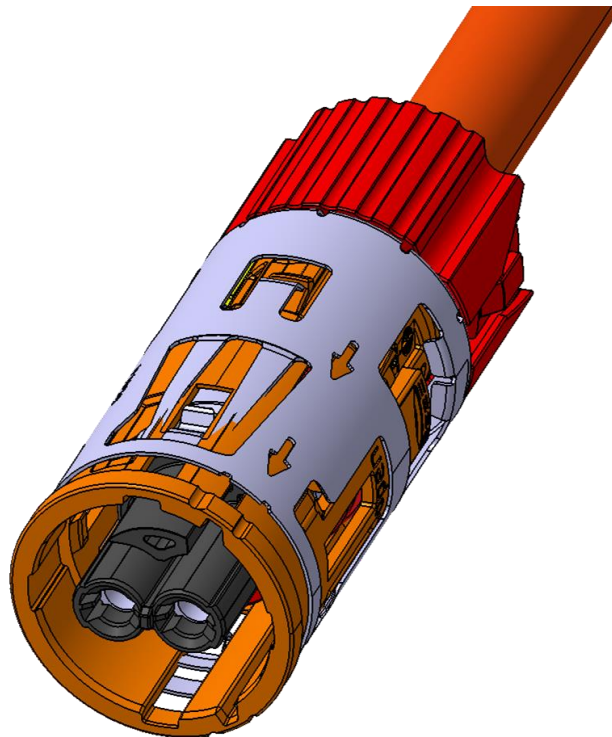


# Process Specification

## HIRSCHMANN AUTOMOTIVE PowerStar 40-2 PLUS 4mm<sup>2</sup> and 6mm<sup>2</sup>



**EVS-100137-03**  
**Version 02**



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## **1 General**

### **1.1 General information and requirements**

- a. This process specification describes detailed requirements and guidelines of Hirschmann Automotive on how to assemble the mentioned component(s) in order to achieve compliance with the defined product- and process specification.
- b. The customer/matrix manufacturer processing the Hirschmann Automotive products is responsible for the appropriate processing of the relevant products and also for the compliance of the described process results with this specification.
- c. In case of improper or deviating processing through the customer/matrix manufacturer, any complaints need to be declined.
- d. During the whole assembly process, individual components and assembly units must not be damaged in any way.
- e. Both the named fixture suppliers and equipment in this process specification are not mandatory to use from Hirschmann Automotive point of view. They are only a non-binding reference which supplier and equipment Hirschmann Automotive used for the evaluation, validation and release of this process specification.
- f. The customer can define different fixture suppliers and equipment for the assembly process at any time.
- g. Additionally, the customer/matrix manufacturer shall validate and release the complete assembly process independently of the chosen equipment supplier.
- h. Process parameters (e.g. welding currents, - times etc.) will not be predetermined by Hirschmann Automotive. In fact, the required technical result of this process needs to be specified in the process specification. With this result, the customer will achieve the product specification conformity (e.g. welding knot geometries, min. retention forces and so on).
- i. All kind of warranty and liability claims of our customers towards Hirschmann Automotive according to the agreed contractual regulations are only valid with reservation of the compliance with the according process specification.



## 1.2 Introduction

This process specification is valid for all variants mentioned in chapter 2.ff and describes the product structure as well as the assembly of the Hirschmann Automotive PowerStar40-2 PLUS plug connection.

**Table 1: HPS40-2 PLUS**

85E.973.271	810-473-501	A	6mm <sup>2</sup>	HCT4
85E.973.271.A	810-473-502	B		
85E.973.271.B	810-473-503	C		
85E.973.271.C	810-473-511	A	4mm <sup>2</sup>	
85E.973.271.D	810-473-512	B		
85E.973.271.E	810-473-513	C		
<b>VW-No.</b>	<b>Hirschmann Automotive No.</b>	<b>Coding</b>	<b>Cross section</b>	<b>Terminalsystem</b>

The manufacturer of the listed products is responsible for the qualitative processing and the accuracy of the version.

In the case of improper processes or deviation from specification that results in quality issues, the right of complaint is void.



### 1.3 Applicable documents

A	Product drawing	VW-Nr. TAB.010.046.EC
B	Product specification	HA-Nr. EPS-100153-03
C	Interface drawing	VW-Nr. 85E.900.962.M
D	HCT4 Process specification (Ag)	EVS-100068
E	Data sheet 2x6mm <sup>2</sup> shielded cable of Coroplast	Coroplast No.: 9-2641 (2x6,0mm <sup>2</sup> )
F	Data sheet 2x4mm <sup>2</sup> shielded cable of Coroplast	Coroplast No.: 9-2641 (2x4,0mm <sup>2</sup> )
G	Data sheet 2x6mm <sup>2</sup> shielded cable of Cablena	Cablana No.: 109.206.001.7 (2x6,0mm <sup>2</sup> )
H	Data sheet 2x4mm <sup>2</sup> shielded cable of Cablena	Cablana No.: 109.204.001.7 (2x4,0mm <sup>2</sup> )
I	Data sheet 2x6mm <sup>2</sup> shielded cable of Hengtong	Hengtong No.: FHLR2GCB2G (2x6,0mm <sup>2</sup> )



## 2 Product structure (single components)

### 2.1 Shielded cable 6mm<sup>2</sup> and 4mm<sup>2</sup>



Figure 1: Cable 6mm<sup>2</sup>



Figure 2: Cable 4mm<sup>2</sup>

Table 2: shielded cable 6mm<sup>2</sup> und 4mm<sup>2</sup>

<b>Coroflex (Coroplast)</b>	FHLR2GCB2G 600/1000V T180	FHLR2GCB2G 600/1000V T180
	9-2641 (2x6mm <sup>2</sup> )	9-2641 (2x4mm <sup>2</sup> )
<b>Cablana (Condumex)</b>	FHLR2GCB2G 600/1000V T180	FHLR2G2GCB2G 600/1000V T180
	109.206.001.7 (2x6mm <sup>2</sup> )	109.204.001.7 (2x4mm <sup>2</sup> )
<b>Hengtong</b>	FHLR2GCB2G 600/1000V T180	-
	t.b.d.	-
<b>Wire manufacturer</b>	<b>6mm<sup>2</sup></b>	<b>4mm<sup>2</sup></b>
	<b>Wire cross section (construction of conductor)</b>	

Only wires which are listed here and released by the respective OEM for the product are allowed to be used.



## 2.2 HCT4 Female terminal (Hirschmann Automotive)



**Figure 3: HCT4 6mm<sup>2</sup>**



**Figure 4: HCT4 4mm<sup>2</sup>**

**Table 3: Hirschmann Automotive female terminal HCT4**

N.108.763.01	709-427-505	6mm <sup>2</sup>	Female terminal HCT4
N.108.944.01	709-427-504	4mm <sup>2</sup>	Female terminal HCT4
<b>VW-No.</b>	<b>Hirschmann Automotive No.</b>	<b>Wire cross section (construction of conductor)</b>	<b>Product description</b>

The female terminals are delivered at terminal strip on a spool.





### 2.3 Stress relief HPS40-2 (Hirschmann Automotive)

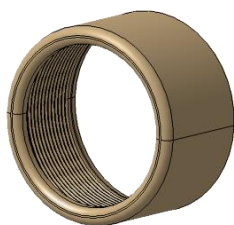


Figure 5: Stress relief 6mm<sup>2</sup>

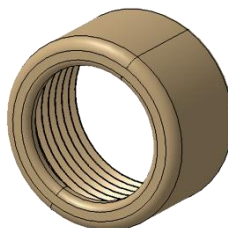


Figure 6: Stress relief 4mm<sup>2</sup>

**Table 4: Hirschmann Automotive stress relief**

709-841-503	6mm <sup>2</sup>	Stress relief HPS40-2
709-841-502	4mm <sup>2</sup>	Stress relief HPS40-2
<b>Hirschmann Automotive No.</b>	<b>Wire cross section (construction of conductor)</b>	<b>Product description</b>

The released Stress relief per approved wire can be found in the product drawing.

VW/Audi - No.: TAB.010.046.EC

Hirschmann Automotive No.: 810-473-...03

The stress reliefs are delivered as bulk goods.



## 2.4 Shielding sleeve HPS40-2 (Hirschmann Automotive)



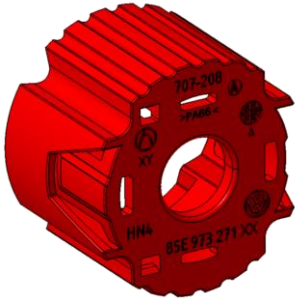
**Figure 7: Shielding sleeve HPS40-2**

**Table 5: Hirschmann Automotive shielding sleeve**

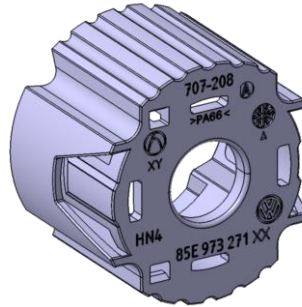
709-840-501	Shielding sleeve HPS40-2
<b>Hirschmann Automotive No.</b>	<b>Product description</b>

The shield sleeves are delivered as bulk goods.

## 2.5 Cover cap HPS40-2 (Hirschmann Automotive)



**Figure 8: Cover cap 6mm<sup>2</sup>**



**Figure 9: Cover cap 4mm<sup>2</sup>**

**Table 6: Hirschmann Automotive cover cap**

707-208-503	6mm <sup>2</sup>	red	Cover cap HPS40-2 PLUS
707-208-502	4mm <sup>2</sup>	grey	Cover cap HPS40-2 PLUS
<b>Hirschmann Automotive No.</b>	<b>Wire cross section (construction of conductor)</b>	<b>Color</b>	<b>Product description</b>

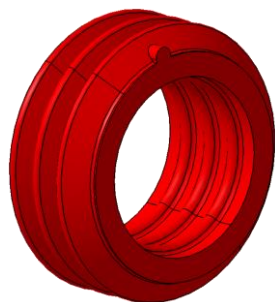
The released Cover cap per approved wire can be found in the product drawing.

VW/Audi - No.: TAB.010.046.EC

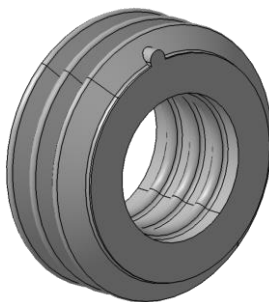
Hirschmann Automotive No.: 810-473-...03

The cover cap is delivered as bulk goods.

## 2.6 Seal HV (Hirschmann Automotive)



**Figure 10: Seal 6mm<sup>2</sup>**



**Figure 11: Seal 4mm<sup>2</sup>**

**Table 7: Hirschmann Automotive seal HV**

709-113-506	6mm <sup>2</sup>	red	Seal HV
709-113-505	4mm <sup>2</sup>	grey	Seal HV
<b>Hirschmann Automotive No.</b>	<b>Wire cross section (construction of conductor)</b>	<b>Color</b>	<b>Product description</b>

The released Seal per approved wire can be found in the product drawing.

VW/Audi - No.: TAB.010.046.EC

Hirschmann Automotive No.: 810-473-...03

The seals are delivered as bulk goods.

## 2.7 Terminal holder HPS40-2 (Hirschmann Automotive)

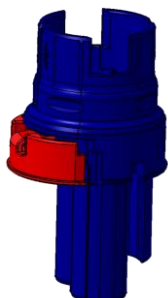


Figure 12: Cod. A

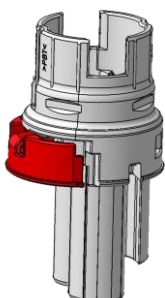


Figure 13: Cod. B

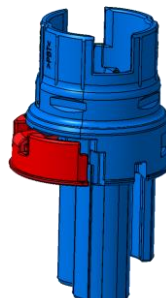


Figure 14: Cod. C

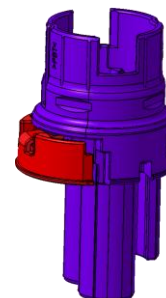


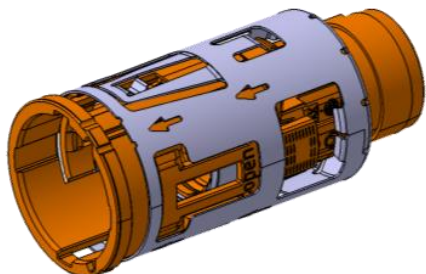
Figure 15: Cod. D

**Table 8: Hirschmann Automotive terminal holder**

810-474-501	A	black	Female terminal holder HPS40-2 PLUS
810-474-502	B	nature/ white	Female terminal holder HPS40-2 PLUS
810-474-503	C	blue	Female terminal holder HPS40-2 PLUS
810-474-504	D	purple	Female terminal holder HPS40-2 PLUS
<b>Hirschmann Automotive No.</b>	<b>Cod.</b>	<b>Color</b>	<b>Product description</b>

The terminal holders are delivered as bulk goods.

## 2.8 Female locking device unit HPS40-2 (Hirschmann Automotive)



**Figure 16: Female locking device unit**

**Table 9: Hirschmann Automotive Female locking device unit**

807-656-531	Female locking device unit HPS40-2	VW – Logo and HA-DMC
<b>Hirschmann Automotive No.</b>	<b>Product description</b>	<b>Labeling</b>

The female locking device units are delivered as bulk goods.

### 3 Processing steps

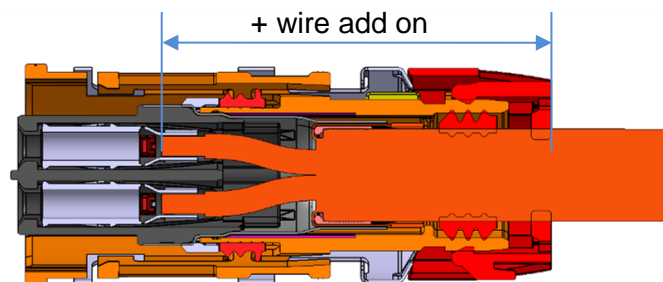
Use the following described processing steps as necessary for the wire cross sections 6mm<sup>2</sup> and 4mm<sup>2</sup>.

As a reference sample, a terminal holder coding A and a 6mm<sup>2</sup> wire was used

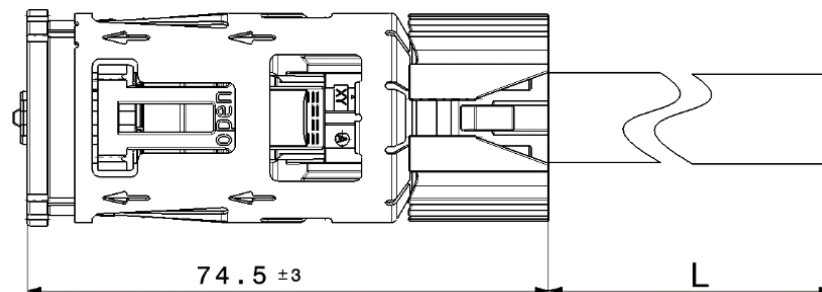
#### 3.1 Cut the shielded cable



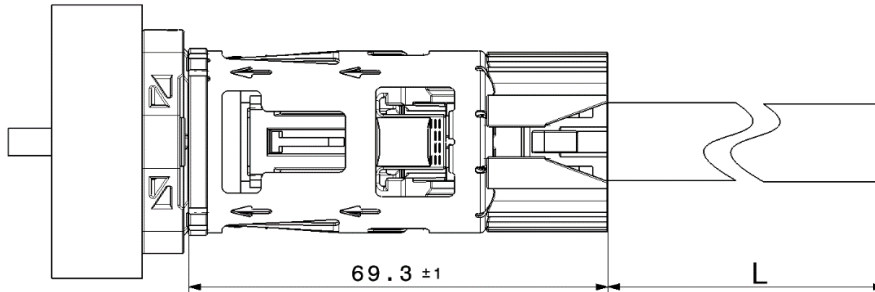
**Figure 17: Symbolic representation of the shielded cable**



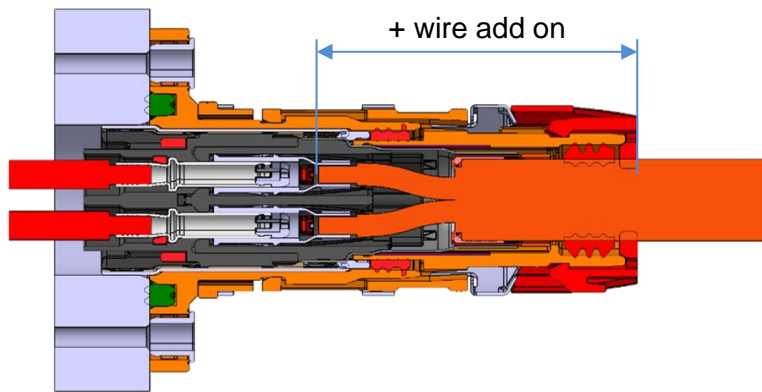
**Figure 18: Wire add-on inside the HPS40-2 PLUS (pre-locking position)**



**Figure 19: Wire-length add-on (pre-locking position)**



**Figure 20: Wire-length add-on (end position)**



**Figure 21: Wire add-on inside the HPS40-2 PLUS (end position)**

Add the following lengths for the Hirschmann Automotive HPS40-2 female connector:

**Table 10: additional wire length**

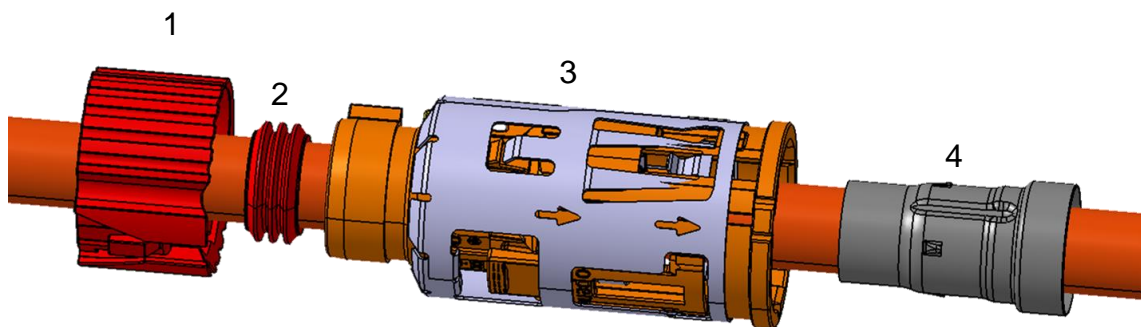
6mm <sup>2</sup> 4mm <sup>2</sup>	L + 50	L + 54	Cover cap in end-position (plugged, installed in the vehicle)
6mm <sup>2</sup> 4mm <sup>2</sup>	L + 54	L + 58	Cover cap in pre-locking position (unplugged, delivery condition)
<b>Wire cross section</b>	<b>Dimension L after zero-cut (mm)</b>	<b>Dimension L for the HCT4 terminal incl. zero-cut (mm)</b>	<b>Position cover cap</b>

This dimension must be added to the planned length at cutting process of the wire for each female connector.



### 3.2 Assembly

Slide the cover cap (1), the seal (2), the female locking device unit (3) and the shielding sleeve (4) onto the shielded cable.



**Figure 22: Assembly components**

### 3.3 Strip off the shielded cable



**Figure 23: Strip off shielded cable**

Stripping length:



**Figure 24: Stripping length L1**

**Table 11: Stripping length L1**

6mm <sup>2</sup>	24,5 ± 1	28,5 ± 1
4mm <sup>2</sup>	24,5 ± 1	28,5 ± 1
<b>Wire (cross section)</b>	<b>Dimension L1 after zero-cut (mm)</b>	<b>Dimension L1 for the Hirschmann Automotive HCT4 terminal incl. zero-cut (mm)</b>

Do not damage the shielding during the processing operation.

### 3.4 Assemble the stress relief, remove the foil and shorten the shielding



**Figure 25: Assemble the stress relief**

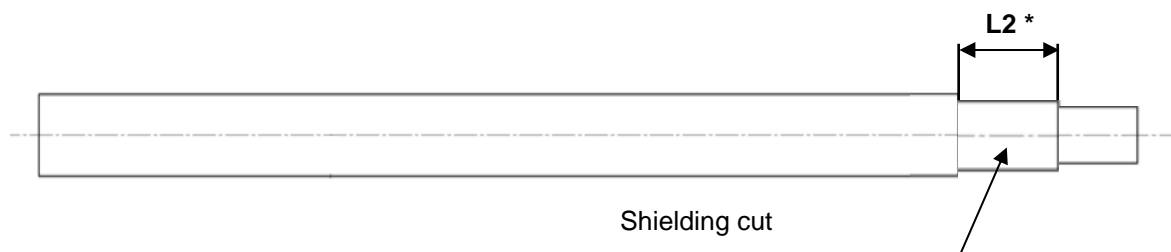


**Figure 26: remove the foil**



**Figure 27: shorten the shielding**

- The following process steps have to be done, but the manufacturer can choose the sequence:
  - Assemble the stress relief (709-841-...) see Table 4.
  - Remove the foil.
  - Shorten the shielding.
- An overlap of the foil in the area of the strain relief is allowed circulating up to max. 1,5mm. An overlap of the foil in the area of the ferrule crimp/strain relief, like small edges is allowed up to max. 4mm.
- Dimension of the shielding:



**Figure 28: Dimension of the shielding**

Depending on the production method of each manufacturer, the dimension L2 can vary.



- After cutting the shielding, there are no wire residues or parts of the shielding allowed on the cable. This must be ensured with some actions like the following:
  - can be avoided by removing the residues of the shielding
  - can be avoided by blowing out or by suction of the residues of the shielding
- In the next process step, make sure that the shielding is rising over the stress relief at 100%

### 3.5 Reverse the shield backwards, hold the shield with tape and remove filling



Figure 29: Fold over and fix the shielding

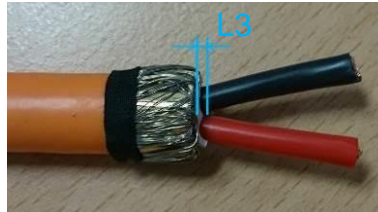


Figure 30: protrude filling material max. L3 = 3mm

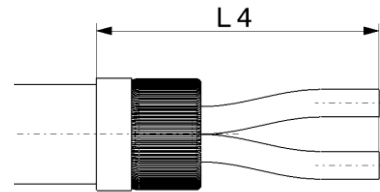


Figure 31: Position fixing band

- 100% of the shield has to be turned over the stress relief.

A targeted unbraiding of the shield is not necessary. By turning over the shield, a process related unbraiding is possible.

After this the shield has to be fixed with a fixing device after the stress relief. (for example: tape)

- The fixing tape needs to stay on, until the pressing procedure is done and can be left inside the connector. The max. width of the tape is **5mm**.

The fixing tape has to be positioned immediately after the stress relief and must not reach the stress relief.

No shielding allowed outside the fixing tape.

The max. position of the tape is showed with the dimension L4.

$$\begin{aligned} L4 = & \text{ max. } 37,5\text{mm after zero-cut (measurement in straightened length)} \\ & \text{ max. } 41,5\text{mm incl. zero-cut (measurement in straightened length)} \end{aligned}$$

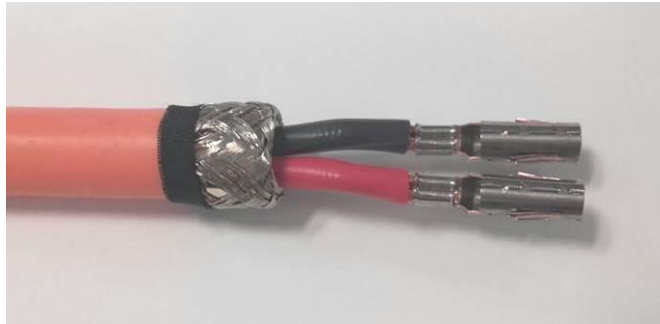
In this specification the PET- fabric tape 837X (838X) 5mm of the company Coroplast is used.

It is possible to use another product to fix the shield. The max. outer diameter after assembling is  $\varnothing 14,3\text{mm}$  and the shield sleeve must be able to be mounted easily. The product must have min.  $150^{\circ}\text{C}$  thermal resistance.



- 
- The filling material can protrude max. 3mm towards the outer sheath. In the area between the two single cores the filling material can be bigger than L3.
  - Single strands of the shield which are not fixed with the tape and stick out must be removed before further process steps.
  - Do not damage the single wires during the complete processing operation.

### **3.6 Crimp the HCT4 female terminal**



**Figure 32: Crimp the HCT4 female terminal**

It is up to the manufacturer which device/machine is used. The crimping and positioning data described on the following pages must be observed during the crimping process.

The order of a crimping device is the responsibility of the assembler.

The test equipment used by Hirschmann Automotive can be found in chapter 4.

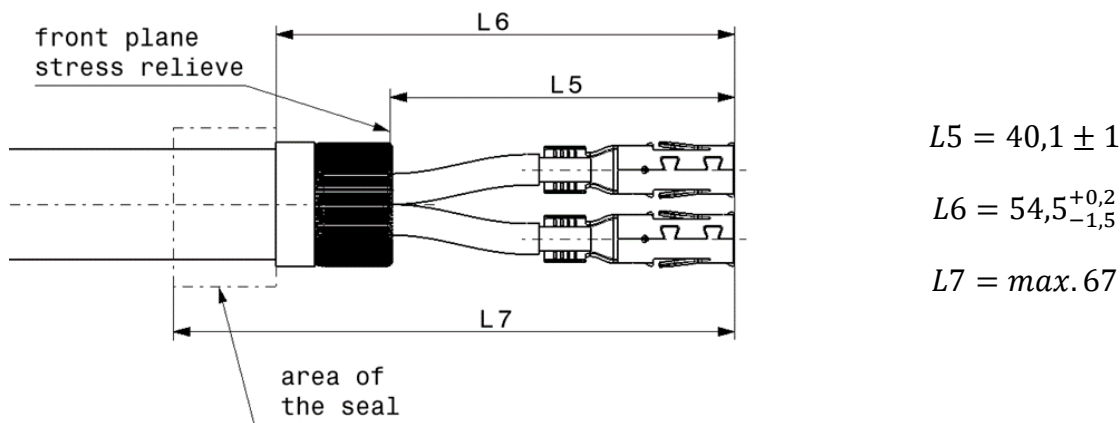
## Process data

The crimp data can be seen in the „Process specification HCT4 female terminal EVS-100068“.

The HCT4 female terminals need to be crimped in relation to the single wires.

For a smooth assembly into the contact holder, the terminals need to be crimped in the correct position.

The dimensions on the following figure need to be adhered to.



**Figure 33: Compliance with dimensions after crimping**

The dimension L5 and L6 are just for information.

The dimensions are caused from the dimension L1, L4 and the EVS-100068.

The difference of the length between the female terminals of max. 0,5mm is allowed.

A mark on the insulation of the single wires or on the outer sheath which is caused due to fixing the wire at the crimping process is allowed. It must be ensured that the insulation will not be damaged because this will lead to an insulation resistance failure.

At the area of the wire seal, it is not allowed to deform or damage the outer sheath which has negative influence on the sealing function. (see L7)



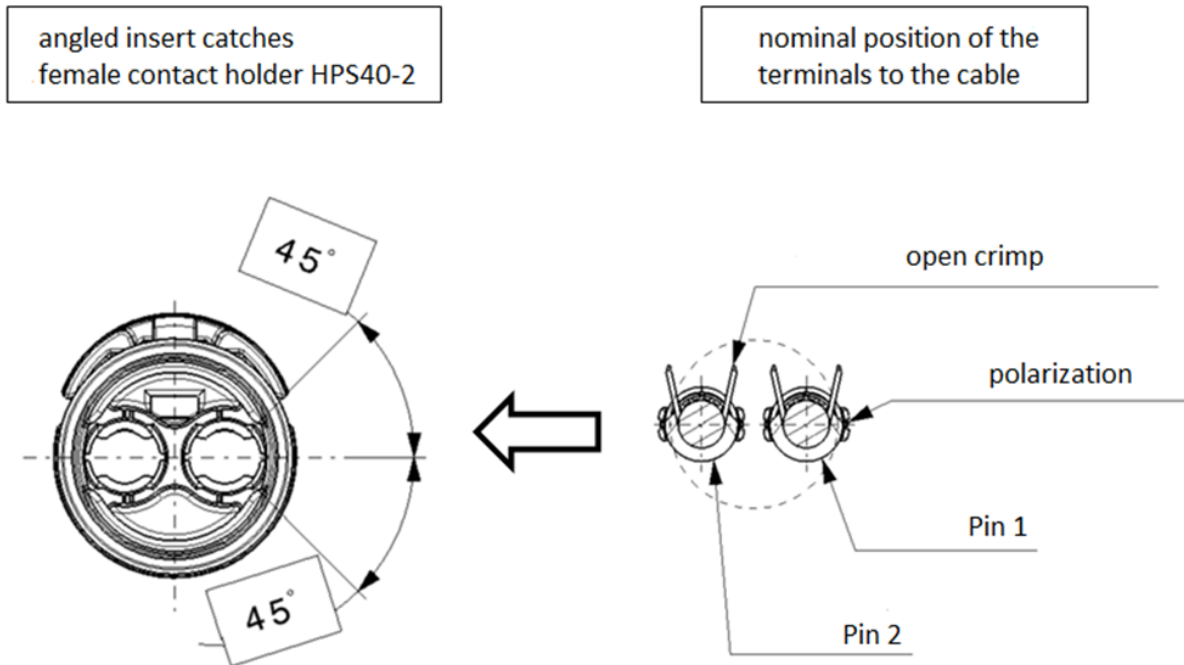


Figure 34: Geometry of the inlet bevels on the female contact holder

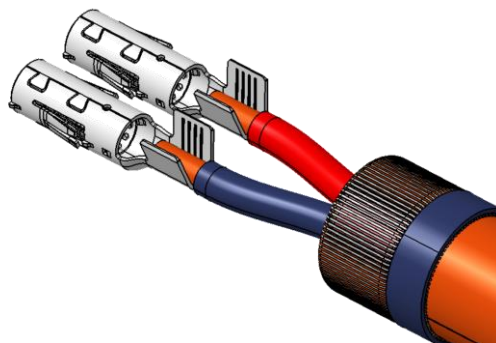


Figure 35: Symbolic representation of crimped HCT4 contacts

To do an orderly assembling / to ensure the primary locking and the secondary locking, the correct position of the terminals and the wire is very important and needs to be ensured.

Usually, the horizontal version is intended.

The allowed angle deviation results from the geometry of the angled insert catches on the female contact holder and the max. assembling force of the cable with the terminals into the contact holder.

This can be checked during the assembling process. (see chapter 3.7 Assembly female terminals into the contact holder)



### 3.7 Assembly

#### Assemble female terminals into the contact holder (1)



2	- / may vary
1	+ / red
<b>Pin</b>	<b>Polarity / Color</b>

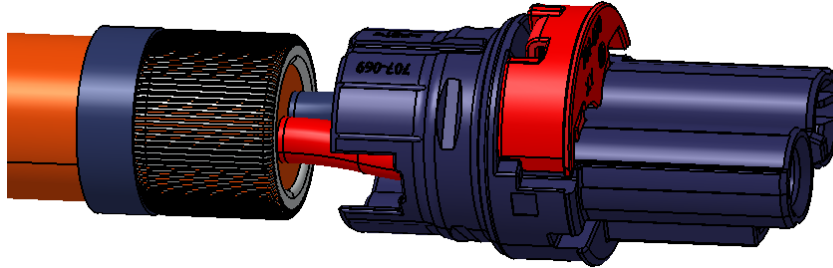
**Figure 36: Assembly the female terminals into the contact holder**

While assembling the HCT4 female terminals, the latching lance of the HCT4 female terminals will be deflected. Once the end position is reached, the latching lance will audibly engage, and female terminals will be primary locked. (Female terminals must be crimped.)

The mounting force of the female terminals into the contact holder have to be proven if the crimping machine is not used or if the terminals are mounted fully automated inside the contact holder.

**Table 12: Wires**

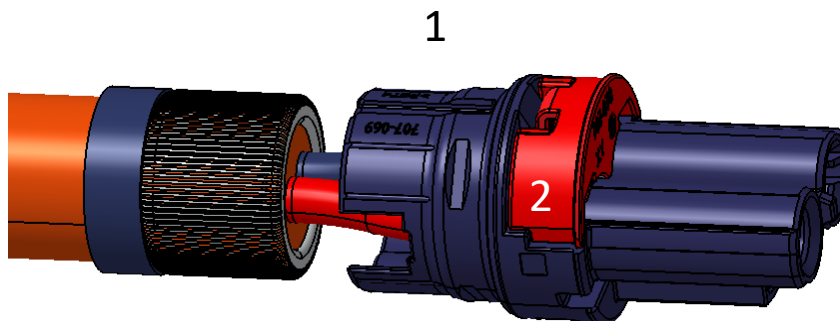
<b>Coroflex (Coroplast)</b>	FHLR2GCB2G 600/1000V T180	FHLR2GCB2G 600/1000V T180
	9-2641 (2 x 6mm <sup>2</sup> )	9-2641 (2 x 4mm <sup>2</sup> )
<b>Insertion-Force</b>	36N	30N
<b>Cablana (Conduxmex)</b>	FHLR2GCB2G 600/1000V T180	FHLR2G2GCB2G 600/1000V T180
	109.206.001.7 (2x6mm <sup>2</sup> )	109.204.001.7 (2x4mm <sup>2</sup> )
<b>Insertion-Force</b>	36N	30N
<b>Hengtong</b>	FHLR2GCB2G 600/1000V T180	-
	-	-
<b>Insertion-Force</b>	36N	30N
<b>Wire manufacturer</b>	6mm <sup>2</sup>	4mm <sup>2</sup>
	<b>Wire cross section</b>	



**Figure 37: Sec. lock pre-locking / HV terminals primary locked**

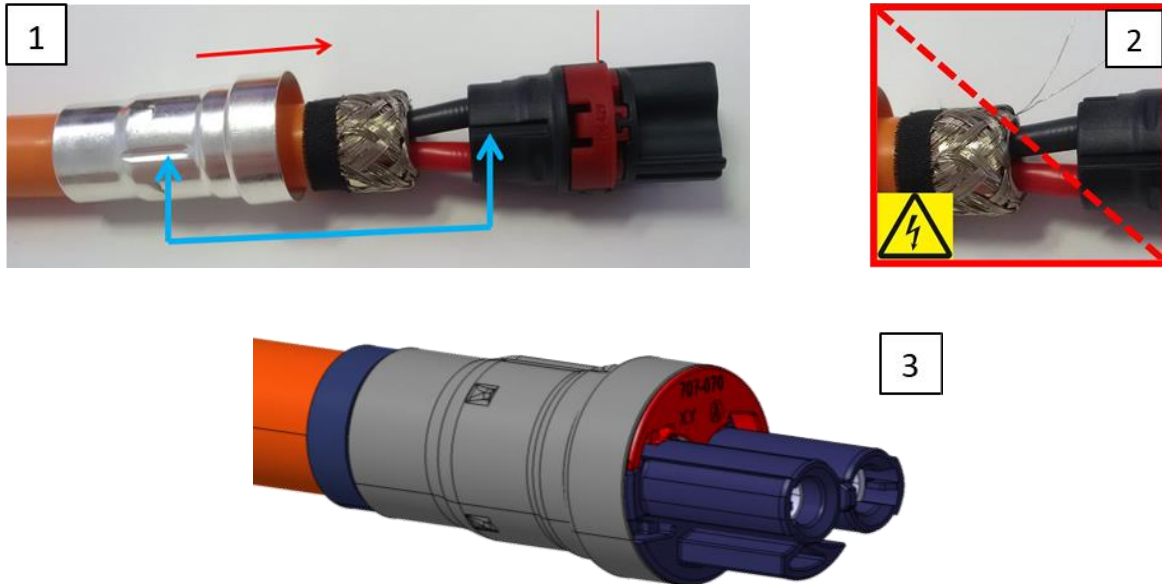
### **Assemble secondary locking (2)**

The secondary locking can only be assembled if the terminals are in the end position. A visible difference of the terminals to each other can be possible in the contact cavity. Because of the position of the contacts on the wire, and the play of the contacts in the contact cavity it is possible and acceptable.



**Figure 38: Sec. lock end position**

### 3.8 Push shielding sleeve onto contact holder



**Figure 39: (1) Assembly of shielding sleeve, (2) Warning notice, (3) Shielding sleeve in end position**

- The shielding sleeve needs to be assembled onto the contact holder in the correct position. It can only be turned by 180°.
- Do not damage the shielding sleeve during the assembly.
- The shielding sleeve has to be assembled until the end position is reached.
- The fixing tape has to come out of the shield sleeve completely after assembling.
- It must be ensured that no single strands of the shield stick out before the shield sleeve is mounted. Demand-oriented, protruding single strands can be removed. This rework has to be clarified with each OEM.



### **Risk of insulation failure**



### **3.9 Press shield sleeve**

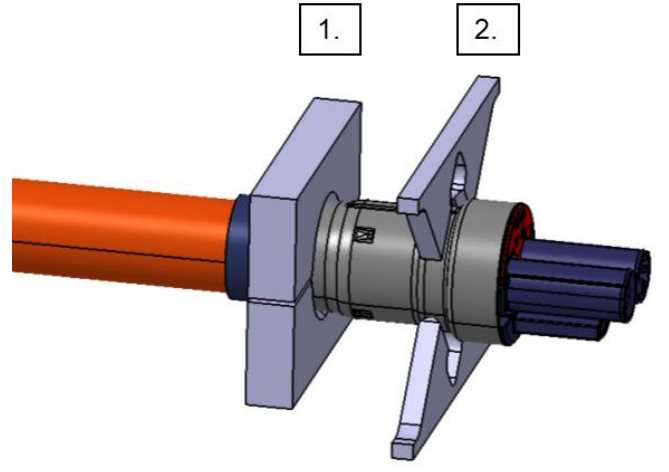
It is up to the manufacturer which device/machine is used. The pressing and positioning data described on the following pages must be observed during the pressing process.

The order of a crimping device is the responsibility of the manufacturer.

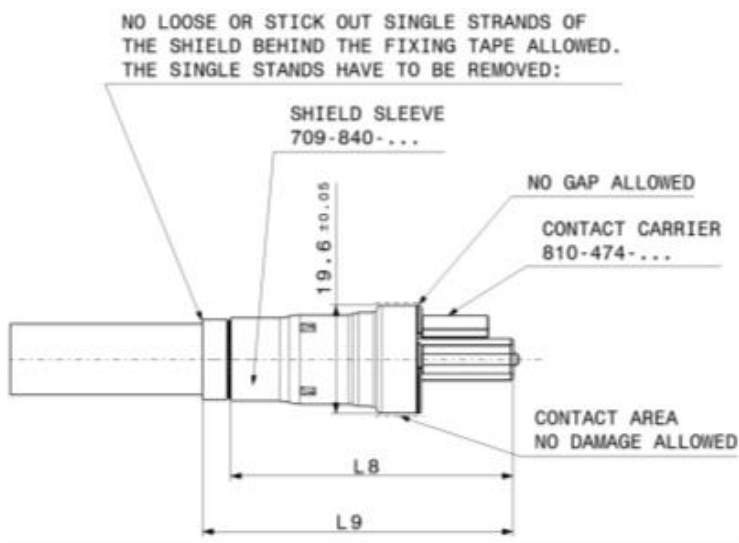
The test equipment used by Hirschmann Automotive can be found in chapter 4.

#### **Pressing data**

- a) The contact holder incl. the female contacts have to be put into the device in the correct position.
- b) Make sure, the shielding sleeve is on the end position of the contact holder. The tape has to stick out of the end of the shielding sleeve.
- c) The circularity of the shielding sleeve in the contact area has to be ensured.
- d) The measurements on the following drawing, have to be adhered to, before and after pressing.
- e) Two pressing actions will be done in one step
  - 1. Shield pressing (shielding sleeve, shielding, stress relief and wire)
  - 2. Pressing of the contact holder (shielding sleeve and contact holder)



**Figure 40: Symbolic representation of the pressing**



$$L8 = 51,4 \pm 0,3$$

$$L9 = 57,7^{+0,2}_{-1,5}$$

**Figure 41: Embossing position from the cable**

The dimension L8 and L9 are just for information.

The dimensions are caused from the dimension L1, L4 and the EVS-100068.

### 3.9.1 Shield pressing by two half-shells

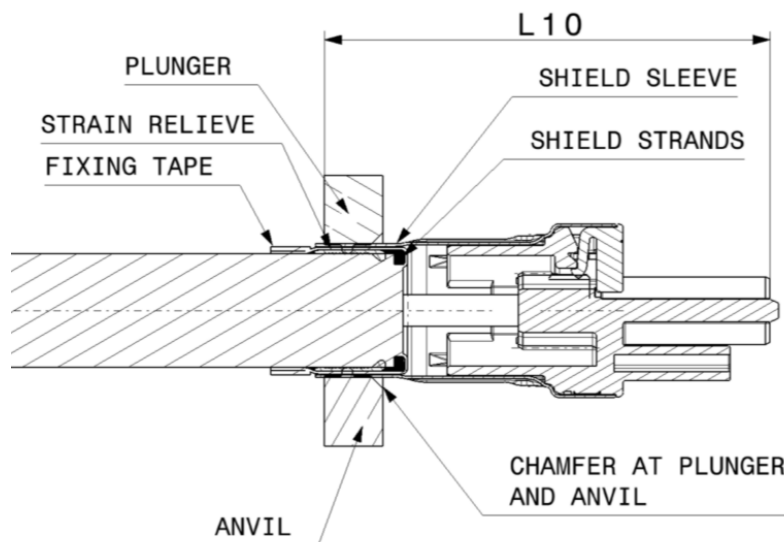
#### Embossing position:

The exact geometry of the plunger and anvil is given.

The position of the plunger and the anvil has to be reversed to the front plane of the contact holder.

The chamfer at the plunger and the anvil has to be on the side to the contact holder.

The dimension L10 is the position of the plunger and the anvil. The dimension L10 is considered as tool dimension and must be ensured in the tool.

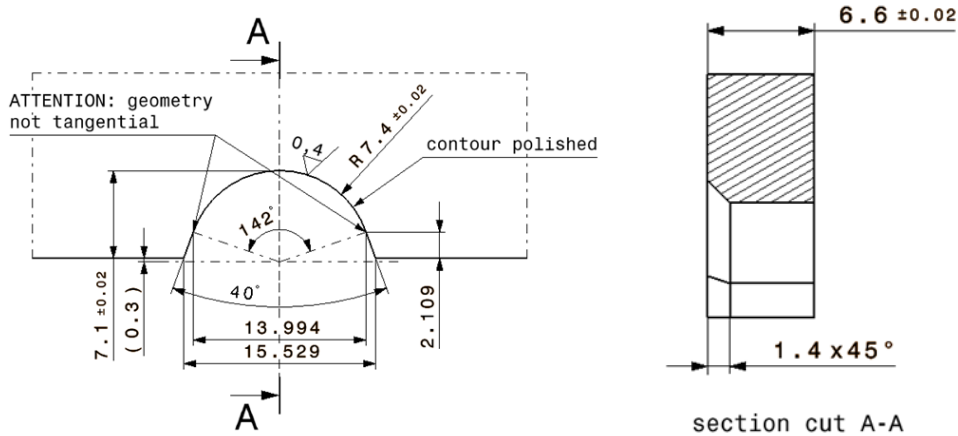


$$L10 = 50,4 \pm 0,1$$

**Figure 42: Embossing position**



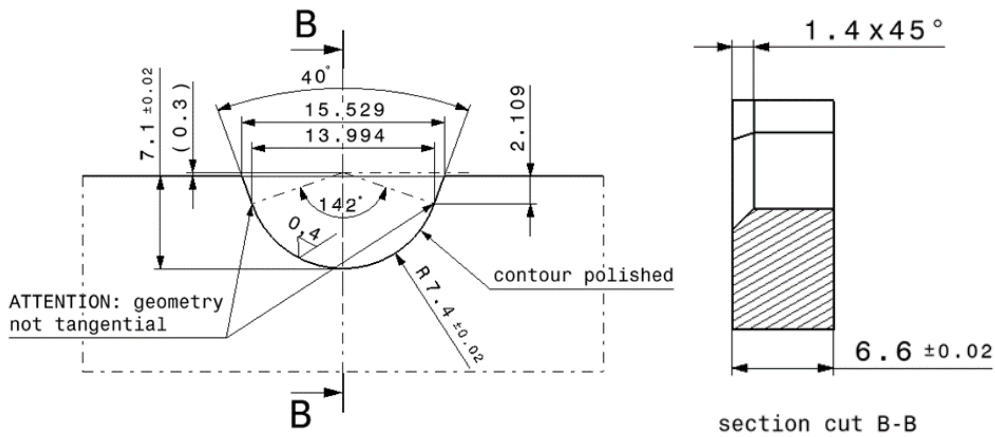
**Plunger and anvil geometry of the wire shield pressing**



**Figure 43: Plunger and anvil geometry of the wire shield pressing**

**Plunger geometry of the wire shield pressing**

Material: 1.2721 vacuum hardened 58hrc



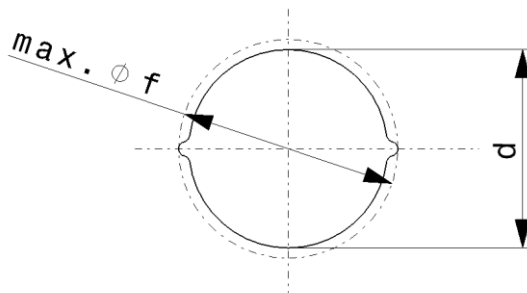
**Figure 44: Plunger and anvil geometry of the wire shield pressing**

**Anvil geometry of the wire shield pressing**

Material: 1.2721 vacuum hardened 58hrc

**Embossing height d:**

The plunger and anvil are pressed together until block. Due to this the dimension **d** will be given. See table of each cross section.



**Figure 45: Drawing specification of dimension d**

**Table 13: press height d**

	Dimension d in mm	
<b>Coroflex (Coroplast)</b>	$14,57 \pm 0,15$	$14,57 \pm 0,15$
<b>Cablana (Conduxmex)</b>		
<b>Hengtong</b>		
Wire manufacturer	$6\text{mm}^2$	$4\text{mm}^2$
	<b>Wire cross section (structure of conductor)</b>	

During the pressing process a fold appears on two sides.

This fold is not allowed to be bigger than the diameter **f = Ø16,4mm** refer to the centerline of the wire.

In the area of the fold the material of the shield sleeve is not allowed to be cracked.

**Check measurement of the embossing height  $d$  and the max. diameter  $f$ :**

To check the dimension  $f$ , a gauge with an inner diameter of 16,4mm has to be used.

To check the dimension  $d$ , the height needs to be measured acc. to the drawing.

All of the dimensions have to be within the given tolerance. (see Table 13, page 34).



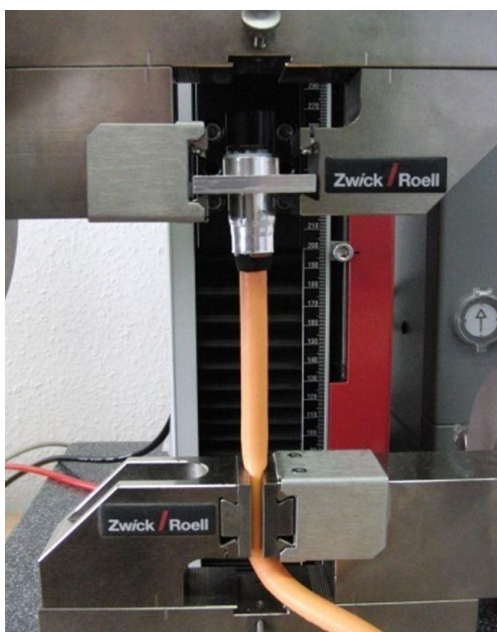
**Figure 46: schematic representation of the measuring device**



**Figure 47: schematic representation of the measurement of the pressing height**

### **Pulling force of the wire**

To measure the pull-out force, the wire must be clamped firmly into a clamping device. The distance between the clamping position of the wire and the fixing tape is about 70mm. The connector must be fixed on the shield sleeve at the transition between the largest and the second largest diameter.



**Figure 48: Test setup pulling force of shield pressing**

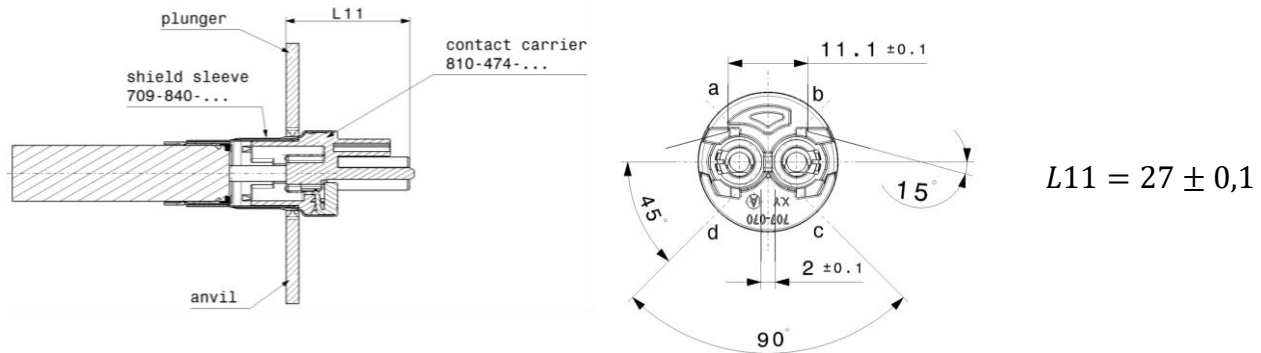
HCT4 terminals must not be installed in the test specimens, in order to test the shield pressing only. In this state, the value in the table 14 must be reached.

**Table 14: Pulling force for the several wire cross section**

4mm <sup>2</sup>	≥ 120N
6mm <sup>2</sup>	≥ 120N
<b>Wire cross section (structure of conductor)</b>	<b>Pulling force</b>

### 3.9.2 Pressing contact holder

#### Embossing position:



**Figure 49: Embossing position on the contact holder**

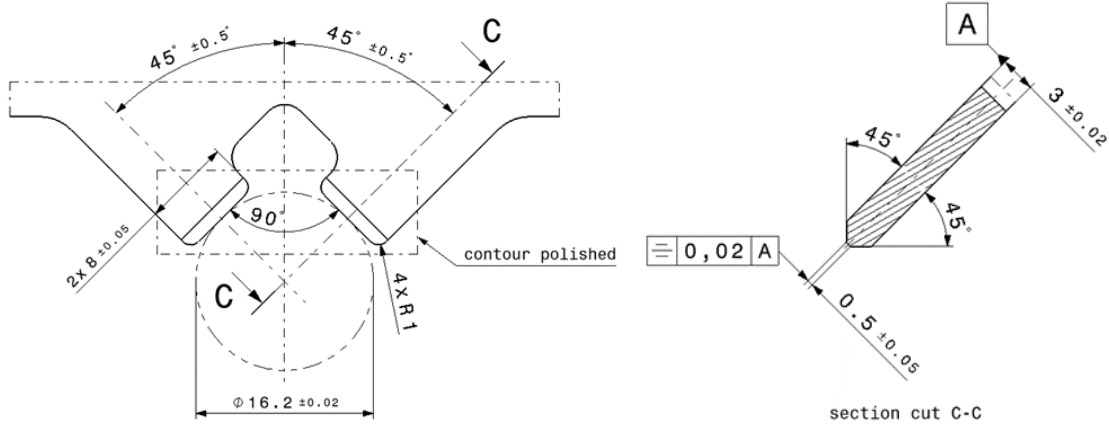
The dimension L11 describes the position of the pressing. The dimension L11 is considered as tool dimension and must be ensured in the tool.

The position of the plunger and the anvil has to be aligned in relation to the front plane of the terminal holder.

The four embossing positions (a-d) must be aligned in relation to the terminal holder. Therefore the terminal holder must be secured against rotation. The green areas can be used as a jack for the contact holder. Ensure that any coding version of the terminal holder can be inserted into the jack.

The exact geometry of the plunger and anvil is given.

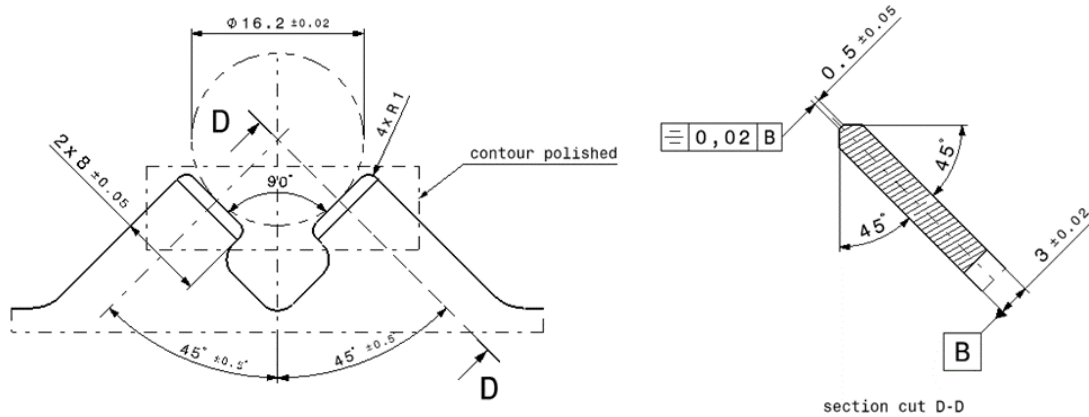
**Geometry of the plunger and the anvil pressing on the terminal holder**



**Figure 50: Geometry of the plunger and the anvil pressing on the terminal holder**

Anvil geometry of the terminal holder pressing

Material: 1.2721 vacuum hardened 58hrc



**Figure 51: Geometry of the plunger and the anvil pressing on the terminal holder**

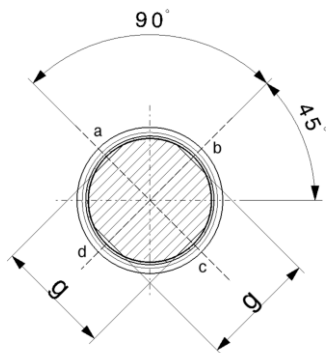
Anvil geometry of the terminal holder pressing

Material: 1.2721 vacuum hardened 58hrc

**Embossing height g:**

The dimension g results from the embossing in between a-c and b-d.

The embossing has to be done at the same time.



$$g = 16,4 \pm 0,1$$

**Figure 52: Drawing specification of dimension g**

**Check the measurement of the embossing height g:**

To check the dimension g, the height needs to be measured acc. to the drawing. All of the dimensions have to be within the given tolerance.

The measuring of the embossing height has to be done with a suitable measuring device. (Micrometer, measuring range: 0-25mm) The thickness of the measuring blades must be lower than 0,3mm.



**Figure 53: schematic representation of the measuring device**



**Figure 54: schematic representation of the measurement of the pressing height**

### **3.10 Positioning of the female locking device unit**

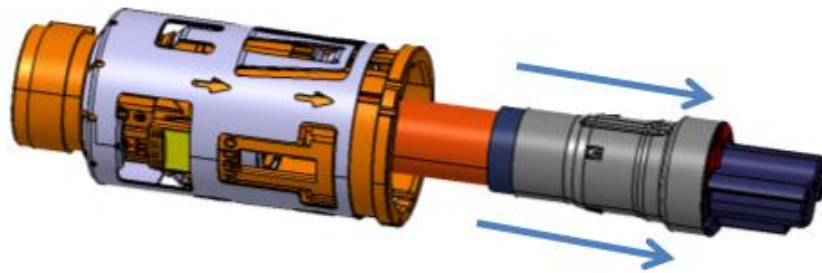
An assembly device (hand lever press) can be used for the positioning and assembly process of the socket housing to the cable assembly.

The manufacturer is free to choose which device/machine is used. The assembly data described on the following pages must be observed during the assembly process.

The order of an assembly device is the responsibility of the manufacturer.

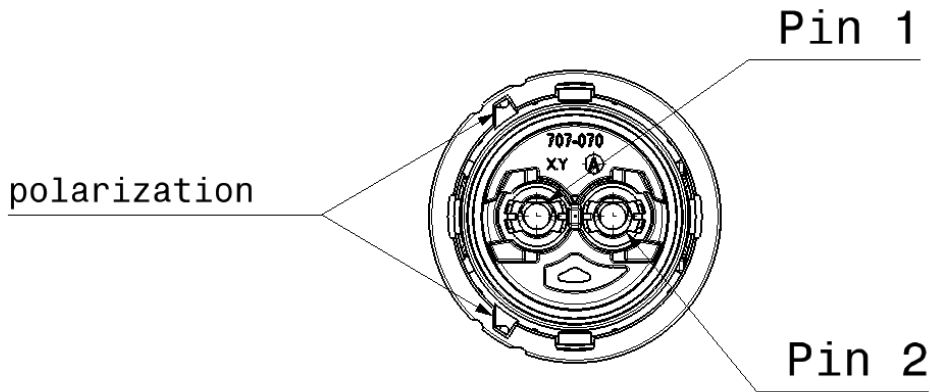
The test equipment used by Hirschmann Automotive can be found in chapter 4.

The female locking device unit has to be assembled power assisted, and in the correct position.



**Figure 55: Mounting direction of the female locking device unit**



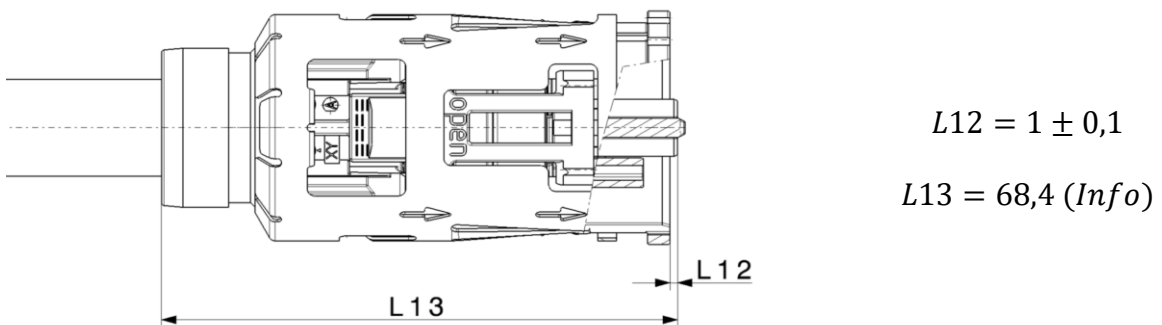


**Figure 56: Position of the polarization of the female locking device unit**

- The contact holder incl. the shield sleeve needs to be assembled into the locking device unit in the correct position.

Both polarizations need to be symmetric to the axis in between of the center of Pin 1 and Pin 2.

Also, the polarization has to be on the side of Pin 1.



**Figure 57: Assembly position of the female locking device unit**

- The locking sleeve must be assembled onto the shield sleeve force-assisted until the dimension L12 is reached.

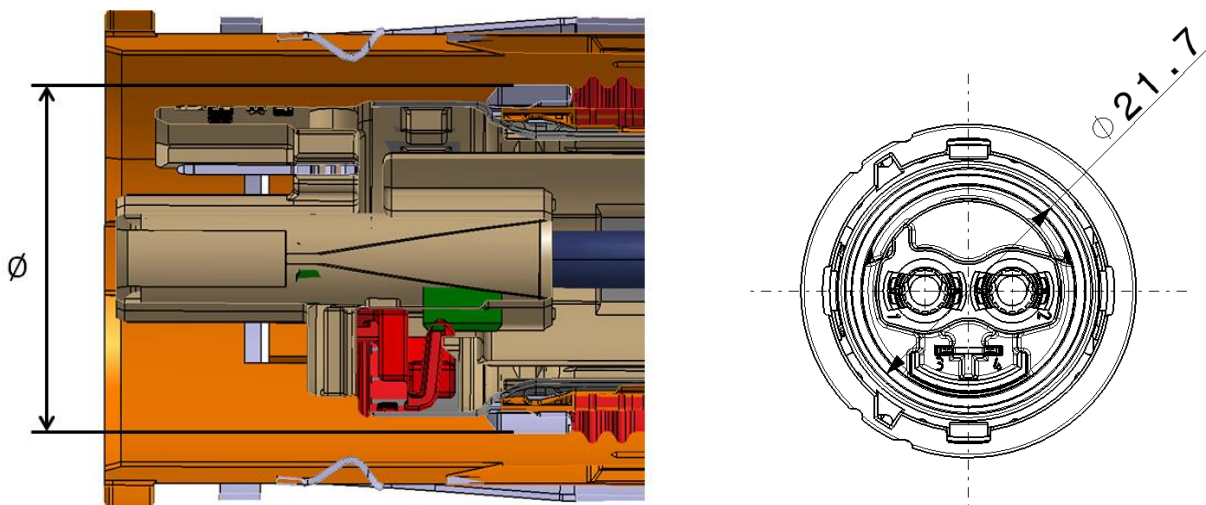
The dimension L12 can be checked with a testing gauge.

The dimension L13 is only for checking purposes.

- During the assembling process, there are no damages allowed on the shield sleeve, the contact holder, or the wire.
- There is no pull on the wire necessary.

Especially do not pull out the cable sheath out of the stress relief.

- The maximum diameter 21,7mm of the safety ring (grey Ring) may not be exceeded after mounting process.



**Figure 58: Maximum diameter of the safety ring after mounting process**

### 3.11 Assembly seal and cover cap

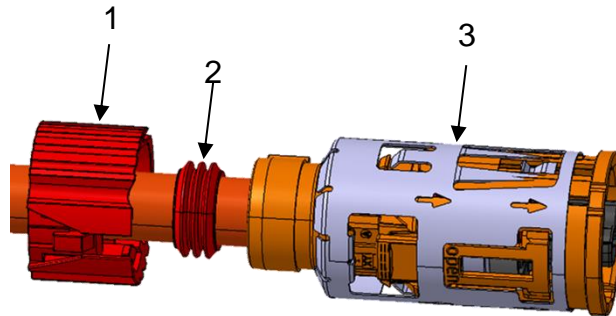


Figure 59: Assemble seal and cover cap

- Push seal [2] into the female locking device unit [3]

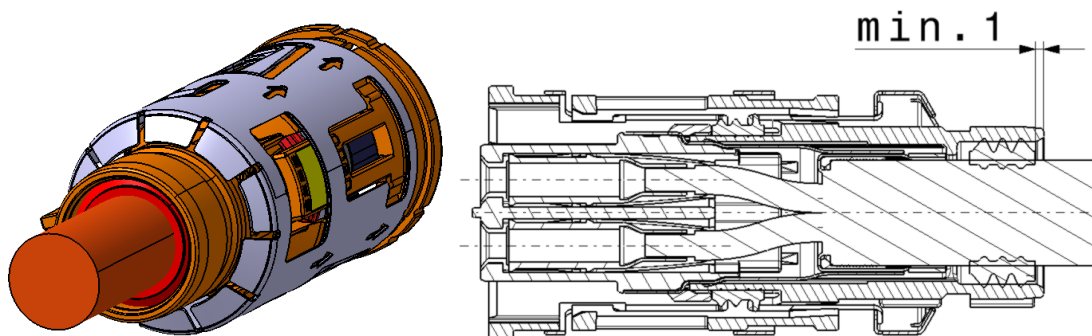


Figure 60: Symbolic representation of the seal one end position

The cable seal can be slightly widened during assembly.

- It is possible to move the seal [2] with the cover cap [1] on the wire, but care must be taken that the seal does not twist and is not pinched or damaged.
- It has to be ensured that the seal [2] is positioned at least 1mm inside the locking sleeve [3] in end-position (see Figure 60).

- Snap the cover cap [1] into the peripheral groove of the locking device assembly [3], considering the polarization, the detachable snap hook [1a] must be located by the arrows of the CPA [3a]. In the delivery condition or unmated state, the metal CPA has to have a distance of  $3,8 \pm 0,4$ mm to the board of the locking device, as visible in the last picture of Figure 61.
- It must be ensured that the cover cap [1] and seal [2] do not get damaged during the processing.

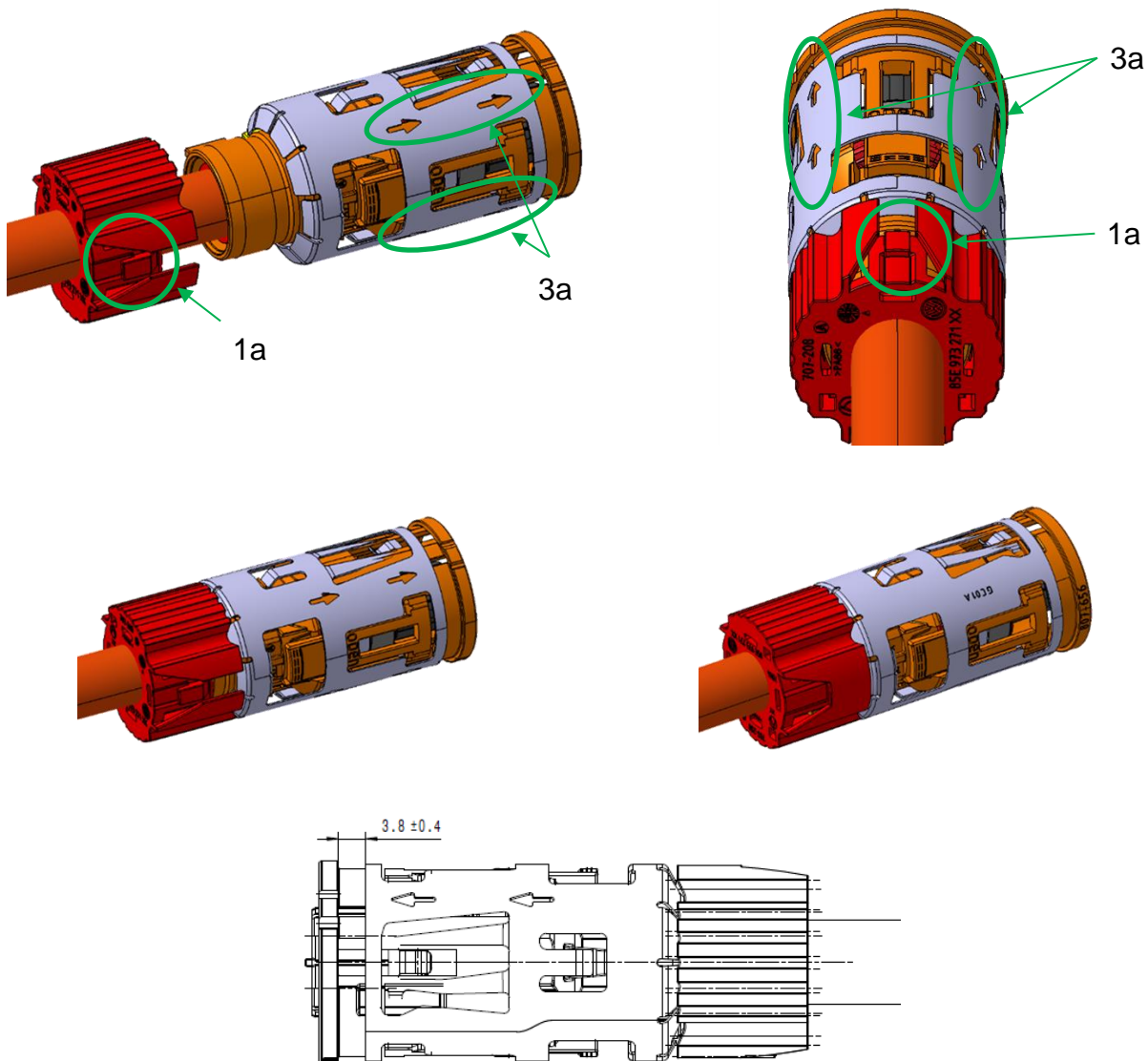


Figure 61: Haltekappe in Vorverrastposition



### **3.12 Technical cleanliness**

In general, pay attention to the cleanliness on the connector and inside of the connector.

Metallic particles generated during the assembly process, have to be removed with a suitable device. Inside the connector and on the connector, there are no metallic particles > 1000 µm allowed.

For metallic particle at each connector: CCC = N (J4/K0) acc. to VDA Volume 19

For all other particle at each connector: CCC = N (J10/K0) acc. to VDA Volume 19

It is also important to protect the component from further contamination during transport. Suitable packaging must be considered.



## **4 Appendix**

The machines and devices described in this chapter were used by Hirschmann Automotive for the production of numerous experimental- and validation parts. The selection, design and commissioning of these devices lies within the responsibility of the manufacturer.

### **4.1 Double stroke crimping machine (see chapter 3.6)**

**Name of the device:** HPS40-2 Double stroke crimping machine  
**Article number:** 185/16  
**Name of the device:** Interchangeable crimping unit  
**Article number:** Shown in the process specification HCT4 female terminal „EVS-100068“

**Contact:** Schäfer Werkzeug- und Sondermaschinenbau GmbH  
Dr.-Alfred-Weckesser-Str. 6  
76669 Bad Schönborn-La, Deutschland  
Tel: +49 7253 9421-0  
Fax: +49 7253 9421-94  
[www.schaefer.biz](http://www.schaefer.biz)



#### **4.2 Pressing device (see chapter 3.9)**

**Name of the device:** Pressing device HPS40-2

**Article number:** 188/16

**Contact:** Schäfer Werkzeug- und Sondermaschinenbau GmbH  
Dr.-Alfred-Weckesser-Str. 6  
76669 Bad Schönborn-La, Deutschland  
Tel: +49 7253 9421-0  
Fax: +49 7253 9421-94  
[www.schaefer.biz](http://www.schaefer.biz)

#### **4.3 Assembling device (see chapter 3.10)**

**Name:** Assembling device HPS40-2

**Article number:** HPS40-2

**Contact:** WKM - Maschinenbau GmbH  
Oberes Ried 15  
A-6833 Klaus  
Tel. +43 5523 / 54907



#### **4.4 Degree of automation**

There is a concept developed by the company Komax in which the process steps as shown in this process specification can be produced fully automatic in various stage of expansion.

This concept was developed together with the company Hirschmann Automotive.

Each manufacturer is responsible of the commissioning of the pressing device and can be requested direct at the company Komax.

**KOMAX AG**

**Industriestraße 6**

**CH-6036 Dierikon**

**Phone: +41 41 455 04 55**

**[www.komaxwire.com](http://www.komaxwire.com)**





## 5 Change History

Version	Description of change	Editor	Status	Date
00	First release	Rümmele M.	released	18.06.2021
01	Chapter 2.7 Table 8 adapted; Chapter 3.1 Table 10 adapted; Chapter 3.4: Definition of foil overhang added; Chapter 3.5: Dimension L4 - added "Measurement in stretched length"; Chapter 3.7 Table 12 adapted; Chapter 3.9.1: Dimension L10 - addition/definition as tool dimension; Chapter 3.9.2: Dimension L11 - addition/definition as tool dimension; embossing height g - max. Width of measuring tips changed to 0.3mm; Chapter 3.11 Assembly of cable seal adapted; Added orientation of the cover cap;	Rümmele M.	released	24.02.2022
02	Chapter 3.1 Figure 18,19 and Table 10 adapted	Rümmele M.	released	07.03.2022