拿取母端塑壳或不带TPA的母端塑壳时，避免接触密封圈区域并擦去表面的润滑剂（红色区域）。

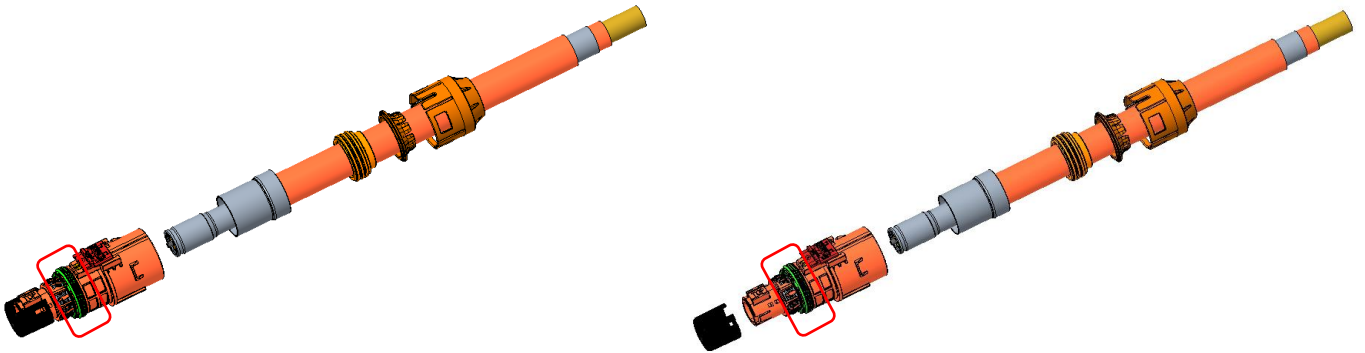


Figure 20: Oriented cable assembly to housing

Insert aligned the cable assembly into the plug subassembly (During the assembly process of harness maker, the cables can be rotated to facilitate assembly, with a maximum of one complete rotation allowed), Slide the cable clip with SWS and cable clip onto plug housing until it is fully locked and makes 'click'.

Press TPA to the full locked position.

The following items at minimum must be inspected and verified:

- Visual examination of correct orientation of single wire seal before sliding the cable clip.
- Visual examination of correct assembling cable cover into housing after assembly, make sure three bulges were locked.

将线缆组件插入母端塑壳组件（在线束厂商的组装过程中，线缆可以旋转以便安装，允许的旋转圈数 ≤ 1 ），滑动线缆卡夹将线缆密封圈和导线卡夹一起推到母端塑壳处直到完全扣住并发出“咔嗒”声。

将TPA推到终锁位置。

必须至少检查并验证以下项目：

滑动线缆卡夹前目视检查线缆密封圈是否外翻，确认密封圈没有外翻后再推动线缆卡夹。

组装完成后目视检查线缆尾盖是否正确组装到主体外壳上，尾夹上的三个凸台必须都扣住主体。

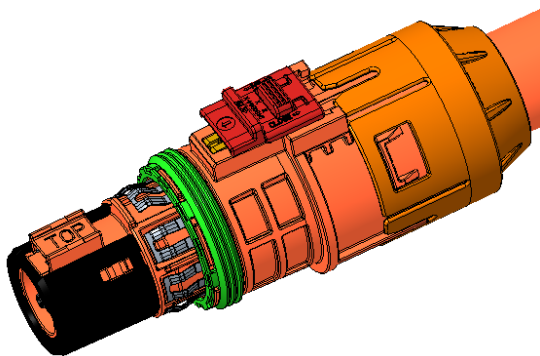


Figure 21a: Plug assembly (Finger Access)

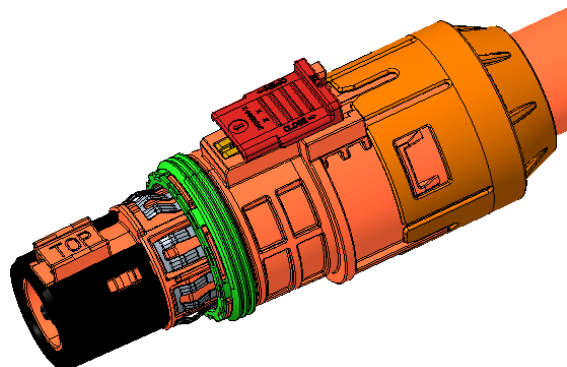


Figure 21b: Plug assembly (Tool Access)

During transportation within the harness production site, it is recommended to use the packing tray provided by TE as it offers good protection for the sealing and shielding springs on the plug assembly. Alternatively, when using other transfer boxes, be sure to avoid collisions between plugs to prevent potential damage to the shield spring and contamination of the lubricant on the radial seal onto other surfaces of the plug housing.

在线束制造商内部的运输过程中，建议使用 TE 提供的包装托盘，因为它为母端塑壳组件上的密封和屏蔽弹簧提供了良好的保护。或者，在使用其他中转箱时，请务必避免母端塑壳之间的碰撞，以防止对屏蔽弹簧的潜在损坏以及密封圈上的润滑剂污染到母端塑壳的其他表面上。



6. FINAL EXAMINATION 终检

6.1 Visual Examination 外观检查

After processing the connector assembly has to be checked of completeness, correctness acc. to customer drawings and free of damage.

在装配连接器后，必须根据客户图纸进行完整性、正确性检查，且不能损坏。

During the storage period, the product surface may be oxidized and discolored. These oxide layers are composed of Silver sulfide. The contact resistance to the electrical performance of the product is not affected and is identical to the brand new state.

在储存期限内，产品表面可能有氧化变色现象，这些氧化层是由硫化银组成的，对产品的电气性能的接触电阻并不受影响，和全新状态完全相同。

6.2 Electrical Tests 电气测试

Electrical characteristic values according product specification TE-108-160407 / chapter 3.4 are ensured by applicator. The test parameter should be not exceeding the values shown in point 3.4/ TE-108-160407.

使用方依据产品规范TE-108-160407第3.4章保证电气特性。测试参数不应超出规范3.4章的值。

7. HEADER ASSY AND PLUG ASSY MATING/ UNMATING INSTRUCTIONS 公母端安装说明

7.1 Header assy and plug assy mating 公母端连接器互配

Delivery condition with CPA are in pre-lock position.

Visual examination of CPA position before mating with header.

CPA的交付条件是处于预锁位置。

公母端连接器互配前目视确认CPA的位置。

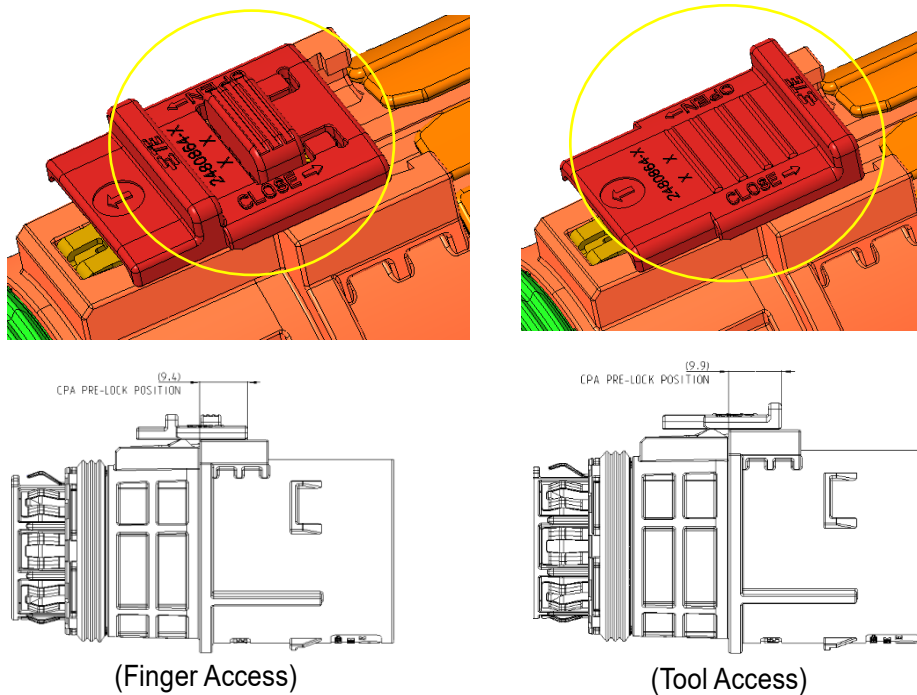


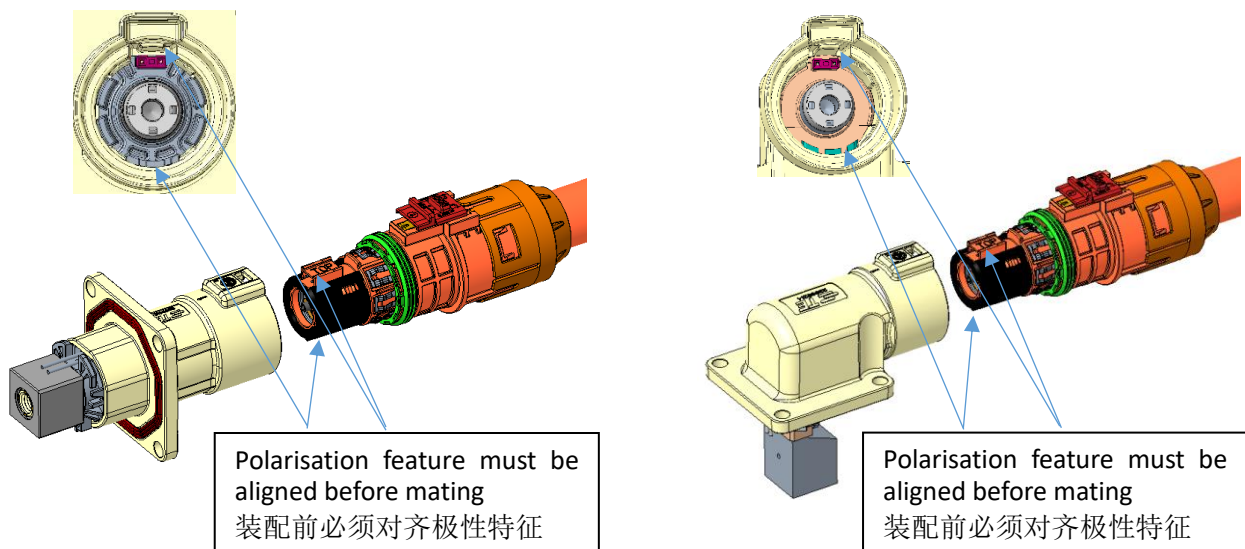
Figure 22: Delivery condition – CPA in pre-lock position

Mating plug with header until the spring come up with sounds like 'click'.

将公母头连接器对配直到弹片弹起并发出“咔哒”声。

If the cable needs to be rotated during installation, the number of rotations should not exceed 2 times.

如需要旋转线缆对配，线缆允许的旋转圈数≤2。



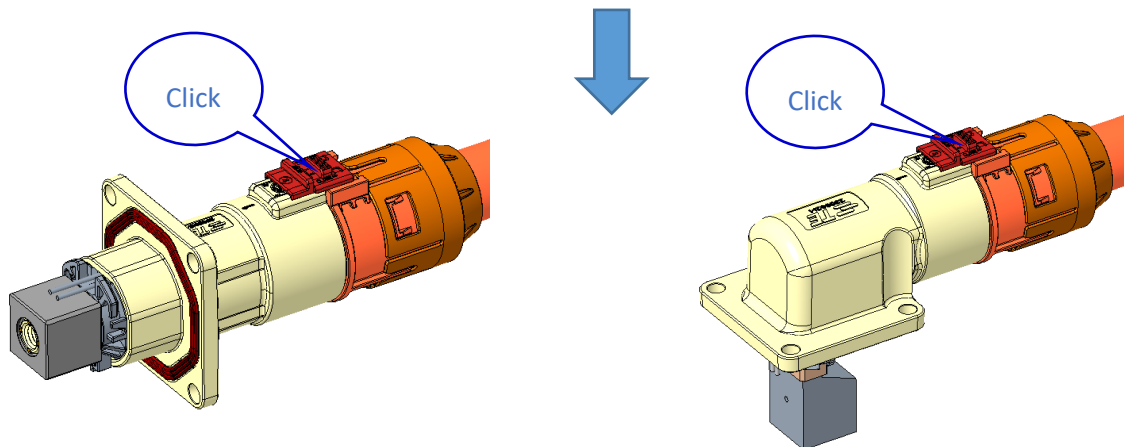


Figure 23: Header assy and plug assy mating condition
(Finger Access, Tool Access share the same steps)

Please note, after header and plug are fully assembled, CPA should be pushed until it stops against the plug housing.

Pushing smoothly indicates that header and plug have been assembled in the correct position, otherwise the mating condition and CPA status should be checked.

请注意，公母头连接器对配完成后，推动CPA到终止位置。

推动顺利说明公母头连接器已对配到正确位置，反之需检查公母头连接器的对配状态和CPA状态。

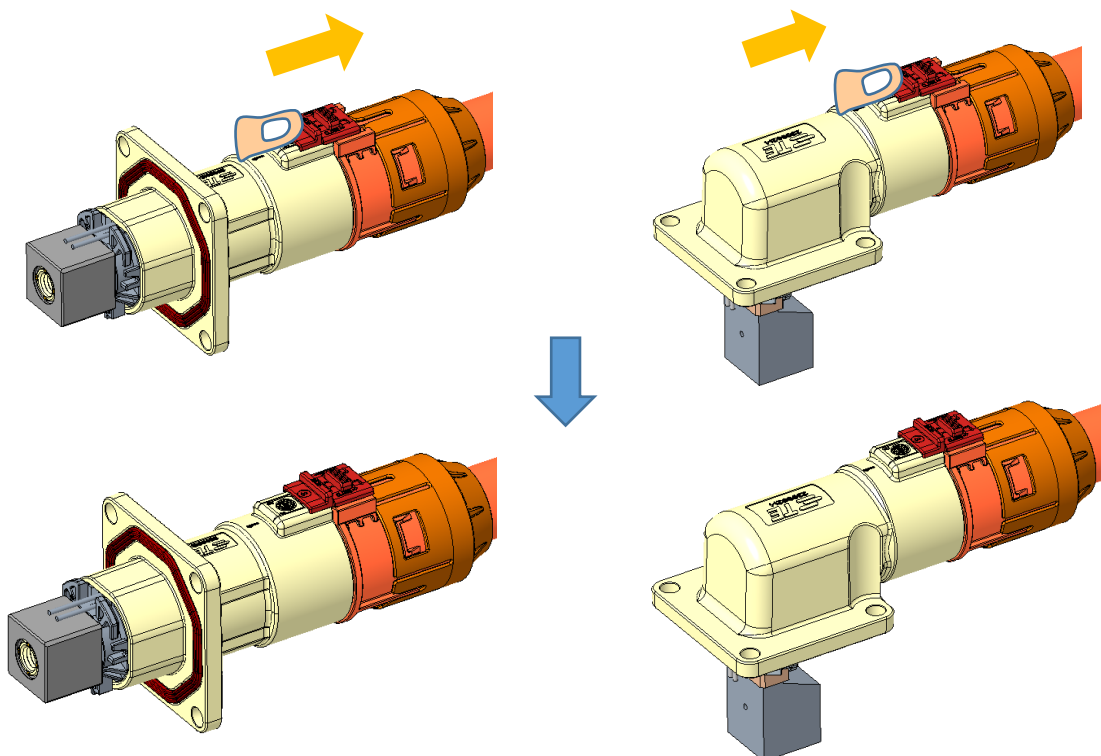


Figure 24: Push CPA to final lock position
(Finger Access, Tool Access share the same steps)

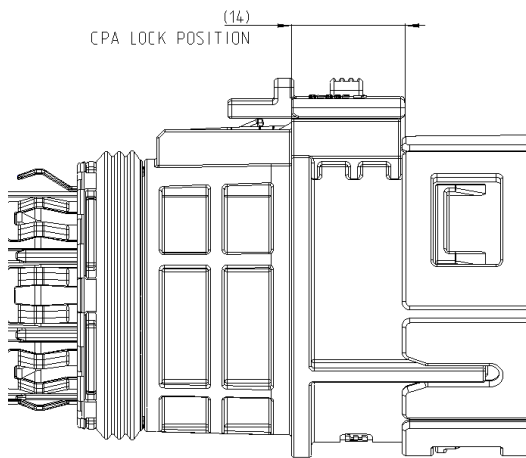


Figure 25a: CPA final lock position
(Finger Access)

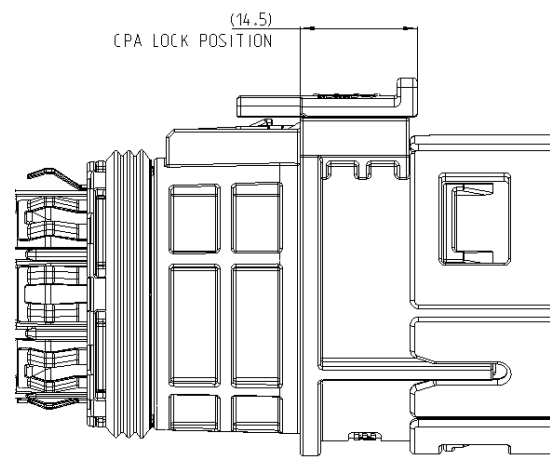


Figure 25b: CPA final lock position
(Tool Access)

7.2 Header assy and plug assy un-mating 公母端连接器解除互配

Push the CPA until it gets to pre-lock position.

将CPA推到预锁位置。

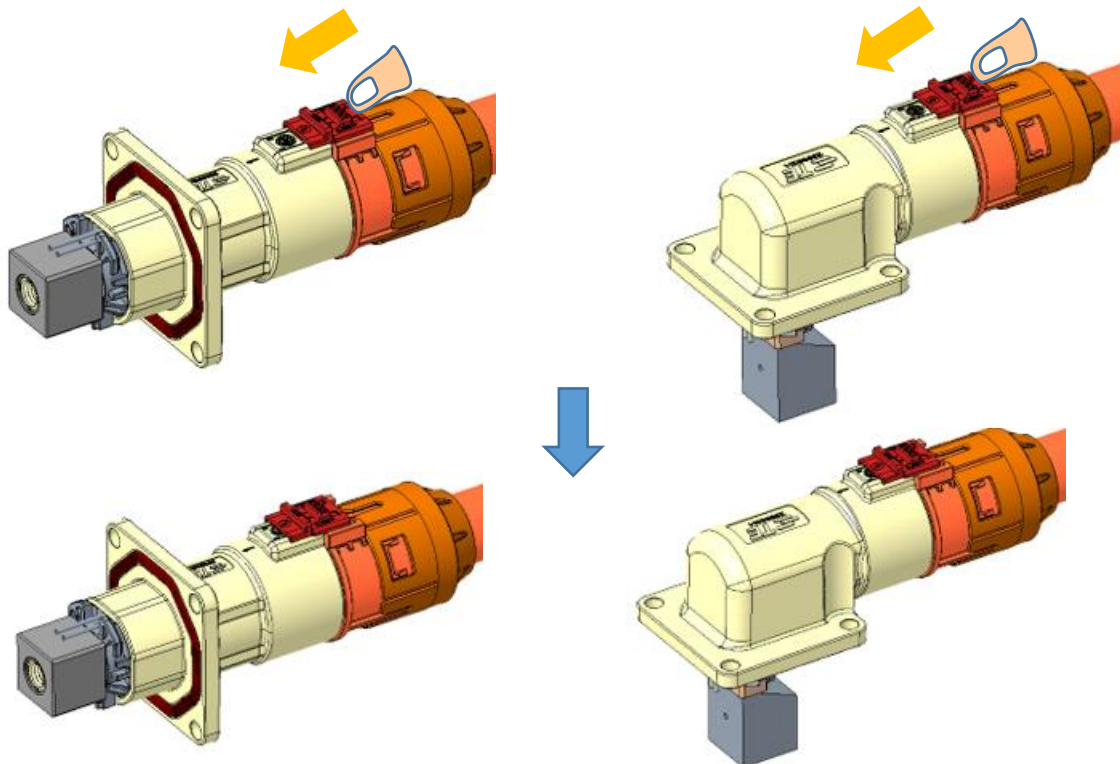


Figure 26: Push CPA to pre-lock position
(Finger Access, Tool Access share the same steps)

Fully depress spring while pulling the plug connector until it is fully separated from the header assembly.

按压spring，同时将母头连接器拔出公端连接器直到完全分离。

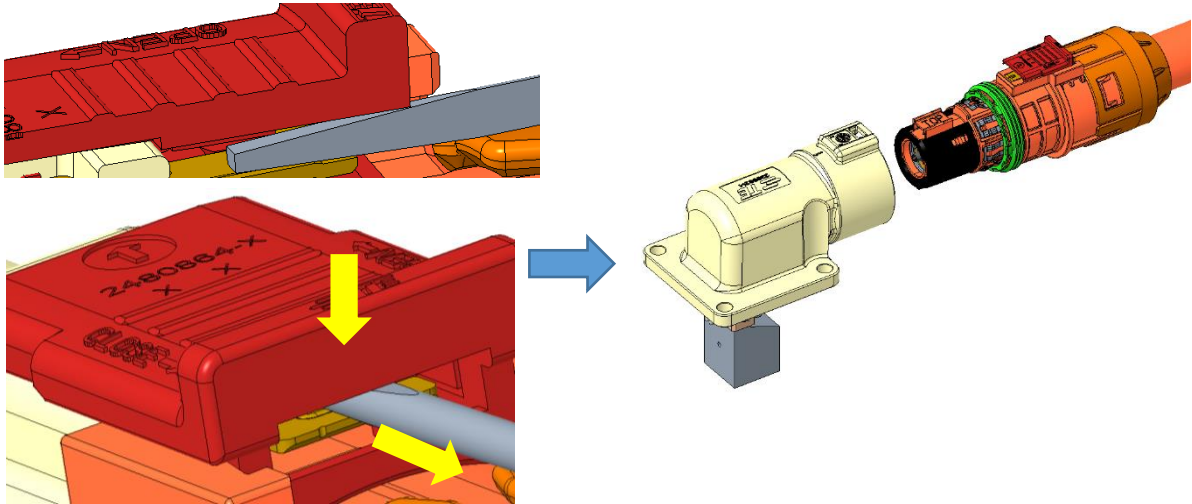


Figure 27: Header assy and plug assy un-mating condition (Tool access)

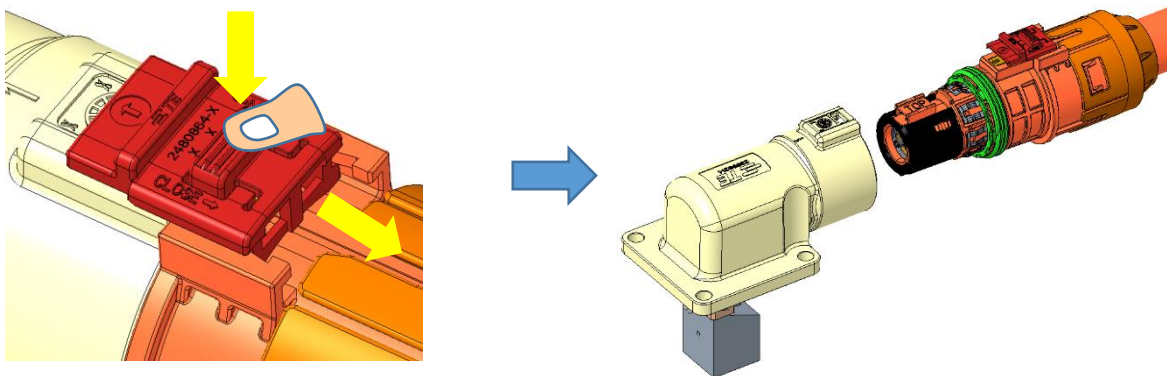


Figure 28: Header and plug assy un-mating condition (Finger Access)

Tip: Both 90°header and 180°header take the same steps in un-mating, please refer to 1POS product when mating or un-mating 2POS、3POS ones.

提示：90度连接器和180度连接器解除适配步骤相同，2POS、3POS产品请参考1POS产品。

8. APPENDIX 附录

8.1 Data sheets 数据表

8.1.1 HUBER+SUHNER shield cable 70 / 95 / 120mm² H+S 70 / 95 / 120mm²带屏蔽的高压导线

No. FHRL91XC13X and FHRL4GC13X 70mm² (Part No. 84100298) 、95mm²(Part No. 84100299)、120mm² (Part No.84103410)shield cable for HVP-HD1400 connector.

HVP-HD1400母端连接器采用物料编号FHRL91XC13X and FHRL4GC13X 70mm² (Part No. 84100298)、95mm² (Part No. 84100299)、120mm² (Part No. 84103410) 带屏蔽的高压导线。

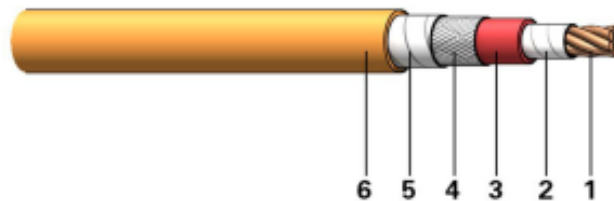
Automotive cable, single-core, screened RADOX 155(S) / RADOX Elastomer S (FHRL91XC13X and FHRL4GC13X)

General Properties:

Excellent resistance to high and low temperature, ozone, UV and weathering resistance, resistant to pressure at high temperature, motor oil, fuels and hydrolysis, flame retardant, high abrasion resistant, solder iron resistant, easy to strip and process, according to ISO 6722-1 class D, ISO 19642-9 class D.
Complies with EU- directive 2000/53/EG on end of life vehicles. It is free from lead, mercury, cadmium and chrome VI.

Application:

Cable, for use in road vehicle applications.



- | | | |
|----|-------------|--|
| 1. | Conductor: | Bare copper, stranded according to ISO 6722-1 / ISO 19642-9, structure B |
| 2. | Coverage: | Tape |
| 3. | Insulation: | RADOX 155S (91X) for ≤ 6 mm ²
RADOX 155 (4G) for > 6 mm ² |
| 4. | EMC-screen: | Tin plated copper braid optimized |
| 5. | Wrapping: | Tape |
| 6. | Sheath: | RADOX Elastomer S (13X), colour: orange |

Printing on sheath: H+S XXXXXXXX - %%% %%% %%% %%% %%% 4 ATTENTION HIGH VOLTAGE MAX 1000VAC/1500VDC 4
(XXXXXXXX = H+S part number; %%% %%% %%% %%% %%% = H+S production lot number)



Technical Data:

Voltage rating	U _i	1000	V AC
Voltage rating	U ₀	1500	V DC
Test voltage, 50 Hz, 5 min.	10	kV AC	
Temperature range (3000h)	-40°C ... +150	°C	
Min. bending radius	fixed	4 x cable D	
	flexing	6 x cable D	

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The product fulfils the test and specification requirements described in this document for the stated areas of application and operating conditions. HUBER+SUHNER AG does not expressly or implicitly guarantee performance under additional or changed conditions. Deviations are to be agreed upon in writing.

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Automotive cable, single-core, screened RADOX 155(S) / RADOX Elastomer S (FHLR91XC13X and FHLR4GC13X)

HUBER+SUHNER

Cross-section Nominal mm ²	Conductor				Cable						
	Number of individual wires Guide value	Diameter of individual wires max. mm	Diameter max. mm	Resistance at +20°C max. Ω/km	Min. Wall thickness of the insulation min. mm	Diameter of insulation nom. mm	Diameter of screen max. mm	Overall-Diameter nom. mm	ZT at 30 MHz nom. mΩ/m	Weight nominal tolerance ± 3% kg/100m	H+S part number
2.5	50	0.26	2.0	7.60	0.32	2.85 ± 0.15	3.3	5.0 ± 0.2	100	4.9	12 582 675
4	56	0.31	2.5	4.71	0.40	3.55 ± 0.15	4.0	5.8 ± 0.2	110	7.0	12 582 674
6	84	0.31	3.0	3.14	0.45	4.15 ± 0.15	4.7	6.6 ± 0.3	70	9.8	12 582 309
8	60	0.41	3.8	2.38	0.47	5.05 ± 0.15	5.6	7.6 ± 0.3	40	12.5	84 119 801
10	78	0.41	4.3	1.82	0.52	5.75 ± 0.20	6.3	8.4 ± 0.3	30	15.8	84 100 295
12	92	0.41	4.7	1.52	0.52	6.10 ± 0.20	6.7	8.9 ± 0.3	30	17.9	84 119 803
16	126	0.41	5.4	1.16	0.54	6.90 ± 0.20	7.5	9.7 ± 0.3	40	23.0	84 116 032
20	154	0.41	6.2	0.955	0.49	7.60 ± 0.20	8.3	10.6 ± 0.3	30	28.2	84 119 804
25	189	0.41	6.7	0.743	0.57	8.20 ± 0.20	8.9	11.2 ± 0.3	40	32.8	84 100 604
30	224	0.41	7.4	0.647	0.60	9.10 ± 0.25	9.8	12.1 ± 0.3	30	38.5	84 119 805
35	273	0.41	7.9	0.527	0.65	9.70 ± 0.25	10.4	12.7 ± 0.3	60	44.7	84 100 296
40	301	0.41	8.5	0.473	0.69	10.40 ± 0.25	11.3	13.6 ± 0.3	20	51.3	84 119 806
50	385	0.41	9.4	0.368	0.78	11.50 ± 0.25	12.6	14.9 ± 0.3	30	64.2	84 096 257
60	294	0.51	10.6	0.315	0.74	12.60 ± 0.25	13.5	15.9 ± 0.3	30	73.1	84 119 807
70	360	0.51	11.6	0.259	0.78	13.70 ± 0.25	14.6	17.0 ± 0.3	30	85.8	84 100 298
85	420	0.51	12.7	0.219	0.90	15.10 ± 0.30	16.8	18.6 ± 0.4	30	101.8	85 108 465
95	480	0.51	13.5	0.196	1.03	16.20 ± 0.30	17.3	19.9 ± 0.4	20	115.3	84 100 299
120	589	0.51	15.1	0.153	1.12	18.00 ± 0.30	19.1	22.6 ± 0.4	20	145.5	84 103 410
150	741	0.51	17.0	0.122	1.16	20.00 ± 0.30	21.3	24.9 ± 0.5	30	177.4	84 111 254

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8.2 Replacement of Plug Assy 组件替换

8.2.1 Auxiliary Tools 辅助工具

3D step-file of auxiliary tooling can be obtained through a local TE Representative, customers make 3D printed parts themselves.

可通过当地TE代表获取辅助工装3D文件，客户自行做3D打印件。



Figure 29: Auxiliary Tool #1 (3D-printed part)
Auxiliary Tool to lift the clips of the cable cover



Figure 30: Auxiliary Tool #2 (3D-printed part)
Auxiliary Tool to lift the hooks of the terminal fixation

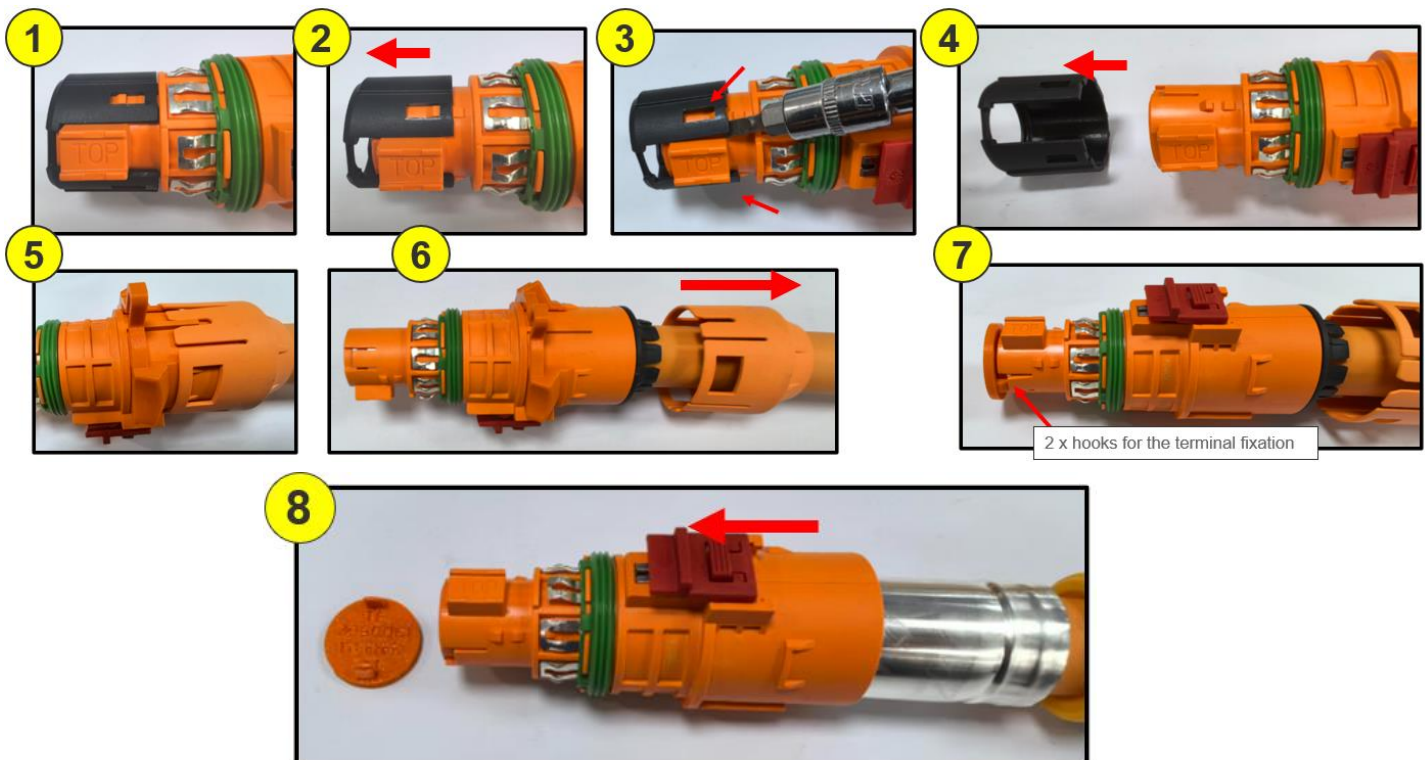
8.2.2 Disassembly-Steps of Plug Assy 组件拆卸

Disassembly-Steps of Plug Assy (The step number is consistent with the sequence number in the following figure):

1. Initial condition of TPA
2. Pull TPA in pre-locking position by hand
3. Shift the TPA carefully over the two locking hooks by using a suitable tool (e.g. screwdriver)
4. Removing the TPA
5. Use the tool #1 like shown to lift the clips of the cable cover
6. Pull back the cable cover by hand
7. Use the tool #2 to lift both hooks for the terminal fixation
8. While performing step 7, pull the Plug Pre-Assy apart from the cable

组件拆卸步骤（步骤号跟下图序号一致）：

1. TPA初始状态
2. 用手将TPA拉到预锁位置
3. 使用合适的工具（如螺丝刀）小心地将TPA移动到两个锁钩上
4. 移除TPA
5. 使用#1工具举起后盖
6. 手动移除后盖
7. 使用#2工具举起端子的固定结构
8. 执行步骤7时，将插头预装配从电缆上拔下



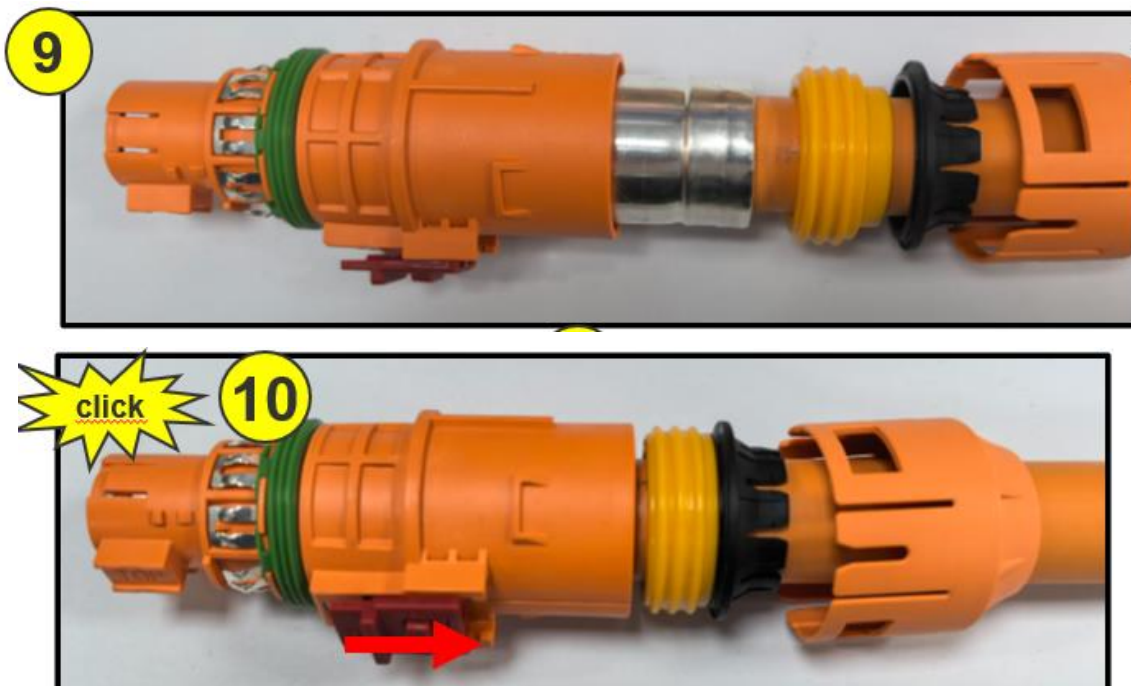
8.2.3 Assembly-Steps of Plug Assy 组件安装

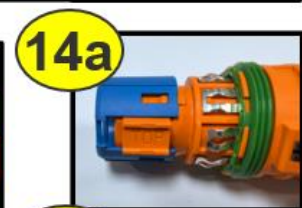
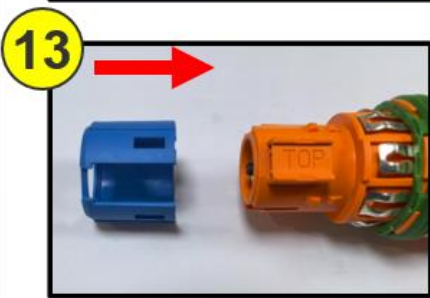
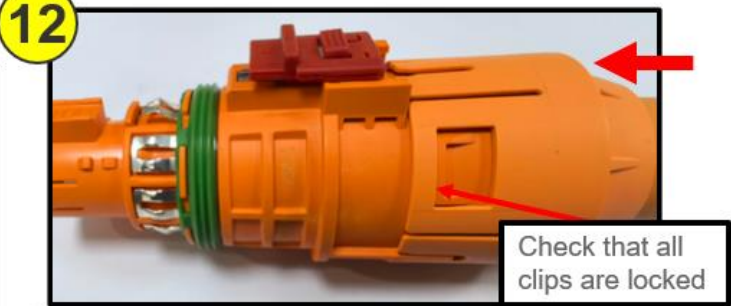
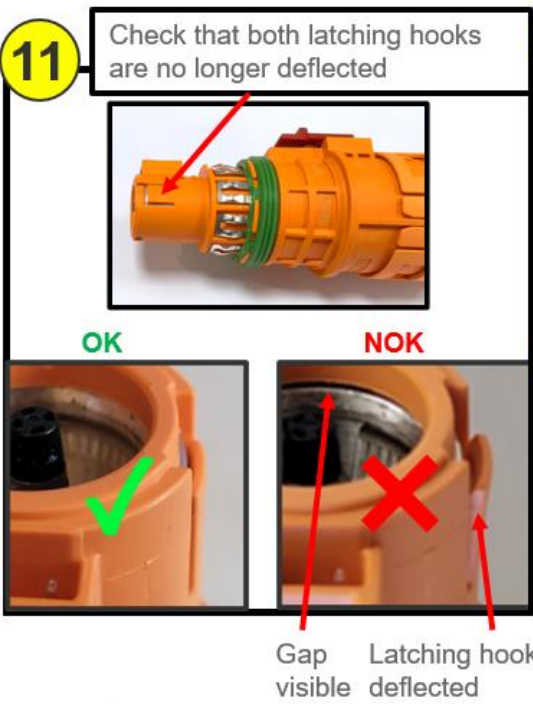
Assembly-Steps of Plug Assy (The step number is consistent with the sequence number in the following figure):

9. Take a new Plug Pre-Assy for replacement. If not already done, please disassemble the TPA (See steps 1 to 3).
10. Slide the Plug-Assy over the cable-side harness assembly until you hear a click
11. Check that both latching hooks are no longer deflected
12. Push the cable cover with seal and strain relief back into its final position & check that all three clips of the cable cover are locked in place
13. Assemble the TPA to the plug housing(Make sure that the correct color-coded TPA part number is selected prior to assembly of the TPA)
14. Push the TPA from pre-lock position (14a) to end-lock position (14b) by hand
15. Visual inspection of final assembled connector: Check if all parts are assembled correctly (like position of seal)

组件组装步骤（步骤号跟下图序号一致）：

9. 取一个新的插头预组件进行更换。如果尚未完成，请拆卸TPA（参见步骤1至3）。
10. 将插头总成滑动到电缆侧线束总成上，直到听到咔嚓声
11. 检查两个锁钩是否不再偏转
12. 将带密封和应力释放装置的电缆盖推回其最终位置，并检查电缆盖的所有三个夹子是否锁定到位
13. 将TPA安装到插头塑壳上(在组装TPA之前，请务必选择颜色编码正确的TPA部件号)
14. 用手将TPA从预锁定位置（14a）推到末端锁定位置（14d）
15. 最终组装连接器的目视检查：检查所有零件是否正确组装（如密封件的位置）







9. APPENDIX: REVISION RECORD 附录：版本记录

B	Chapter2.1.1: Add plug sub-assy without TPA PN Chapter2.1.2: Add specification: Technical information on shelf life Chapter3.1: Update plug picture Add plug sub-assy without TPA and plug TPA Update part number Add variant part number description Chapter3.2: Update the recommendation of storage Chapter4.1: Update the parameter Chapter4.2: Update the parameter Chapter5.1: Update product picture Chapter5.2.2: Update picture Chapter5.2.3: Update pre-process of the braided shield Chapter5.2.4: Update contact crimp Chapter5.2.5: Update description Chapter5.3.1: Update picture Add description of cable rotation Chapter7.1: Update picture Add description of cable rotation Chapter7.2: Update picture Chapter8.2.2: Update picture Chapter8.2.3: Update picture	S.TAN	31MAR2025
A	Release	S.TAN	17MAY2024
LTR	REVISION RECORD	PR	DATE