



PROCESS SPECIFICATION
HPS40-2 2+2
Female Connector MCC

EVS-100096



HIRSCHMANN
AUTOMOTIVE



Table of contents

1	General	3
1.1	Introduction	3
1.2	Customer releases	4
1.2.1	Customer: Miscellaneous	4
1.2.2	Customer: BMW	4
1.3	Other current documents	5
2	Product structure (single components)	7
2.1	Sheated cable (see table)	7
2.2	HPS40-2 2+2 locking sleeve	9
2.3	HPS40-2 2+2 female contact carrier	10
2.4	HPS40-2 2+2 shielding sleeve	11
2.5	HPS40-2 2+2 stress relief	12
2.6	HPS40-2 2+2 wire seal	14
2.7	HPS40-2 2+2 cover cap	15
2.8	HCT4 2+2 female terminal	16
3	Product structure (optional parts)	17
3.1	HPS40-2 2+2 CPA housing	17
3.2	HPS40-2 2+2 coding clip	18
3.3	HPS40-2 2+2 90° angle cap	19
3.4	HPS40-2 2+2 protection cap	20
4	Processing steps	21
4.1	Cut the shielded cable	21
4.2	Assembly of the single components	22
4.3	Strip off the shielded cable	23
4.4	Wire processing I	24
4.5	Wire processing II	25
4.6	Crimp the HCT4 female terminal	26
4.7	Assembly I	29
4.8	Assembly II	31
4.9	Push shielding sleeve onto contact carrier	32
4.10	Rotative orientation	33

This document is not subject to change service!



4.11	Press shielding sleeve	34
4.11.1	Shield pressing by two half-shells.....	36
4.11.2	Pressing contact carrier.....	42
4.12	Positioning of the female locking device.....	46
4.13	Assemble seal and cover cap	48
5	Processing steps (CPA Housing)	50
5.1	Positioning of the CPA Housing	50
6	Processing steps (optional parts)	53
6.1	Assemble 90° angled cap	53
6.2	Assemble coding clip	56
6.3	Assemble transport protection cap.....	57
6.4	Stacking of produced harnesses	57
7	Technical information	58
7.1	General requirements	58
7.2	Technical cleanliness	58
7.3	Degree of automation.....	59
7.4	Sample preparation for shielding retention force	59
7.4.1	Manipulation of primary and secondary locking	59
7.4.2	Removal of HCT4 female terminals after shielding crimping.....	60
8	Change of documentation	61

This document is not subject to change service!



1 General

1.1 Introduction

This process specification is valid for all variants and describes the product structure as well as the assembly of the Hirschmann Automotive HPS40-2 2+2 female connector MCC.

System number	Coding	Wire cross section
807-655-501/-521	A	2.5 mm ² 4.0 mm ² 6.0 mm ²
807-655-502/-522	B	
807-655-503/-523	C	
807-655-504/-524	D	
807-655-507/-527	Z	
807-655-541 / -561	A	
807-655-542 / -562	B	
807-655-543 / -563	C	
807-655-544 / -564	D	
810-385-501	A	
810-385-502	B	
810-385-503	C	
810-385-504	D	
813-919-501	A	
813-919-502	B	
813-919-503	C	
813-919-504	D	
813-919-507	Z	

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.

This document is not subject to change service!



1.2 Customer releases

It is our suggestion that the specified dimensions are observed during processing. Further functional features must be coordinated and defined with the OEM. The adjustments in the processing specification with the status 08/ 2023 must be considered for new applications, but not for existing applications.

1.2.1 Customer: Miscellaneous

Customer: Miscellaneous					
L	S	F	Characteristic	Specific Purpose	Place of implementation
-	-	F2	"d" Height of shield-crimping	Strain-relief, electrical shield connection - EMC	Tier 1
-	-	F3**	Retention force of shield crimping	Strain-relief, electrical shield connection - EMC	
-	-	F1	L12 depth of contact carrier	Pluggability	

**No 100% check possible since the specimens are destroyed during testing.
Proof of capability or continuous testing of all special characteristics must be aligned with OEM directly.

1.2.2 Customer: BMW

Customer: BMW			NAEL: N OU53 B – October 2022		
BMW-Number.: 5 A88 290					
Special characteristics according to GS 91011:2019-8					
L	S	F	Characteristic	Specific Purpose	Place of implementation
L1	-	-	"d" Height of shield-crimping	Strain-relief, electrical shield connection - EMC	Tier 1
L2**	-	-	Retention force of shield crimping	Strain-relief, electrical shield connection - EMC	
-	-	F1	L12 depth of contact carrier	Pluggability	

**No 100% check possible since the specimens are destroyed during testing.
Proof of capability or continuous testing of all special characteristics must be aligned with BMW directly.

Legend: L = Legal, S = Safety, F = Function

This document is not subject to change service!



1.3 Other current documents

A	HCT4 Process specification (Ag)	EVS-100068
B	Data sheet 2x 2.5 mm ² shielded cable (T180) of Kroschu	Kroschu No. 64996918
C	Data sheet 2x 4.0 mm ² shielded cable (T180) of Kroschu	Kroschu No. 64997293
D	Data sheet 2x 6.0 mm ² shielded cable (T180) of Kroschu	Kroschu No. 64995979 Kroschu No. 64997213
E	Data sheet 2x 2.5 mm ² shielded cable of Coroplast	Coroplast No.: 9-2641 (2x 2.5 mm ²)
F	Data sheet 2x 4.0 mm ² shielded cable of Coroplast	Coroplast No.: 9-2641 (2x 4.0 mm ²)
G	Data sheet 2x 6.0 mm ² shielded cable of Coroplast	Coroplast No.: 9-2641 (2x 6.0 mm ²)
H	Data sheet 2x 2.5 mm ² shielded cable of Bitzlink "Leoni"	Bitzlink "Leoni" No.: FHLR2G2GCB2G 00001
I	Data sheet 2x 4.0 mm ² shielded cable of Bitzlink "Leoni"	Bitzlink "Leoni" No.: FHLR2G2GCB2G 00002
J	Data sheet 2x 6.0 mm ² shielded cable of Bitzlink "Leoni"	Bitzlink "Leoni" No.: FHLR2G2GCB2G 00003
K	Data sheet 2x 2.5 mm ² shielded cable of Coficab	Coficab No.: LGCBG225XXXXX
L	Data sheet 2x 4.0 mm ² shielded cable of Coficab	Coficab No.: LGCBG240XXXXX
M	Data sheet 2x 6.0 mm ² shielded cable of Coficab	Coficab No.: LGCBG260XXXXX
N	Data sheet 2x 6.0 mm ² shielded cable of NBKBE	NBKBE No.: 818-00011 (2x 6.0 mm ²)
O	Data sheet 2x 4.0 mm ² shielded cable of NBKBE	NBKBE No.: 818-00013 (2x 4.0 mm ²)
P	Data sheet 2x 6.0 mm ² Radox shielded cable from H+S	H+S No.: 12584915
Q	Data sheet 2x 4.0 mm ² shielded cable from Coficab	Coficab No.: V4XXCBX240Hxx
R	Data sheet 2x 4.0 mm ² shielded cable from Coficab (not validated yet)	Coficab No.: H3XXCBX240Hxx
S	Data sheet 2x 6.0 mm ² shielded cable from Coficab (not validated yet)	Coficab No.: H3XXCBX260Hxx
T	Data sheet 2x 4.0 mm ² shielded cable from Aptiv	Aptiv No.: M9098201 (Data sheet no. M90982212 Rev. E)

This document is not subject to change service!



U	Data sheet 2x 4.0 mm ² Radox shielded cable of H+S	H+S Nr.: 12582308
V	Data sheet 2x 4.0 mm ² Radox shielded cable of H+S	H+S Nr.: 85149176
W	Data sheet 2x 6.0 mm ² shielded cable from Aptiv	Aptiv No.: M9098301 (Data sheet no. M90982212 Rev. E)
X	Data sheet 2x 4.0 mm ² shielded cable from Coficab	Coficab No.: FHLR2G2GCB2G
Y	Data sheet 2x 6.0 mm ² shielded cable (T180) from Kroschu	Kroschu No. 64990766
Z	Data sheet 2x 4.0 mm ² shielded cable from Cablena/ Condumex	Cablana No. 109204

This document is not subject to change service!



2 Product structure (single components)

2.1 Sheated cable (see table)

Only wires which are listed here and released by the respective OEM are allowed to use.

Wire manufacturer	Wire cross section		
	2.5 mm ²	4.0 mm ²	6.0 mm ²
Coficab	FHLR2G2GCB2G 600/1000V T180		
	Supplier production site: Portugal, 6300 Guarda	Supplier production site: Portugal, 6300 Guarda Romania, 310494 Arad Tunesia, 1004 Tunis China, 301800 Tianjin	Supplier production site: Portugal, 6300 Guarda Mexico
	LGCBG225XXXXX	LGCBG240XXXXX	LGCBG260XXXXX
	FHLR91X91XCB91X T4 Supplier production site: Tunisia, 1004 Tunis		
	-	V4XXCBX240Hxx	-
	FHLR91X91XCB91X T3 (not validated yet) Supplier production site: t.b.d.		
	-	H3XXCBX240Hxx	H3XXCBX260Hxx
Kroschu	FHLR2G2GCB2G 600/1000V T180 Supplier production site: Germany, 46414 Rhede		
	64996918	64997293	64995979 64997213 64990766
Bitzlink "Leoni"	FHLR2G2GCB2G 600/900V T180 Supplier production site: Italy, 29010 Monticelli		
	FHLR2G2GCB2G 00001	FHLR2G2GCB2G 00002	FHLR2G2GCB2G 00003
Coroplast	FHLR2G2GCB2G 600/1000V T180 Supplier production site: Germany, 42279 Wuppertal		
	9-2641 2x 2.5 mm ²	9-2641 2x 4.0 mm ²	9-2641 2x 6.0 mm ²
NBKBE	FHLR2G2GCB2G 600/1000V T180 Supplier production site: China		
	-	818-00013 (2x 4.0 mm ²)	818-00011 (2x 6.0 mm ²)-
H + S	FHLR91XC13X-2x6 T150 Supplier production site: Switzerland, 8330 Pfäffikon		
	-	-	12584915
	FHLR91XC13X-2x4 T150 Supplier production site: Switzerland, 9100 Herisau		
-	12582308, 85149176	-	
Aptiv	FHLR91X91XC91X-B -40°C / +150°C Supplier production site: t.b.d.		
	-	M9098201	M9098301

This document is not subject to change service!

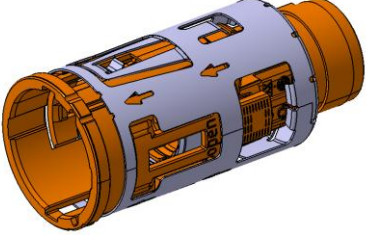
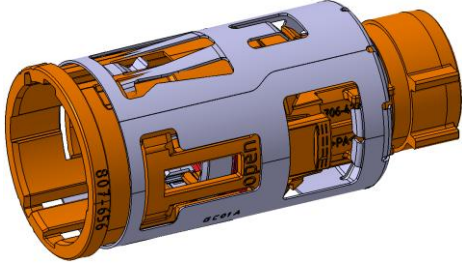
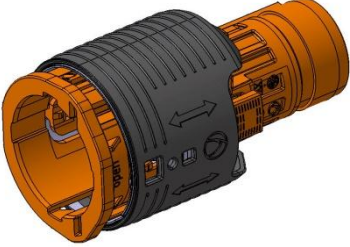
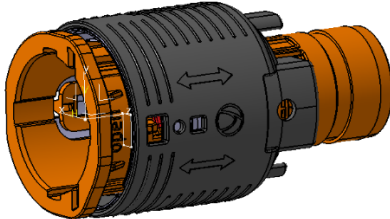
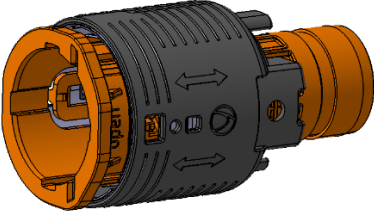
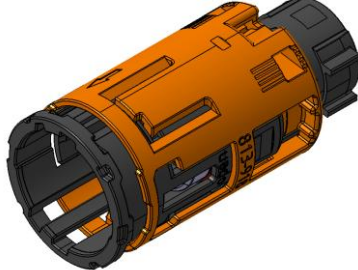


Cablana / Condumex	FHLR2G2GCB2G/T180		
	Produktionsstandort Lieferant: Spain, 50016 Zaragoza		
	-	109.204	-

This document is not subject to change service!



2.2 HPS40-2 2+2 locking sleeve

	
807-656-501	807-656-511 / 807-656-521 / 807-656-522
	
807-656-503	807-656-505
	
807-656-506	813-918-501

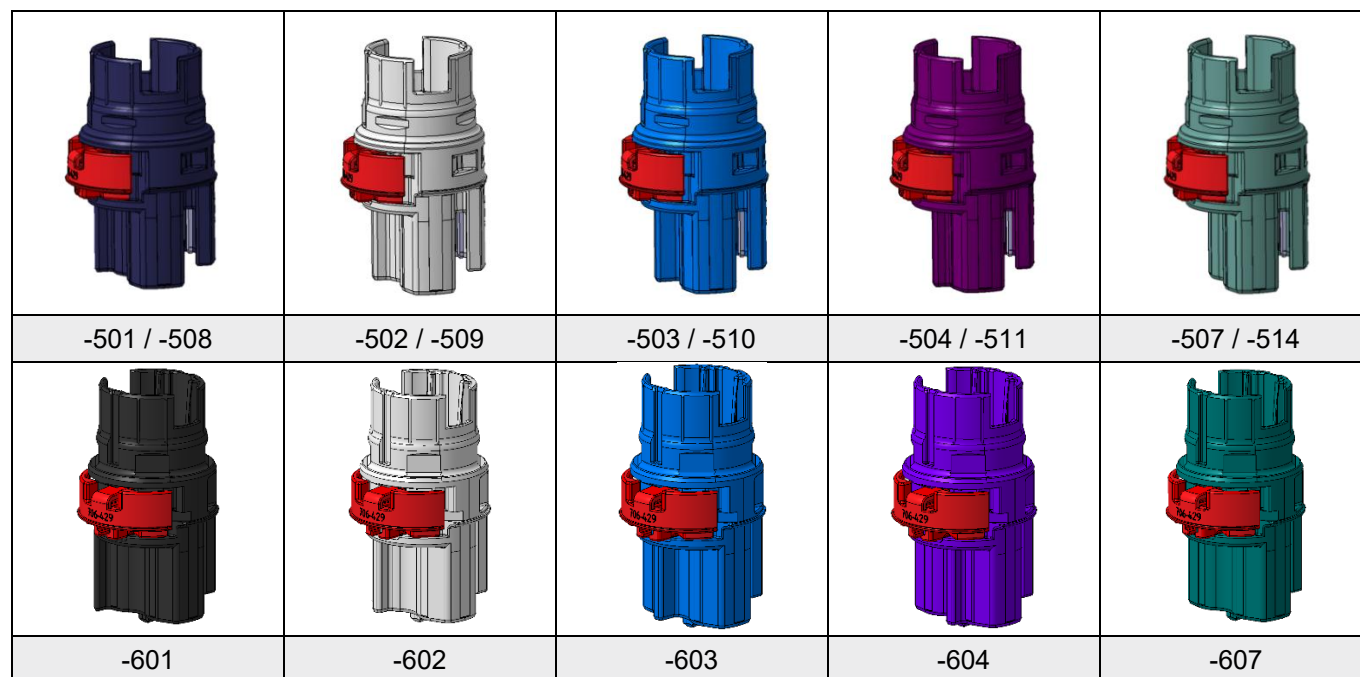
Hirschmann Automotive No.	Wire cross section
807-656-522	2.5 mm ² 4.0 mm ² 6.0 mm ²
807-656-521	
807-656-511	
807-656-501	
807-656-503	
807-656-505	
807-656-506	
813-918-501	

Information: Different DMC/logo laser marking on the locking sleeve, depending on the OEM/customer.
Delivery condition: The locking sleeves are delivered as bulk good.

This document is not subject to change service!



2.3 HPS40-2 2+2 female contact carrier



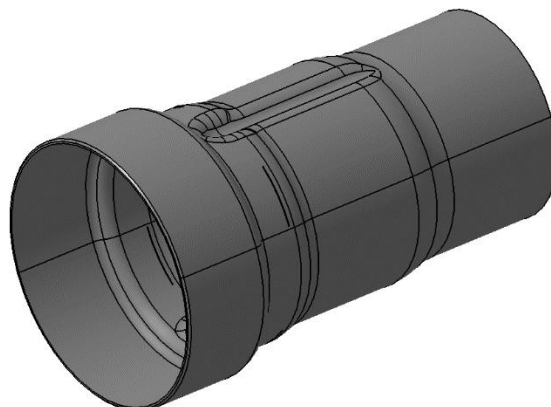
Hirschmann Automotive No.	Coding	Colour	HVIL bridge	Wire cross section
807-657-501	A	Black	Yes	2.5 mm ² 4.0 mm ² 6.0 mm ²
807-657-502	B	Natural / white	Yes	
807-657-503	C	Blue	Yes	
807-657-504	D	Purple	Yes	
807-657-507	Z	Waterblue	Yes	
807-657-508	A	Black	No	
807-657-509	B	Natural / white	No	
807-657-510	C	Blue	No	
807-657-511	D	Purple	No	
807-657-514	Z	Waterblue	No	
807-657-601	A	Black	No	
807-657-602	B	Natural / White	No	
807-657-603	C	Blue	No	
807-657-604	D	Purple	No	
807-657-607	Z	Waterblue	No	

Delivery condition: The contact carriers are delivered as bulk good.

This document is not subject to change service!



2.4 HPS40-2 2+2 shielding sleeve



504 / -505 / -506 / -514

Hirschmann Automotive No.	Wire cross section
709-840-504	2.5 mm ² 4.0 mm ² 6.0 mm ²
709-840-506 (Localized Version China)	2.5 mm ² 4.0 mm ² 6.0 mm ²
709-840-505 (Bare surface)	2.5 mm ² 4.0 mm ² 6.0 mm ²
709-840-514 (hot annealed)	2.5 mm ² 4.0 mm ² 6.0 mm ²

Delivery condition: The shield sleeves are delivered as bulk good.



2.5 HPS40-2 2+2 stress relief

		
709-841-501	709-841-502	709-841-503
		
709-841-511	709-841-512	709-841-513
		
709-841-522	712-492-502	712-492-503

Hirschmann Automotive No.	Wire cross section
709-841-501	2.5 mm ²
709-841-502	4.0 mm ²
709-841-503	6.0 mm ²
709-841-511 (Prolonged Version)	2.5 mm ²
709-841-512 (Prolonged Version)	4.0 mm ²
709-841-513 (Prolonged Version)	6.0 mm ²
709-841-522	4.0 mm ² (only available for H&S wire harness)

This document is not subject to change service!



712-492-502 (Deepdrawn Version)	4.0 mm ²
712-492-503 (Deepdrawn Version)	6.0 mm ²

Wire manufacturer: On the product drawing (HA No. 807-655-...XX / 810-385-...XX), you can find the released cables for each stress relief.

Delivery condition: The stress reliefs are delivered as bulk good.



2.6 HPS40-2 2+2 wire seal

		
-504	-505	-506
		
-522		

Hirschmann Automotive No.	Colour	Wire cross section
709-113-504	Beige	2.5 mm ²
709-113-505	Grey	4.0 mm ²
709-113-506	Red	6.0 mm ²
709-113-522	Purple	4.0 mm ² (only available for H&S wire harness)

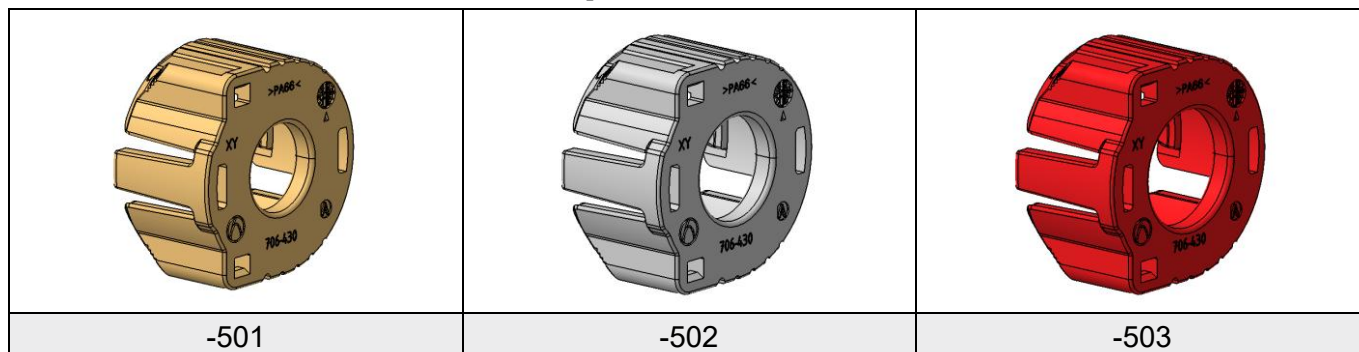
Wire manufacturer: On the product drawing (HA No. 807-655-...XX / 810-385-...XX), you can find the released cables for each seal.

Delivery condition: The seals are delivered as bulk good

This document is not subject to change service!



2.7 HPS40-2 2+2 cover cap



Hirschmann Automotive No.	Colour	Wire cross section
706-430-501	Beige	2.5 mm ²
706-430-502	Grey	4.0 mm ²
706-430-503	Red	6.0 mm ²

Wire manufacturer: On the product drawing (HA No. 807-655-...XX / 810-385-...XX), you can find the released cables for each cover cap.

Delivery condition: The cover caps are delivered as bulk good.

This document is not subject to change service!



2.8 HCT4 2+2 female terminal

		
-502	-504	-505

Hirschmann Automotive No.	Wire cross section
709-427-502	1.5 – 2.5 mm ²
709-427-504	4.0 mm ²
709-427-505	6.0 mm ²

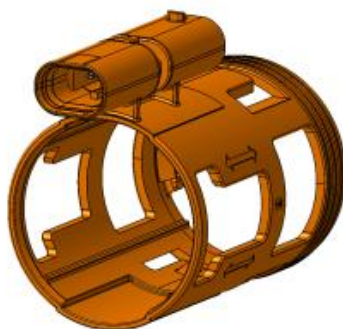
Delivery condition: The female terminals are delivered at terminal strip on a spool.

This document is not subject to change service!



3 Product structure (optional parts)

3.1 HPS40-2 2+2 CPA housing



-501

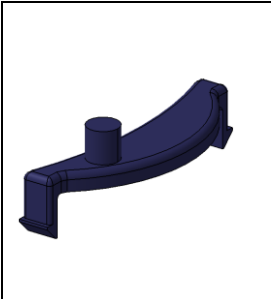
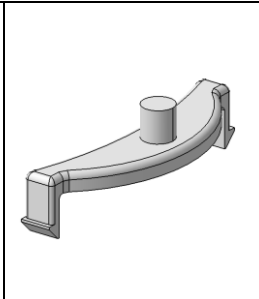
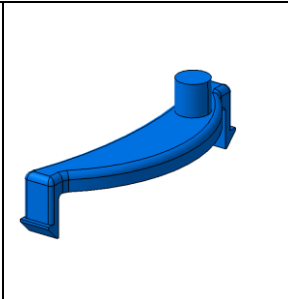
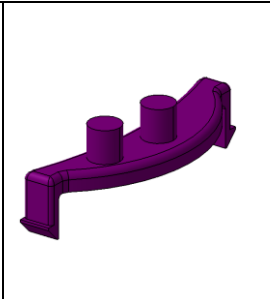
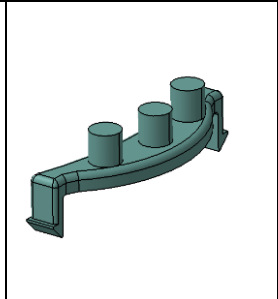
Hirschmann Automotive No.	Wire cross section
810-287-501	2.5 mm ² 4.0 mm ² 6.0 mm ²

Information: The CPA Housing will be used for the In-Line Connector with HVIL and is not applicable if the cable harness is built up with following locking sleeve indices: 807-656-503 / 807-656-505 / 807-656-506 / 813-918-501

Delivery condition: The CPA-housings are delivered as bulk good.



3.2 HPS40-2 2+2 coding clip

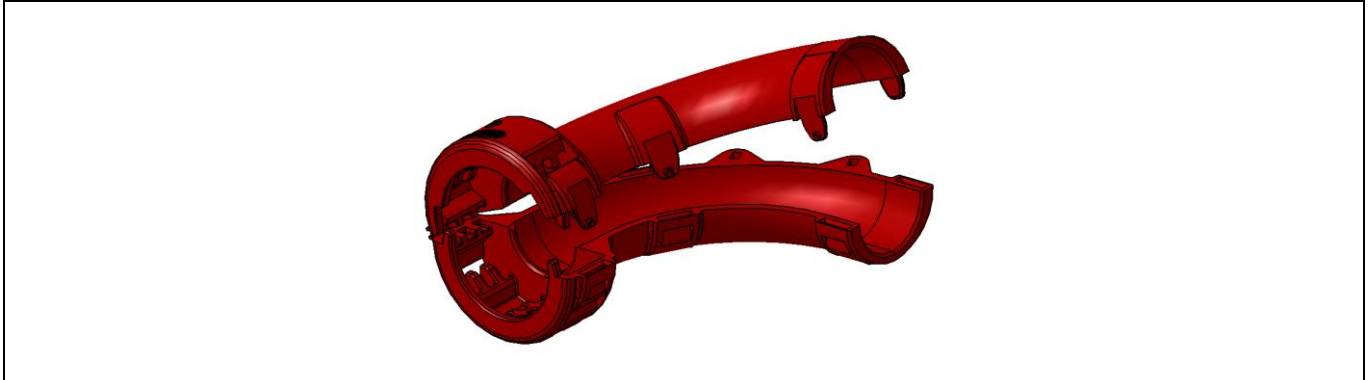
				
Cod. A	Cod. B	Cod. C	Cod. D	Cod. Z

Hirschmann Automotive No.	Coding	Colour	Wire cross section
706-505-501	A	Black	2.5 mm ² 4.0 mm ² 6.0 mm ²
706-505-502	B	Natural / White	
706-505-503	C	Blue	
706-505-504	D	Purple	
706-505-507	Z	Waterblue	

Delivery condition: The coding clips are delivered as bulk good.

This document is not subject to change service!

3.3 HPS40-2 2+2 90° angle cap



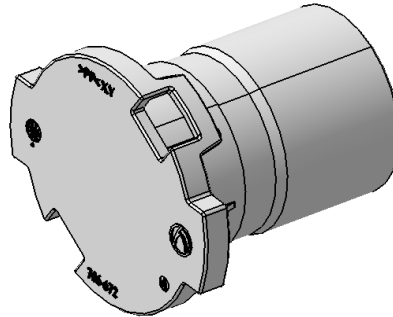
Hirschmann Automotive No.	Wire cross section
706-506-503	2.5 mm ² 4.0 mm ² 6.0 mm ²

Information: The 90° angled cap can be used as an optional part instead of the cover cap.

Delivery condition: The 90° angled caps are delivered as bulk good.

This document is not subject to change service!

3.4 HPS40-2 2+2 protection cap



**Hirschmann
Automotive No.**

706-672-501 (Not valid for NAFTA und TAC
Housing – see Information below)

Information: The HPS40-2 2+2 protection cap is not applicable if the cable harness is built up with following locking sleeve indices: 807-656-503 / 807-656-505 / 807-656-506 / 813-918-501

Delivery condition: The transport protection caps are delivered as bulk good.

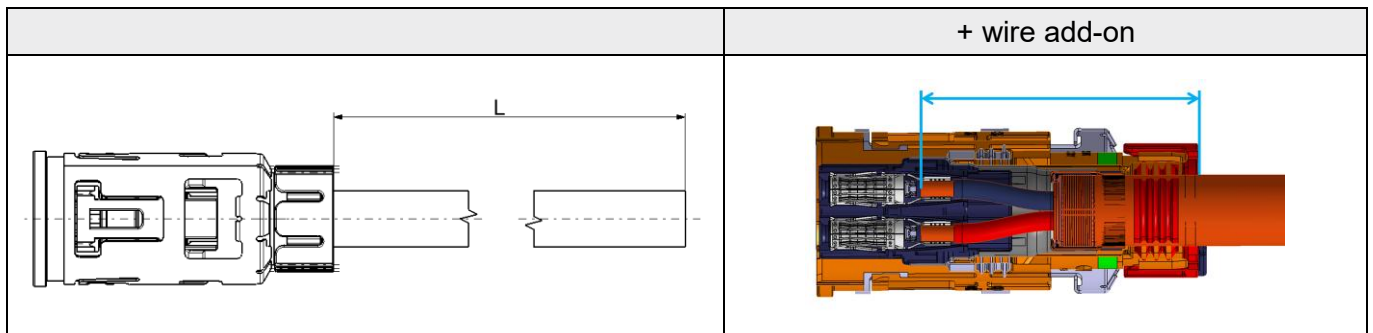
This document is not subject to change service!



4 Processing steps

Use the following described processing steps as necessary for the wire cross sections 2.5 mm²/ 4.0 mm² and 6.0 mm². As a reference sample, a terminal holder coding A and a 6.0 mm² wire was used.

4.1 Cut the shielded cable



Add following lengths for the HPS40-2 2+2 female connector:

Wire cross section	Dimension L after zero-cut (mm)	Dimension L after zero-cut for 90° angle cap (mm)
2.5 mm ²	L + 50	L + 112
4.0 mm ²	L + 50	L + 112
6.0 mm ²	L + 50	L + 112

The length add-on must be added to the length specification of the cable set.

Note:

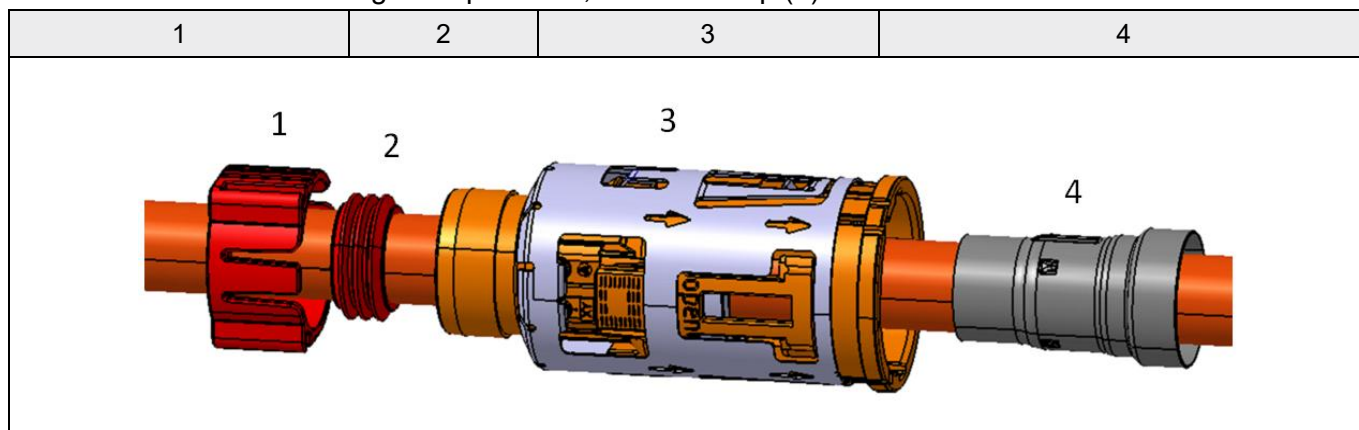
For reproducible series production of the product, a double stroke system with zero cut should be used for production. When using equipment with zero cut, please note for the following process steps that the dimension for the zero cut must be added to the cable allowance. The exact length of the zero cut must be agreed with the equipment manufacturer and taken into account for the manufacturing process.

This document is not subject to change service!



4.2 Assembly of the single components

Slide the cover cap (1), the seal (2), the female locking device (3) and the shielding sleeve (4) onto the shielded cable. If the 90° angled cap is used, the cover cap (1) is omitted.





4.3 Strip off the shielded cable



Stripping length:



Used strain relief	Dimension L1 after zero-cut (mm)
709-841-501 709-841-502 709-841-503 709-841-522	min. 23.5
709-841-511 709-841-512 709-841-513 712-492-502 712-492-503	min. 21.5

The dimension L1 should not be less than listed in the table above for further processing. In the case of a deviating or longer design, a zero cut, as described in chapter 4.1, must be made before attaching the HCT4 contacts (see chapter 4.6) to maintain dimension L5. The braided shield must not be damaged during processing.

This document is not subject to change service!

4.4 Wire processing I

Assemble the stress relief, remove the foil and shorten the shielding.

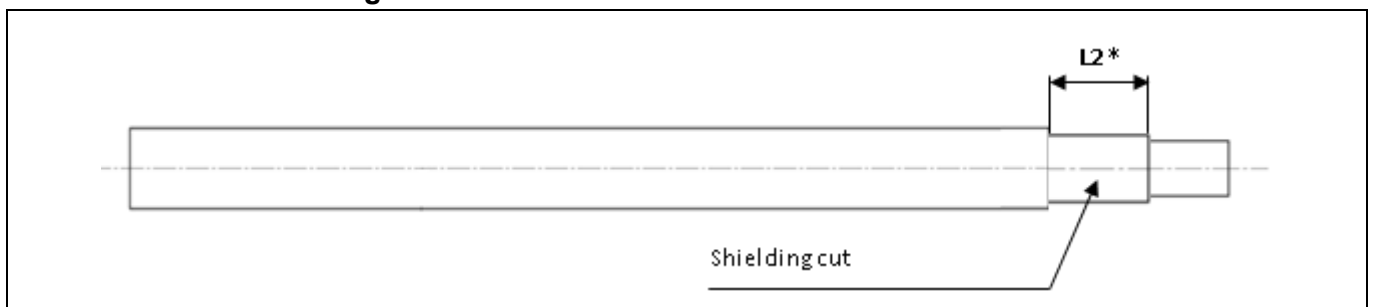


The following process steps must be done, but the manufacturer can choose the sequence:

- Assemble the stress relief.
The correct variant (see table below) must be used depending on the cross-section and Customer Application.
- Remove the foil.
- Shorten the shielding.

An overlap of the foil around the strain relief is allowed circulating up to max. 1.5 mm. An overlap of the foil around the ferrule crimp/ strain relief, like small edges is allowed up to max. 4.0 mm.

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:

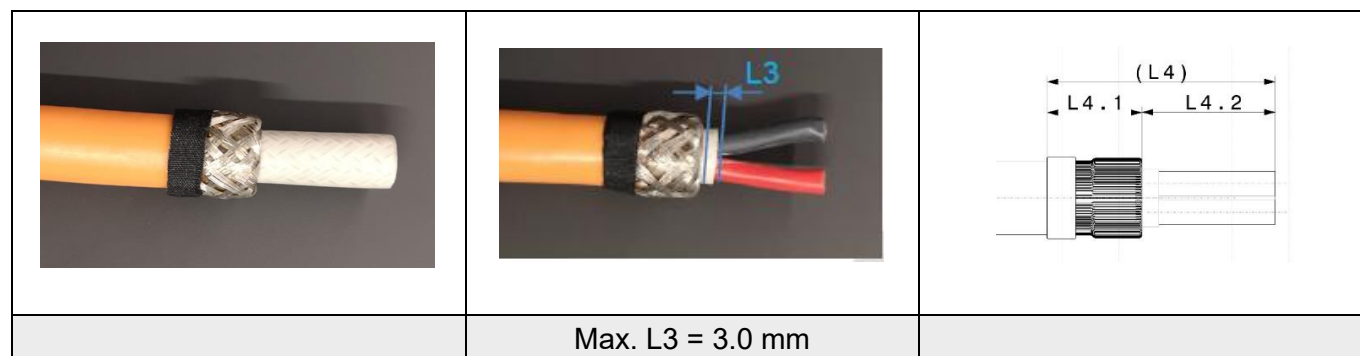
- Can be avoided by removing the residues of the shielding.
- Can be avoided by blowing out or by suction of the residues of the shielding.

This document is not subject to change service!



4.5 Wire processing II

Fold the shield backwards, hold the shield with tape and remove the filling.



The shielding braid must be folded back completely and tightly over the strain relief. No strands of the braid may point towards the two inner conductors. Minor process-related unraveling may occur when folding back the shield; this is acceptable. Precise handling of the shield is essential for product quality.

After this the shield must 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 **5.0 mm**. The fixing tape must be positioned immediately after the stress relief and must not reach the stress relief. The shielding should be under the fixing tape. NO shield strands are allowed outside the max position of the tape (L4 / L4.1)

The max. position of the tape is showed with the dimension L4 – after zero-cut (measurement in straightened length), L4.1 or L4.2.

Used strain relief	L4 (mm)	L4.1 (mm)	L4.2(mm)
709-841-501	max. 40	max. 16.7	max. 23.3
709-841-502			
709-841-503			
709-841-522		max. 18.7	max 21.3
709-841-511			
709-841-512			
709-841-513			
712-492-502			
713-492-503			

In this specification the PET- fabric tape 837X (838X) 5.0 mm 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 mm and the shield sleeve must be able to be mounted easily. The product must have min. 150° C thermal resistance.

The filling material can protrude max. 3.0 mm towards the outer sheath. In the area between the two single cores the filling material is allowed to 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.

This document is not subject to change service!

4.6 Crimp the HCT4 female terminal



- **Double stroke crimping machine**

For the positioning and the crimping process of the HCT4 female terminals, the crimping machine of the company “Schäfer” can be used:

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

The device was designed and implemented by the processing guidelines of Hirschmann Automotive GmbH. The individual details referring to commissioning, handling and process description of the device can be requested directly at the supplier:

Schäfer Werkzeug- und Sondermaschinenbau GmbH
Dr.-Alfred-Weckesser-Str. 6
76669 Bad Schoenborn-La, Deutschland
Tel: +49 7253 9421-0
Fax: +49 7253 9421-94
www.schaefer.biz

The commissioning of the crimping device must be done through the manufacturer. The manufacturer is at liberty to use a crimping device of his choice. The crimp process must meet the crimp and positioning data which are specified on the following pages.

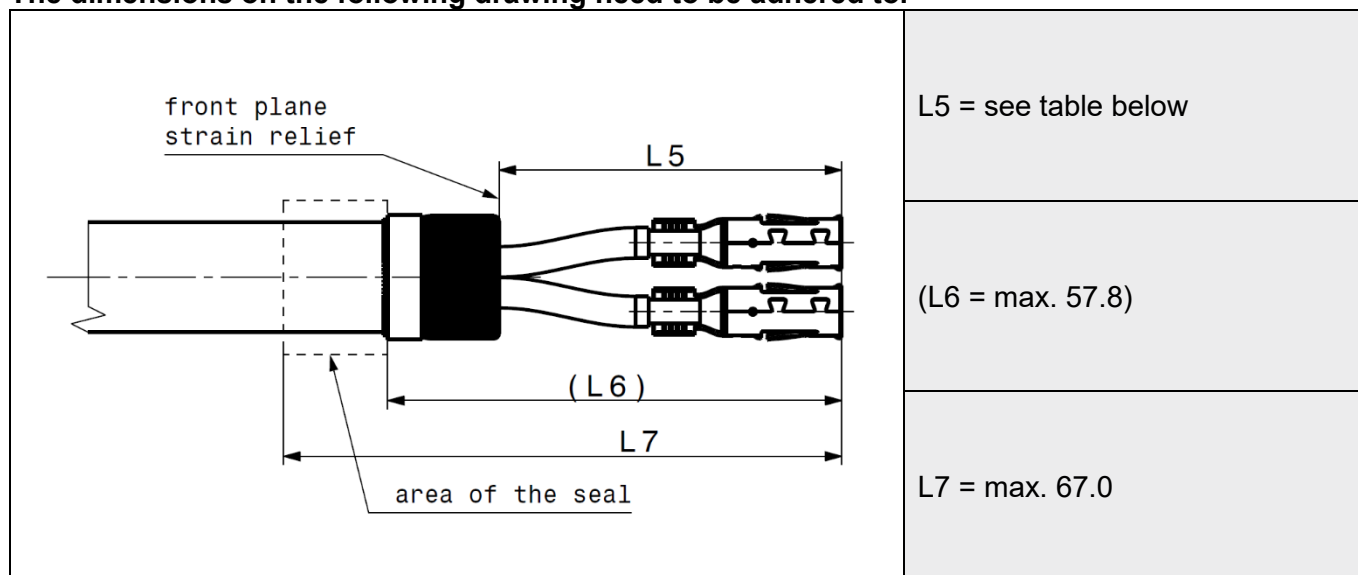
This document is not subject to change service!



• **Process data**

- a) The crimp data can be seen in the „Process specification HCT4 female terminal EVS-100068“.
- b) 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 drawing need to be adhered to.



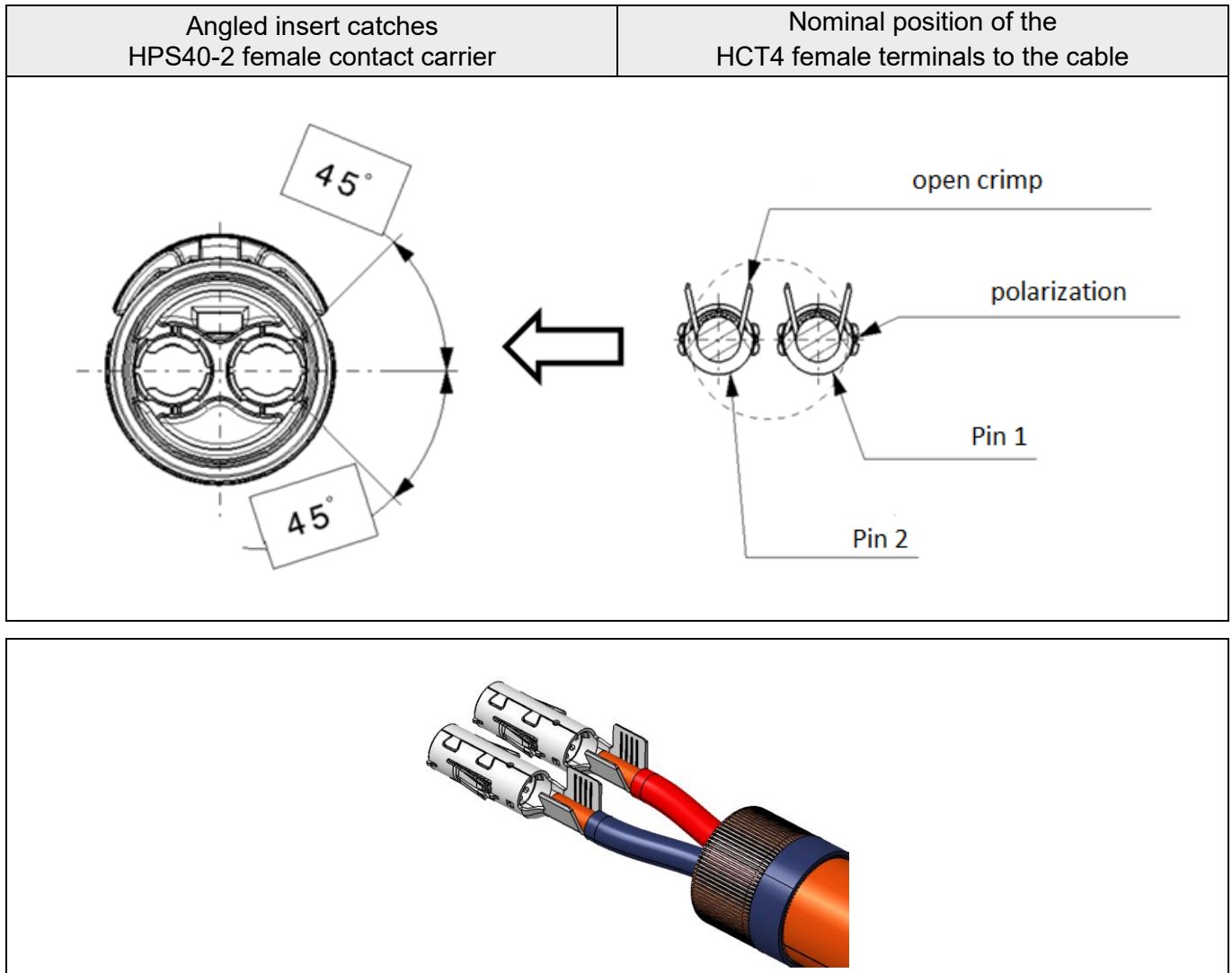
Used strain relief	L5 (mm)
709-841-501	40.1 ± 1
709-841-502	
709-841-503	
709-841-522	
709-841-511	38.1 ± 1
709-841-512	
709-841-513	
712-492-502	
713-492-503	

The dimension L5 is decisive for the position of the strain relief. As alternative to L5 it is allowed to prove dimension 5.1, but one of the two combinations from L4.1 and L5.1 or L4 and L5 must be chosen. L6 is only for information and is built from L4.1 and L5. The dimensions are caused from L1, L4 and the EVS-100068.

The difference of the length between the female terminals of max. 0.5 mm 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.

This document is not subject to change service!



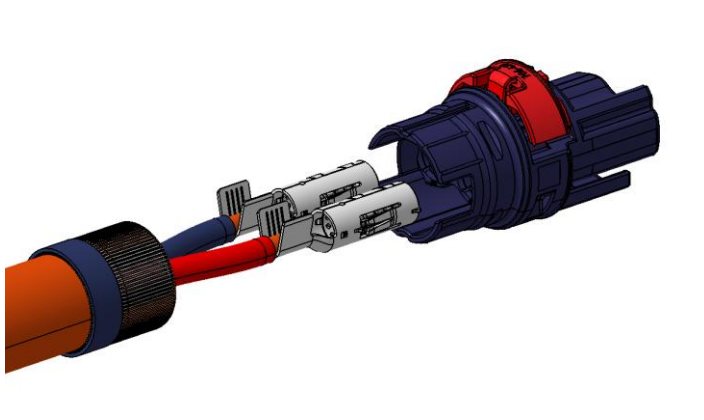
To do an orderly assembling / to ensure the primary locking and the secondary locking, the correct position of the terminals and the wire is very important and needs to be ensured. Usually, the horizontal version is intended.

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.

This document is not subject to change service!



4.7 Assembly I

Assemble HCT4 female terminals into the contact carrier (1).		
	Pin	Polarity / Colour
	1	+ / Red
	2	- / May vary

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 the female terminals will be primary locked. (The female terminals must be crimped.)

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

This document is not subject to change service!



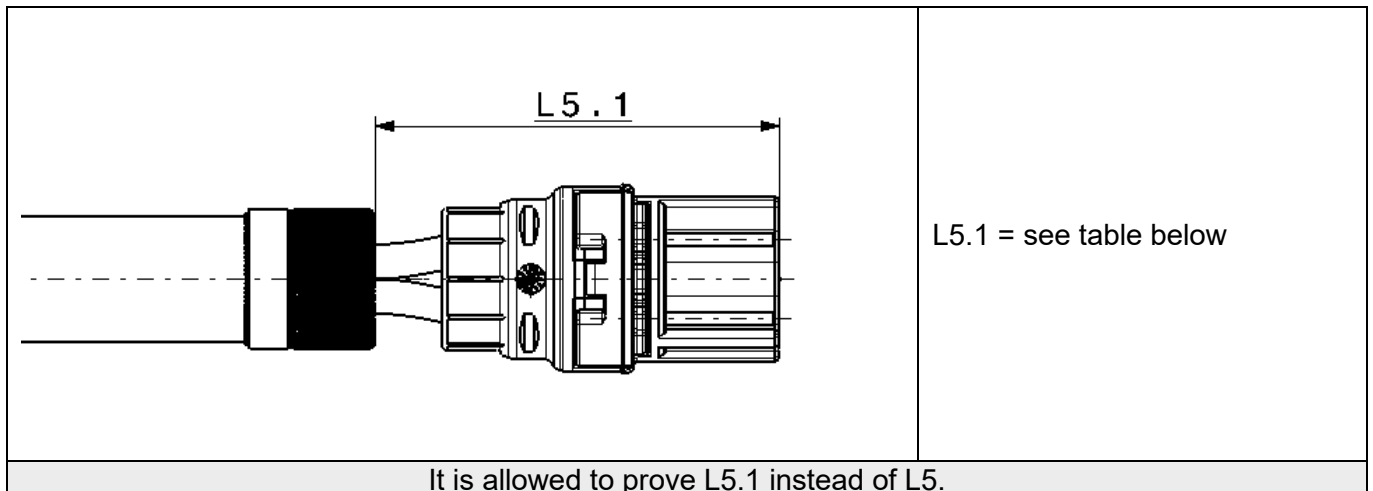
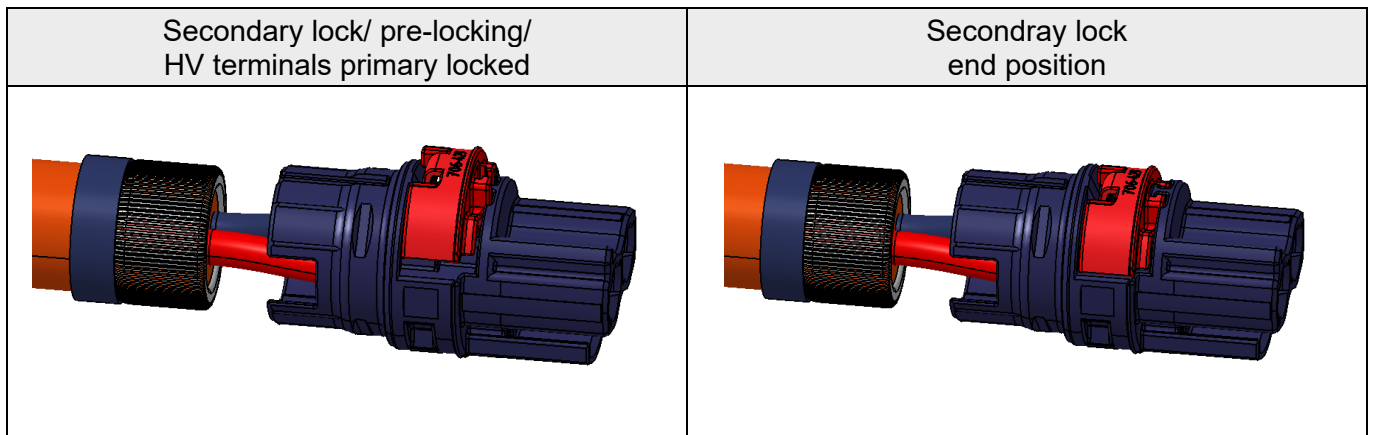
Wire manufacturer	Wire cross section		
	2.5 mm ²	4.0 mm ²	6.0 mm ²
Kroschu	FHLR2G2GCB2G 600/1000V T180		
	64996918	64997293	64995979 64997213 64990766
	24 N	30 N	36 N
Bitzlink "Leoni"	FHLR2G2GCB2G 600/900V T180		
	FHLR2G2GCB2G 00001	FHLR2G2GCB2G 00002	FHLR2G2GCB2G00003
	24 N	30 N	36 N
Coroplast	FHLR2G2GCB2G 600/1000V T180		
	9-2641 (2 x 2.5 mm ²)	9-2641 (2 x 4.0 mm ²)	9-2641 (2 x 6.0 mm ²)
	24 N	30 N	36 N
NBKBE	FHLR2G2GCB2G 600/1000V T180		
	-	818-00013 (2x 4.0 mm ²)	818-00011 (2 x 6.0 mm ²)
	-	30 N	36 N
H+S	FHLR91XC13X-2x6 T150		
	-	-	12584915
	-	-	36 N
	FHLR91XC13X-2x4 T150		
	-	12582308, 85149176	-
	-	30 N	-
Coficab	FHLR91X91XCB91X T3 (not validated yet)		
		H3XXCBX240Hxx	H3XXCBX260Hxx
		30 N	36 N
	FHLR91X91XCB91X T4		
	-	V4XXCBX240Hxx	-
	-	30 N	-
	FHLR2G2GCB2G 600/1000V T180		
	LCGBG225	LCGBG240	LCGBG260
24 N	30 N	36 N	
Cablana / Condumex	FHLR2G2GCB2G/T180 Supplier production site: Spain, 50016 Zaragoza		
	-	109.204	-
	24 N		24 N

This document is not subject to change service!

4.8 Assembly II

Assembly of the secondary lock (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.

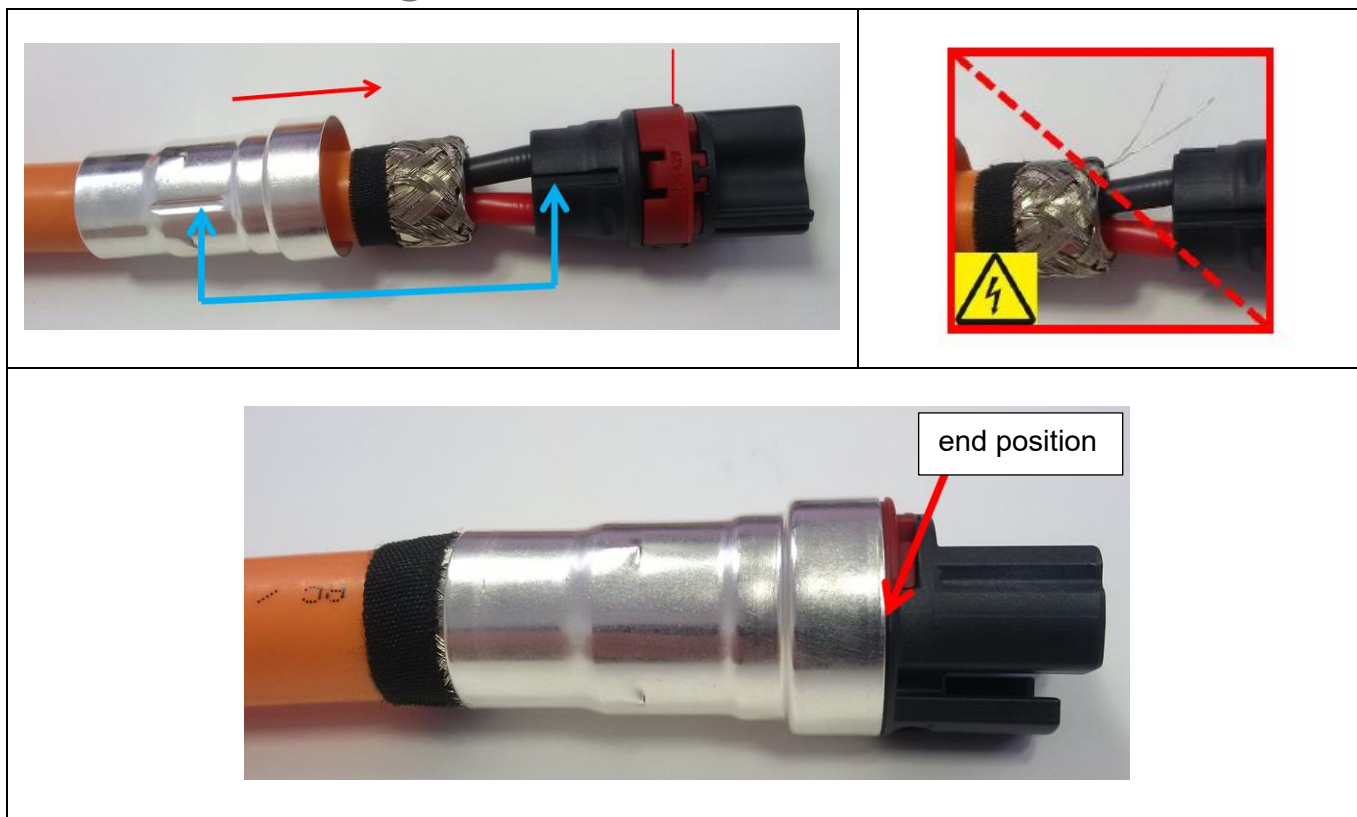


Used strain relief	L5.1 (mm)
709-841-501	40.9 ± 1
709-841-502	
709-841-503	
709-841-522	
709-841-511	38.9 ± 1
709-841-512	
709-841-513	
712-492-502	
713-492-503	

This document is not subject to change service!



4.9 Push shielding sleeve onto contact carrier



- The shielding sleeve needs to be assembled onto the contact carrier in the correct position. It can only be turned by 180° C.
- Do not damage the shielding sleeve during the assembly.
- The shielding sleeve must be assembled until the end position is reached.
- The fixing tape must 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 must be clarified with each OEM.



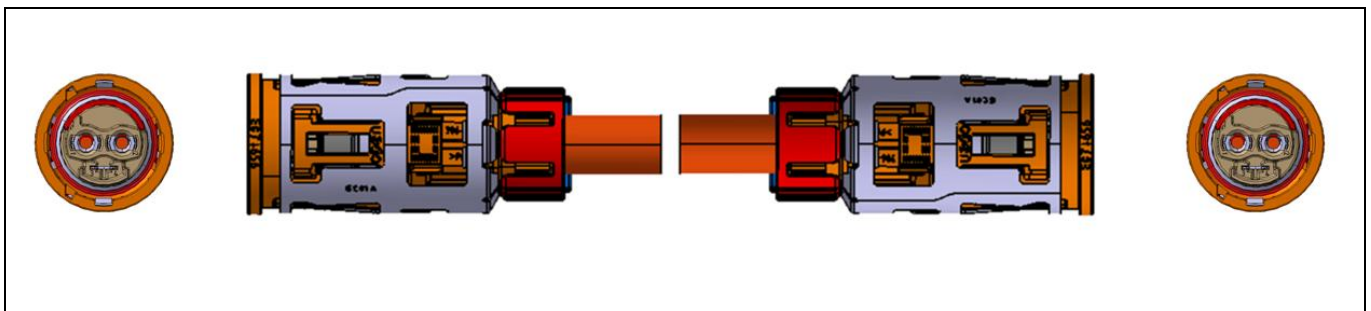
Risk of insulation failure!

4.10 Rotative orientation

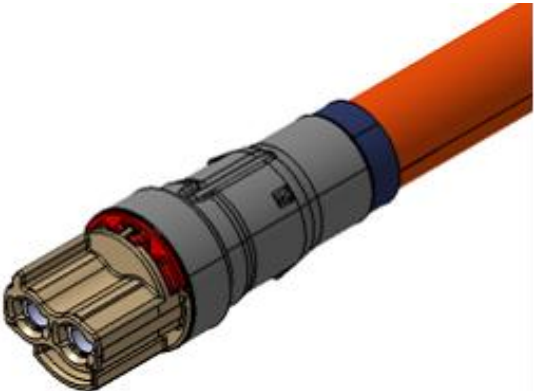

Rotational alignment is used when there is a connector on both sides of the cable, and they must be aligned with each other.

Only applicable when one of the following strain relief is used:

- 709-841-511
- 709-841-512
- 709-841-513
- 712-492-502
- 712-492-503



Before the shield crimping, the alignment of the connector can be corrected by the following options:

The assembled contact carrier and shield sleeve can be rotated in relation to the wire.	The wire can be rotated in relation to the contact carrier.
	

A maximum rotation of up to $\pm 180^\circ$ is possible and cannot be exceeded.

This twisting results in an overturning of the single wires, which leads to a reduction in length between the contact carrier and the strain relief.

The moveability must be ensured at least on one side (by the contact carrier or cable) to enable the length reduction.

This document is not subject to change service!

4.11 Press shielding sleeve

- **Pressing device**

For the process of positioning and pressing of the stress relief and the shielding sleeve, the following pressing device of the company “Schäfer” can be used:

Name of the device: Pressing device HPS40-2
Article number: 188/16

Based on the processing guidelines of Hirschmann Automotive, the device was designed and produced. The details of the commissioning, handling and the process guideline of the device can be requested directly at the supplier:

Schäfer Werkzeug- und Sondermaschinenbau GmbH
Dr.-Alfred-Weckesser-Str. 6
76669 Bad Schoenborn-La, Deutschland
Tel: +49 7253 9421-0
Fax: +49 7253 9421-94
www.schaefer.biz

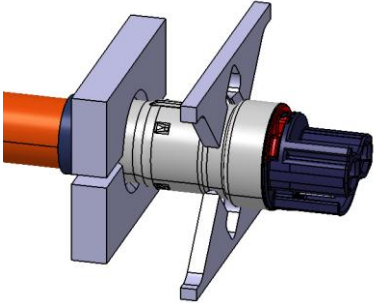
The commissioning of the pressing device must be done through the manufacturer. The manufacturer is at liberty to use a pressing device of his choice. The pressing process must meet the pressing and positioning data which are specified on the following pages.

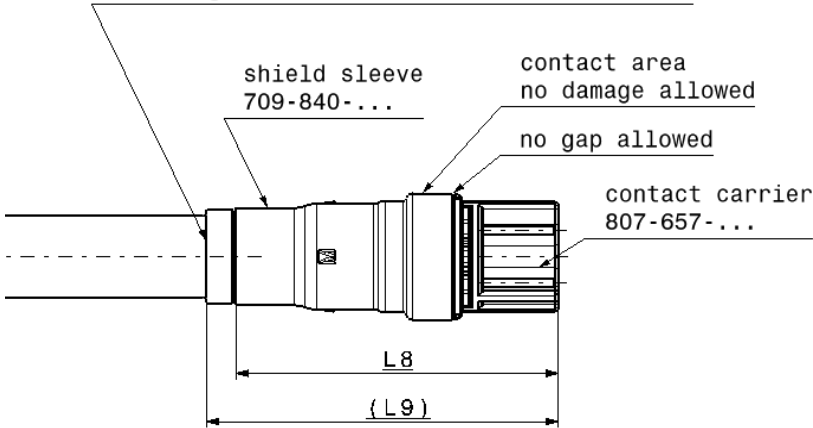
This document is not subject to change service!



- **Pressing data**

- a) The contact holder incl. the female contacts must 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 must stick out of the end of the shielding sleeve.
- c) it must be ensured that there is no damage or deformation in the contact area.
- d) The measurements on the following drawing, must 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)

<p>no loose or stick out single strands of the shield behind the fixing tape allowed. The single strands have to be removed.</p> 	L8 = 49.7 ± 0.4
	L9 = max. 57.9

The dimension L8 and L9 are just for information. The dimensions are caused from the dimension L1, L4 and the EVS-100068 or L4.1 and L5.1.

Do not damage the following parts during the pressing process.

- Insulation of the wire
- Insulation of the single wires
- Stress relief
- Shield sleeve
- Shield strands of the wire

This document is not subject to change service!

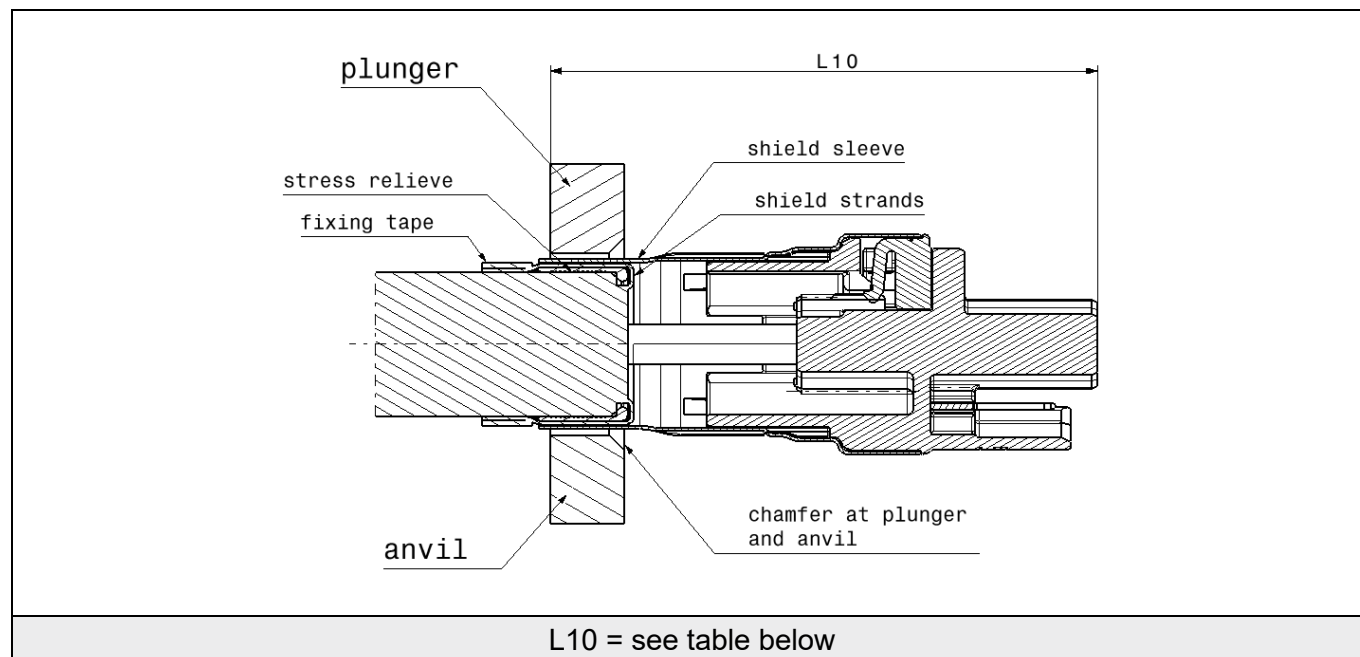


4.11.1 Shield pressing by two half-shells

- **Embossing position**

The exact geometry of the plunger and anvil is given. The position of the plunger and the anvil must be reversed to the front plane of the contact holder. The chamfer at the plunger and the anvil must 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.



Used strain relief	L10
709-841-501 709-841-502 709-841-503 709-841-522	48.7 ± 0.1
709-841-511 709-841-512 709-841-513 712-492-502 712-492-503	46.5 ± 0.1

This document is not subject to change service!



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

Geometries vary depending on which components have been used and which application the harness are used for.

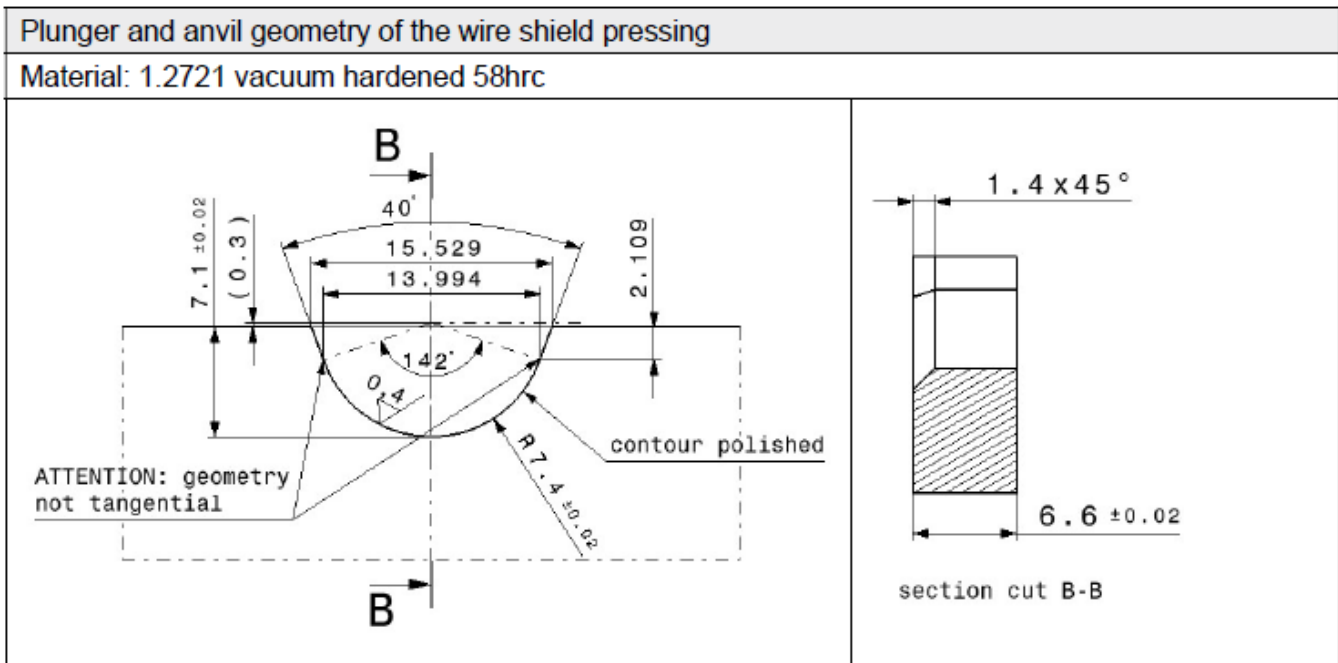
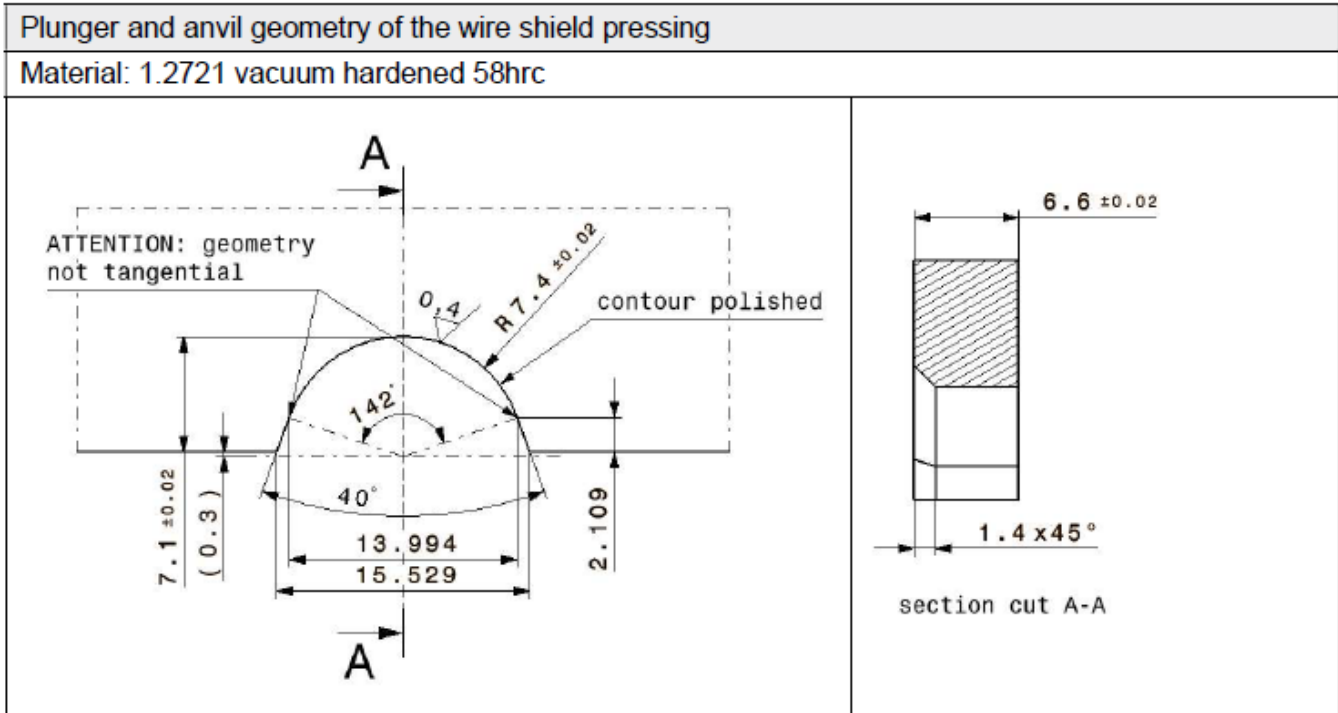
Detailed List which plunger and anvil geometry has to be used follows:

Used strain relief	Plunger and anvil geometry
709-841-501 709-841-511	1 OR 2
709-841-502 709-841-503 709-841-512 709-841-513	1
709-841-522 712-492-502 712-492-503	2

This document is not subject to change service!



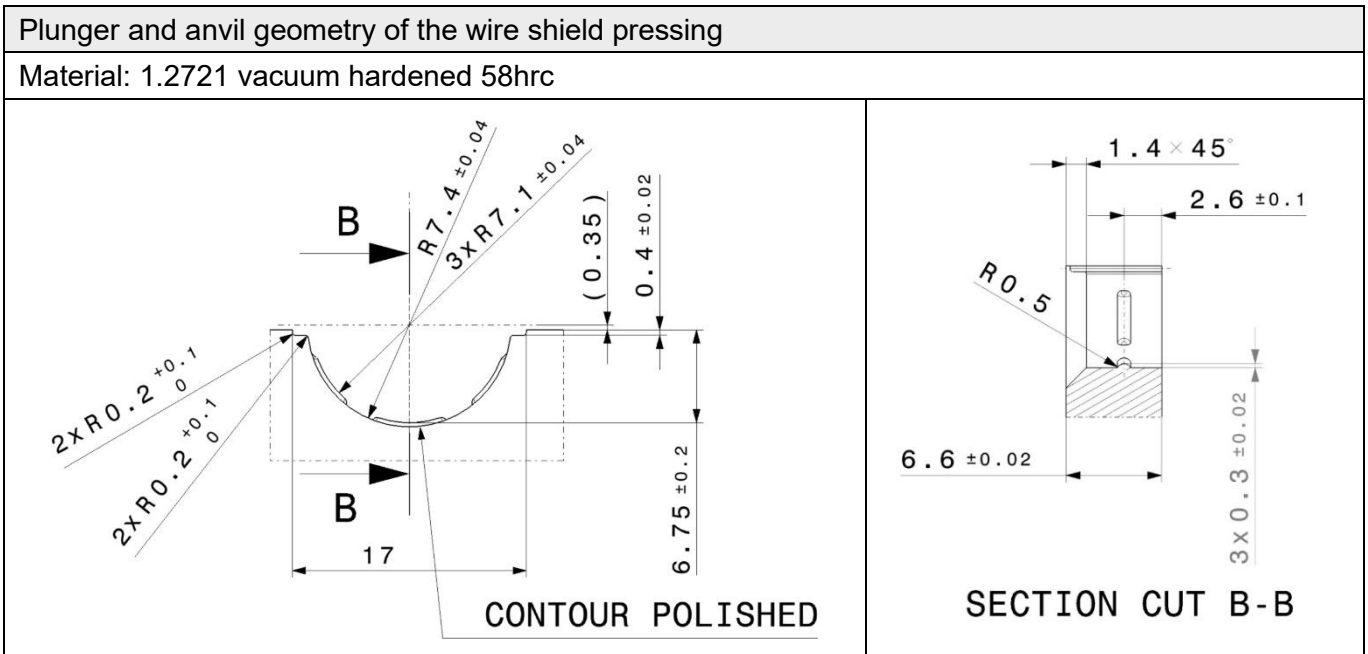
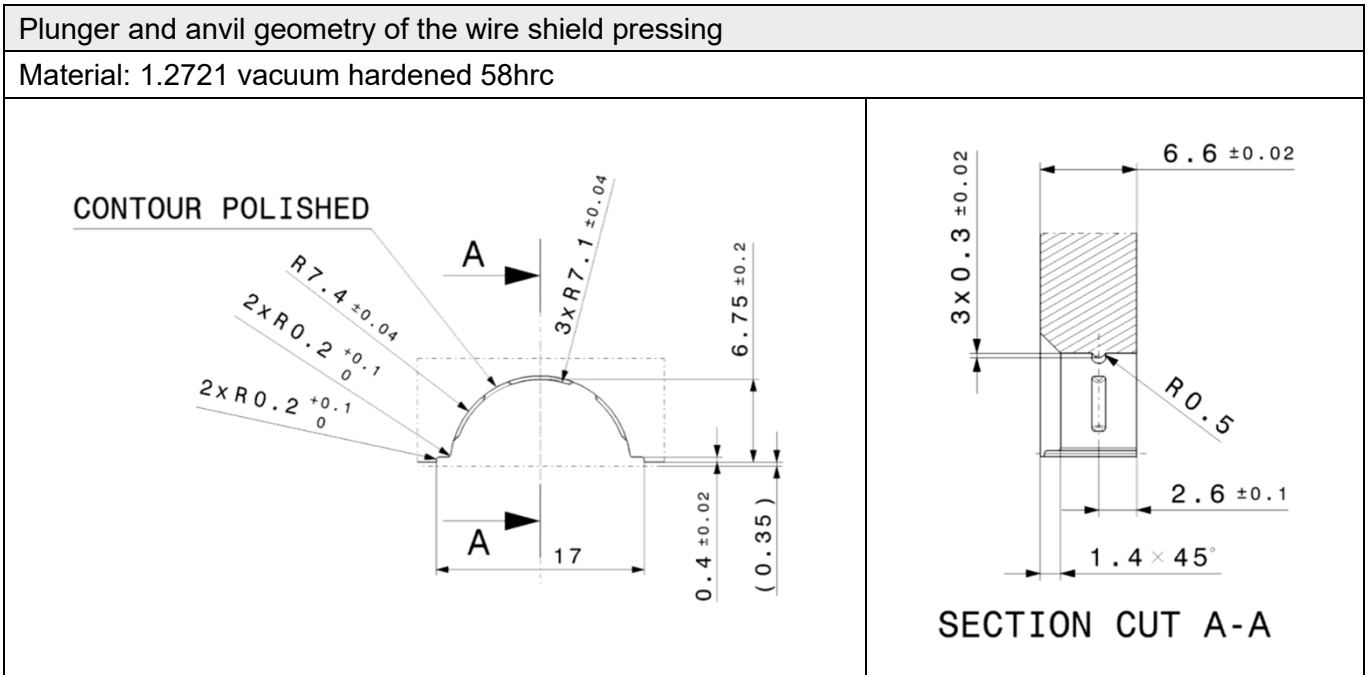
- Plunger and Anvil Geometry 1 of the wire shield pressing



This document is not subject to change service!



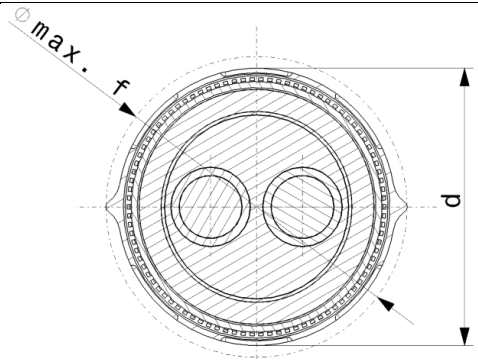
- Plunger and anvil geometry 2 of the wire shield pressing



This document is not subject to change service!



- **Embossing height**



Schnittansicht A-A
Maßstab: 2:1

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

Measurement “d” in mm		
	L1	F2
2.5 mm ²	14.57 ± 0.15	14.57 ± 0.15
4.0 mm ²	14.57 ± 0.15	14.57 ± 0.15
6.0 mm ²	14.57 ± 0.15	14.57 ± 0.15

During the pressing process a fold appears on two sides.

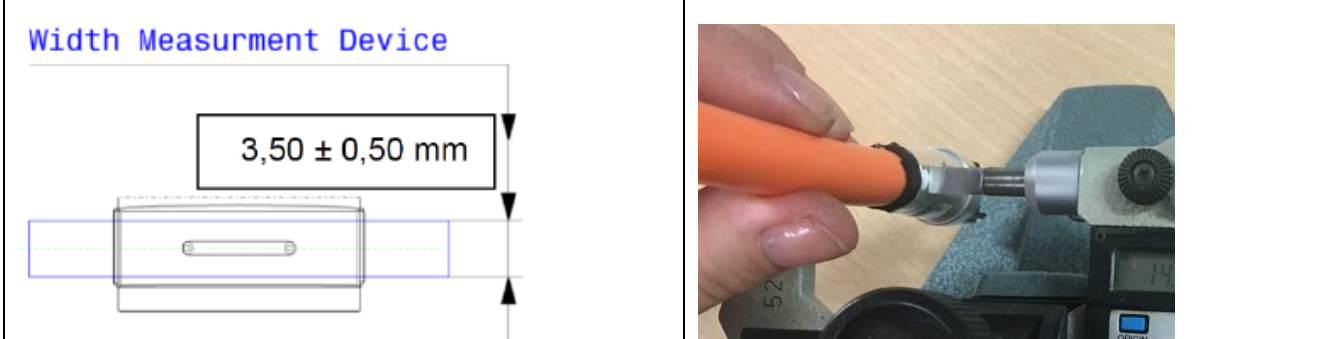
This fold is not allowed to be bigger than the diameter $\varnothing f = 16.4 \text{ mm}$ refer to the centerline of the wire. In the area of the fold the material of the shield sleeve is not allowed to be cracked.

- **Check measurement of the embossing height “f”**

To check the dimension “f”, a gauge with an inner diameter of 16.40 mm must be used. Alternatively, a caliper can also be used for checking.

To check the dimension “d”, the height needs to be measured acc. to the drawing. All dimensions have to be within the given tolerance.

The measuring of the embossing height “d” must be done with a suitable measuring device. (e.g. Micrometer or caliper, measuring range: 0-25 mm) The gauge for the measurement must have a width of $3.50 \pm 0.50 \text{ mm}$. The measurement must be taken symmetrically to the embossing position.



Width Measurement Device

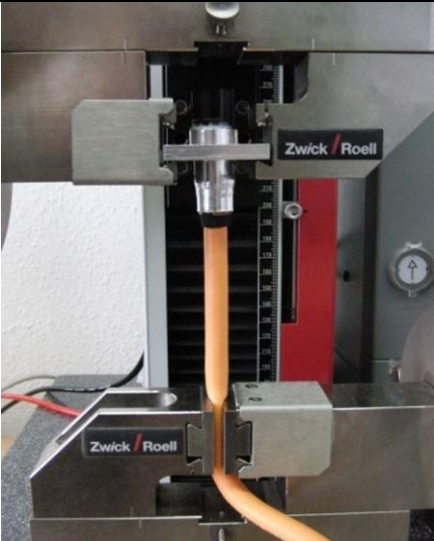
3,50 ± 0,50 mm

This document is not subject to change service!

- **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 70 mm. The connector must be fixed on the shield sleeve at the transition between the largest and the second largest diameter.

HCT4 terminals must not be installed in the test specimens, to test the shield pressing only. In this state, the figure in the table must be reached for following used components and application.

	Used strain relief	Pulling force
	709-841-501 709-841-502 709-841-503 709-841-511 709-841-512 709-841-513	$\geq 120 \text{ N}$ L2 F3
	709-841-522 712-492-502 712-492-503	$\geq 300 \text{ N}$ L2 F3

For this connector, a pull-off force of 120 N applies only to the variants specified accordingly. This requirement is based on the original specification and may deviate from generally applicable standards, as it was initially defined for the HPS40-2 female connector.

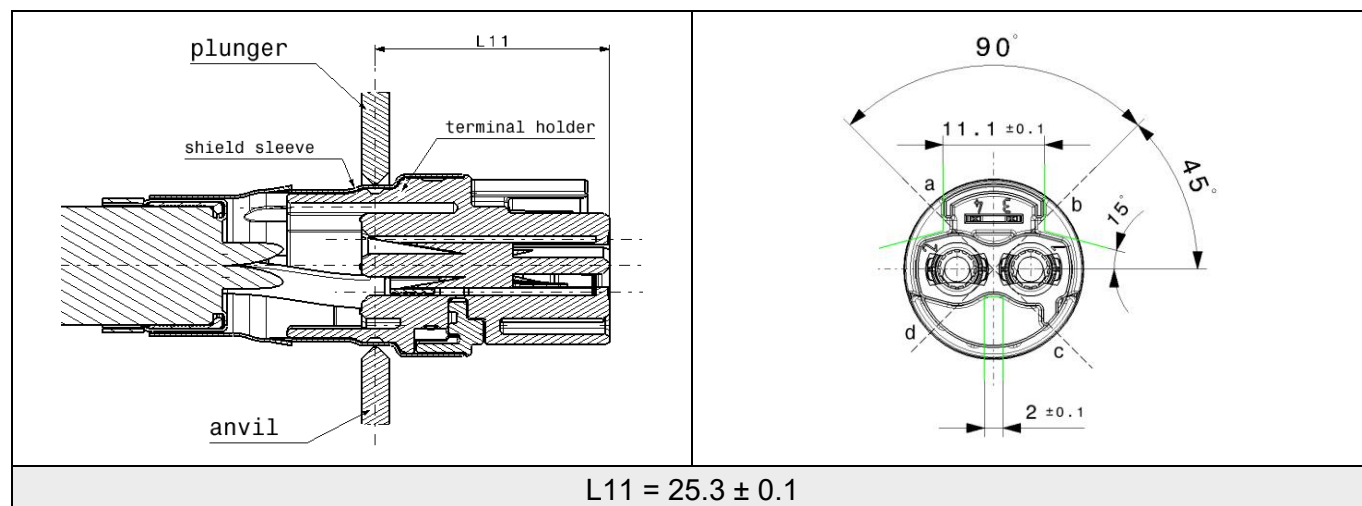
For all other applicable variants, the pull-off force requirement is increased to 300 N as defined above.

This document is not subject to change service!



4.11.2 Pressing contact carrier

- **Embossing position**



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 must 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.

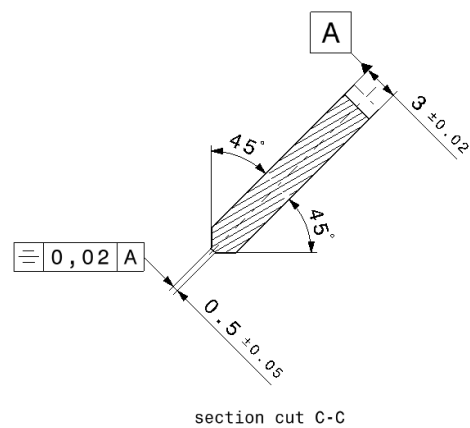
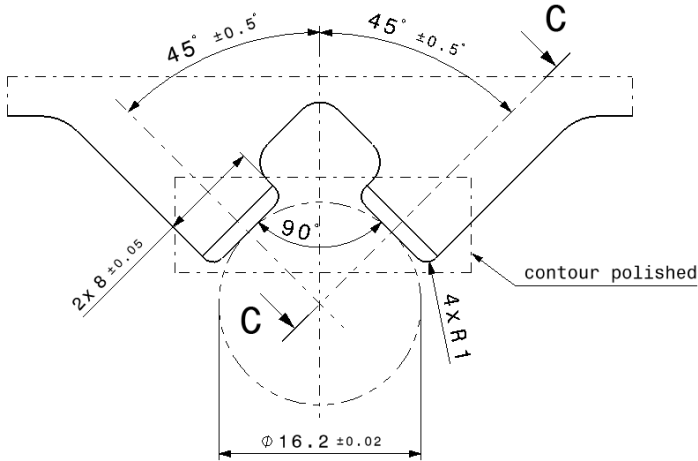
This document is not subject to change service!



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

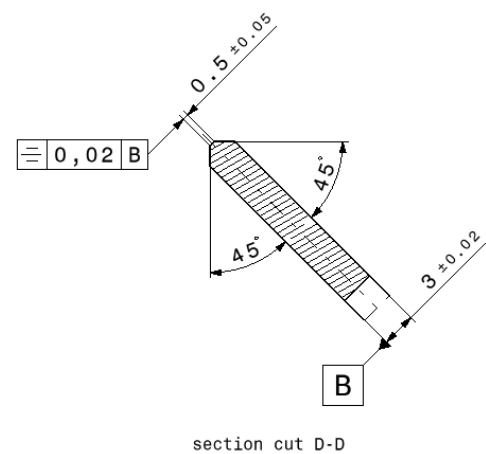
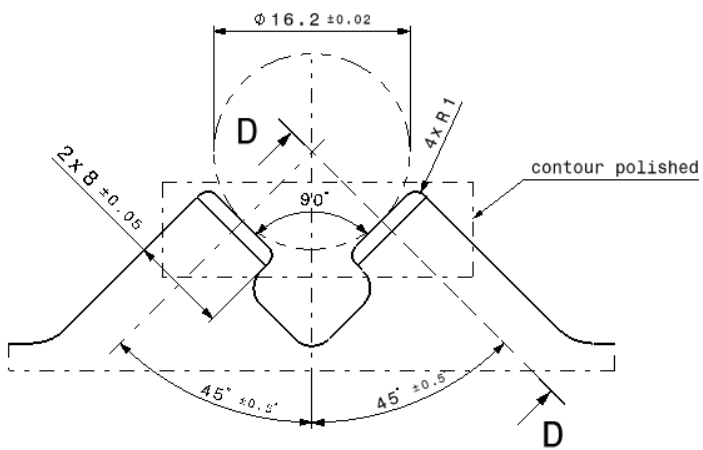
Plunger and anvil geometry of the terminal holder pressing

Material: 1.2721 vacuum hardened 58hrc



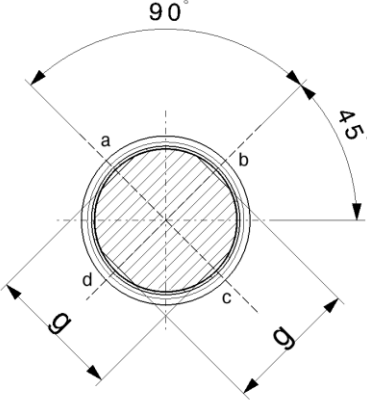
Plunger and anvil geometry of the terminal holder pressing

Material: 1.2721 vacuum hardened 58hrc



This document is not subject to change service!

- **Embossing height “g”**


	<p>The dimension “g” results from the embossing in between a-c and b-d.</p> <p>The embossing must be done at the same time.</p>
---	---

The dimension g is defined as following:

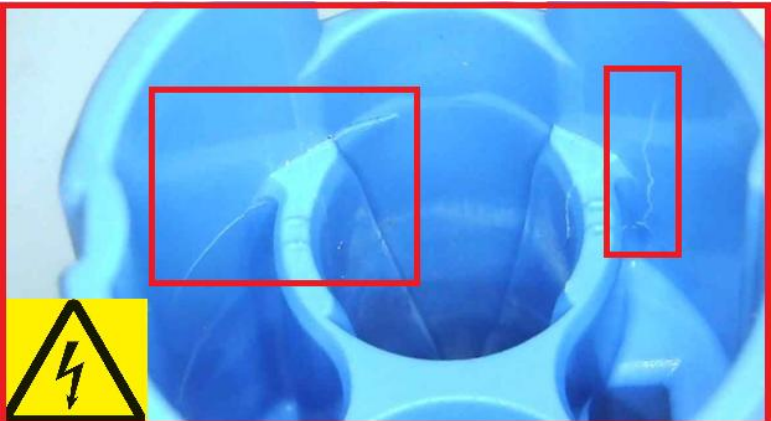
(g = 16.40 mm ± 0,1 – valid for applications already in series production)

g = 16.50 mm ± 0,1 – valid for all new applications

For every new application of the HPS40-2 female connector it must be used a embossing height of 16.5 mm ± 0,1mm for the dimension “g”.

	<p>Risk of insulation failure!</p>
---	---

The embossing of the shield sleeve must not cause any damage to the supporting terminal holder part. It's not allowed to go below the min. limit of the dimension “g”.

<p>Possible error image for over pressing (stress marks at the plastic part):</p>	
--	--

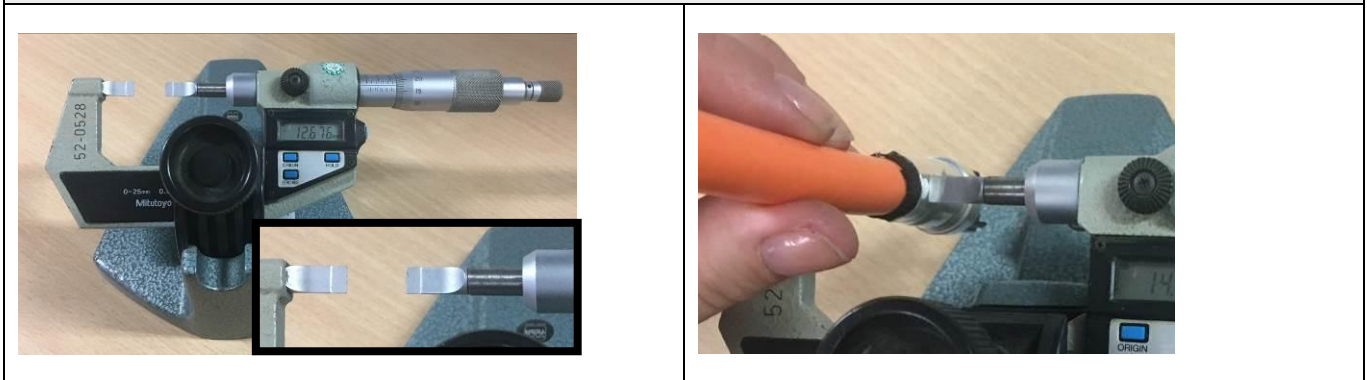
This document is not subject to change service!

- **Check the measurement of the embossing height “g”:**

To check the dimension “g”, the height needs to be measured acc. to the drawing.
All the dimensions must be within the given tolerance.

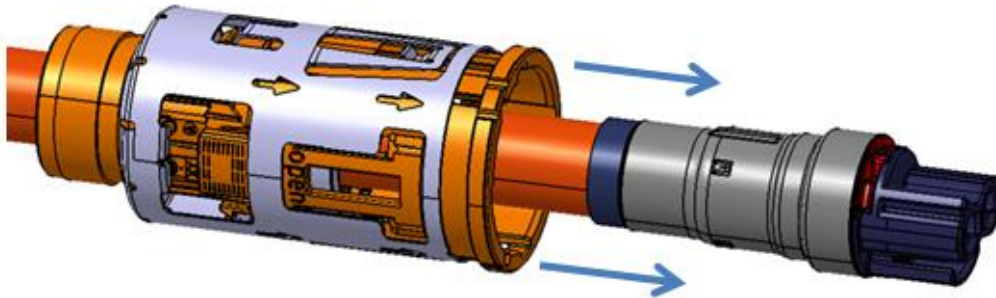
The measuring of the embossing height must be done with a suitable measuring device.
(Micrometer, measuring range: 0-25 mm).

The thickness of the measuring blades must be lower than 0.3 mm.



4.12 Positioning of the female locking device

The female locking device must be assembled power assisted, and in the correct position.



For the positioning and the assembling process of the female locking device unit onto the wire unit, the assembling device (Hand device) of the company “WKM” can be used.

Name of the device: Assembling device HPS40-2
Article number: HPS40-2

Based on the processing guidelines of Hirschmann Automotive, the device was designed and produced. The details of the commissioning, handling and the process guideline of the device can be requested directly at the supplier: Each manufacturer is responsible of the commissioning of the pressing device.

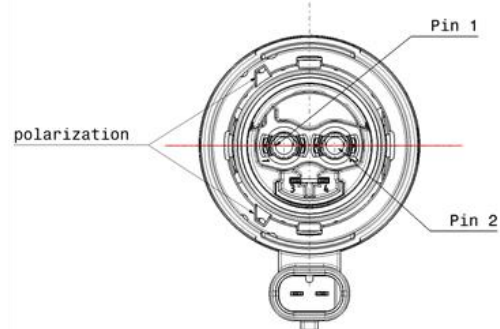
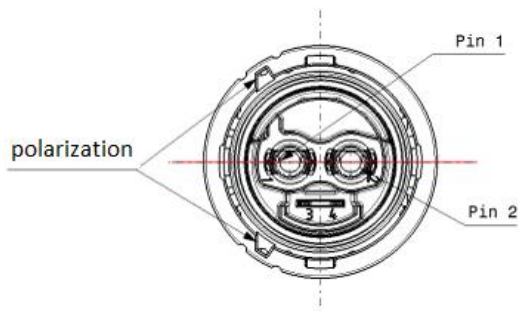
WKM - Maschinenbau GmbH
Oberes Ried 15
A-6833 Klaus
Tel. +43 5523 / 54907

The commissioning of the pressing device must be done through the manufacturer. The manufacturer is at liberty to use a pressing device of his choice. The assembling process must meet the assembling data which are specified on the following pages.

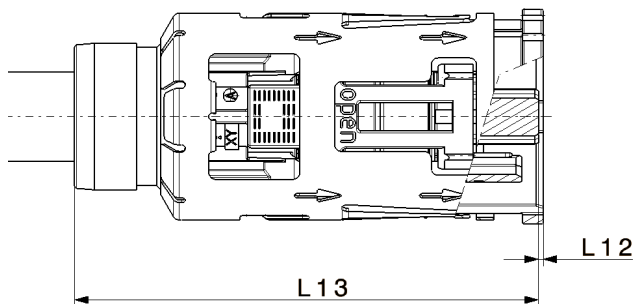
This document is not subject to change service!



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 centre of Pin 1 and Pin 2. Also, the polarization must be on the side of Pin 1.

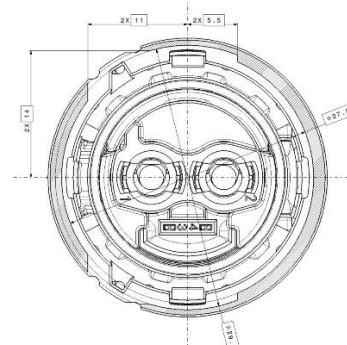
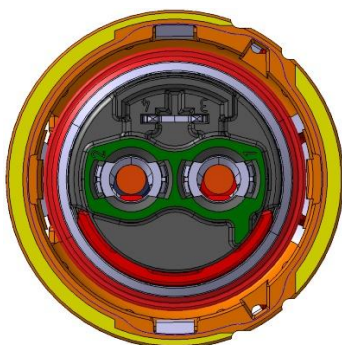


The locking sleeve must be assembled onto the shield sleeve force-assisted until the dimension L12 is reached. The reference on the terminal holder is in the middle between Pin 1 and Pin 2. The dimension L13 is only for checking purposes. During the assembling process, there are no damages allowed on 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.



$L12 = 0.75 \pm 0.15$ **F1**, valid for all new applications
($L12 = 0.7 + 0.2/-0.1$, valid for all applications, which are already in serial production)

$L13 = 66.7$ (Info)

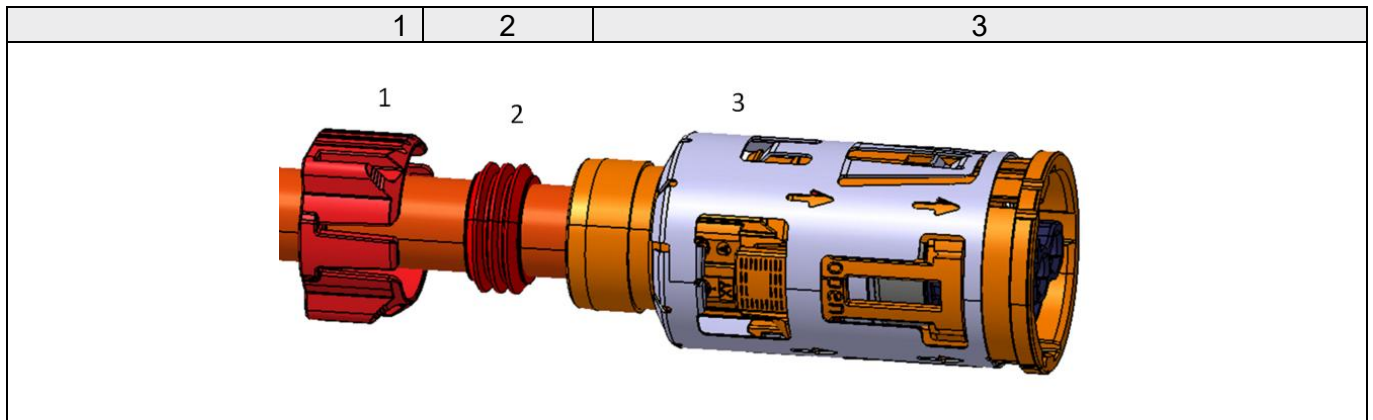


The adjustments in the processing specification with the status 08/ 2023 must be considered for new applications, but not for existing applications.

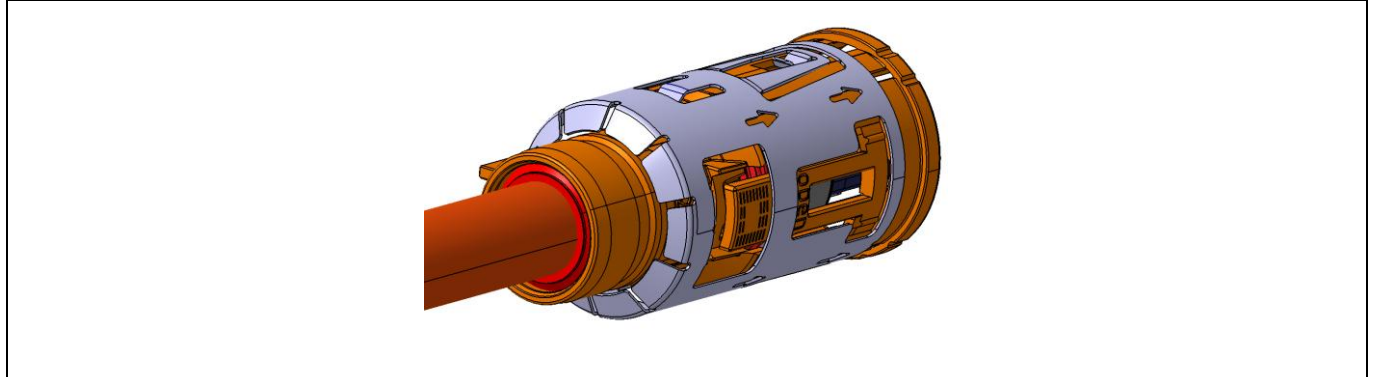
This document is not subject to change service!



4.13 Assemble seal and cover cap



Push seal (2) into the female locking device unit (3)

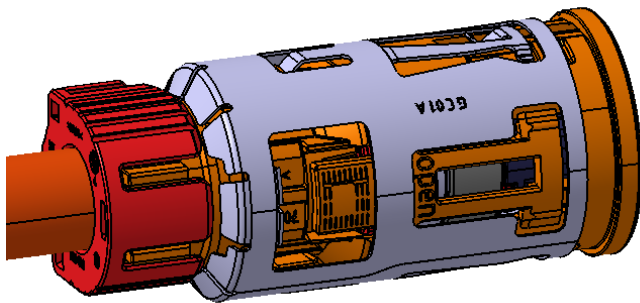
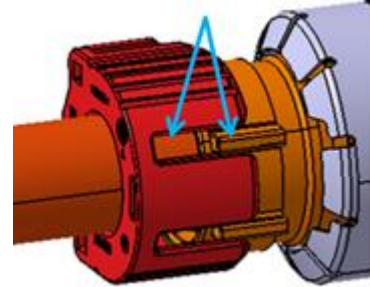
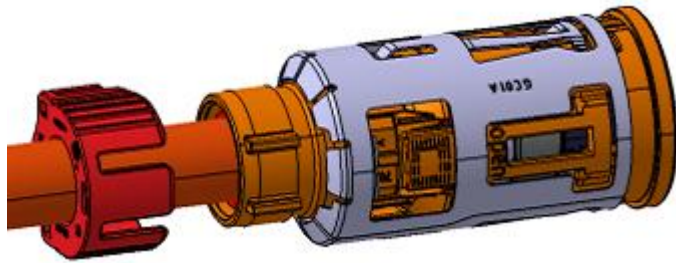


The cable seal can be slightly widened during assembly. It is possible to move the seal with the cover cap (1) on the wire, but care must be taken that the seal does not twist and is not pinched or damaged.

This document is not subject to change service!

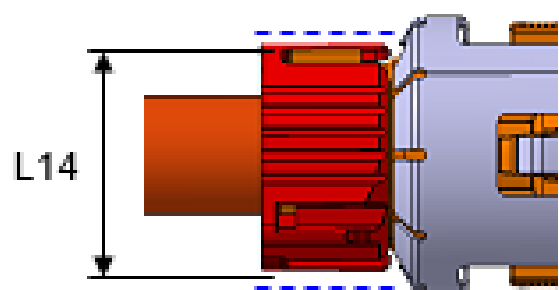
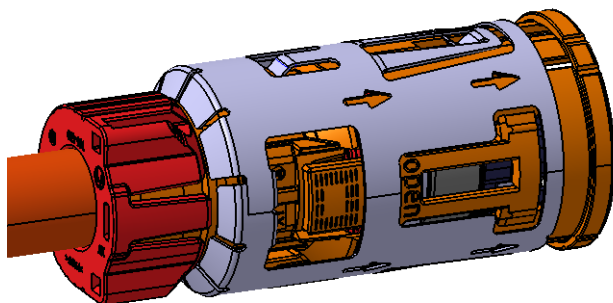


Snap the cover cap (1) into the recess of the female locking device unit (3) and consider the polarization.



Cover cap on end position

end position (locked)



Do not damage the cover cap (1) or the seal (2) during assembly. If the cover cap is in end position the locking hooks on both sides must be about straight on the female locking device unit. They are not allowed to stay in a deflected position. They must be within dimension L14 = max. 25 mm

If the 90° angled cap is used, the process steps of the cover cap (1) are omitted.

This document is not subject to change service!



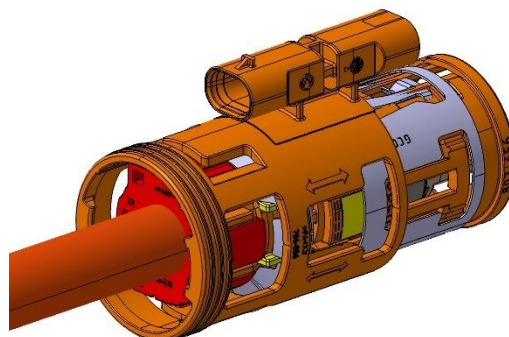
5 Processing steps (CPA Housing)

5.1 Positioning of the CPA Housing

Only applicable if following Female Housing were used:

- 807-656-501
- 807-656-511
- 807-656-521
- 807-656-522

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



For the positioning and the assembling process of the female locking device unit onto the wire unit, the assembling device (Hand device) of the company “WKM” can be used.

<u>Name of the device:</u>	Assembly device horizontal positioning assembly group
<u>Article number:</u>	216331_V01
<u>Tool insert:</u>	FAS HPS40-2 CPA

Based on the processing guidelines of Hirschmann Automotive, the device was designed and produced. The details of the commissioning, handling and the process guideline of the device can be requested directly at the supplier: Each manufacturer is responsible of the commissioning of the pressing device.

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

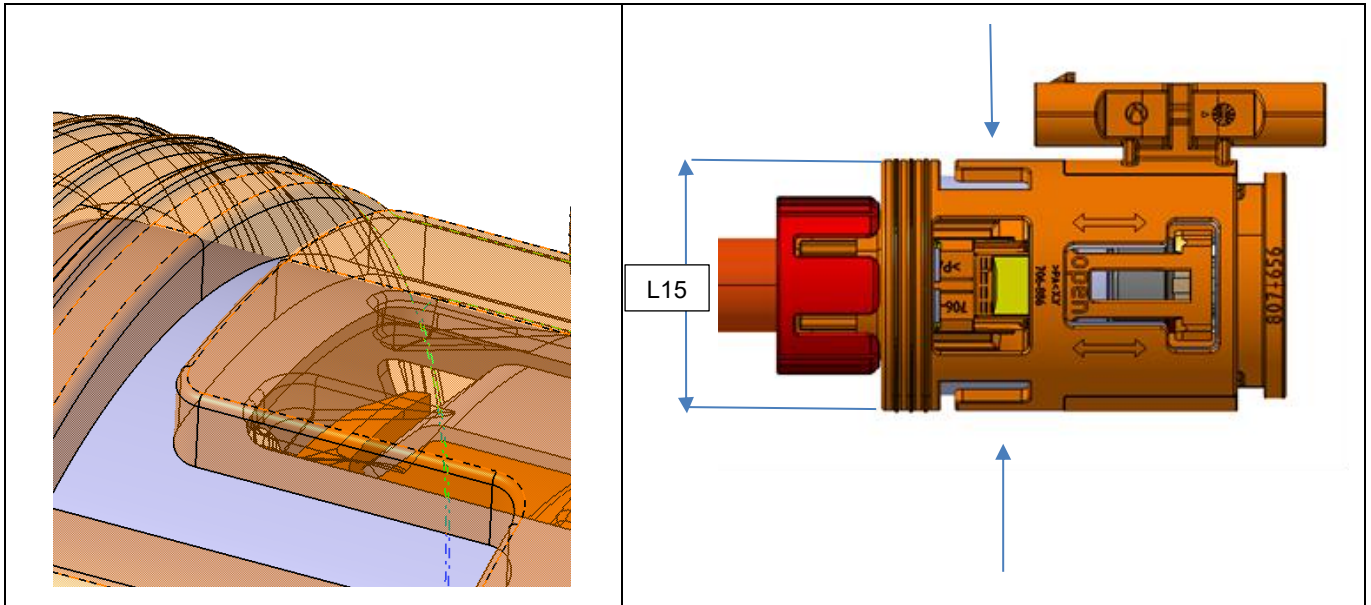
The commissioning of the pressing device must be done through the manufacturer. The manufacturer is at liberty to use a pressing device of his choice. The assembling process must meet the assembling data which are specified on the following pages.

This document is not subject to change service!



HIRSCHMANN
AUTOMOTIVE

When assembling the CPA housing, ensure that the metal CPA (shown in grey in the image) is properly supported. This is necessary to prevent any pre-damage to the housing, which could result in reduced retention force of the CPA in its pre-lock position.



If the CPA Housing is in end position at least one of the locking hooks must about straight on the female locking device unit. They are not allowed to stay in a deflected position. They must be within the dimension L15 = max. 35.0 mm. Under certain circumstances (Tolerances) it needed to press on the locking hooks by hand.

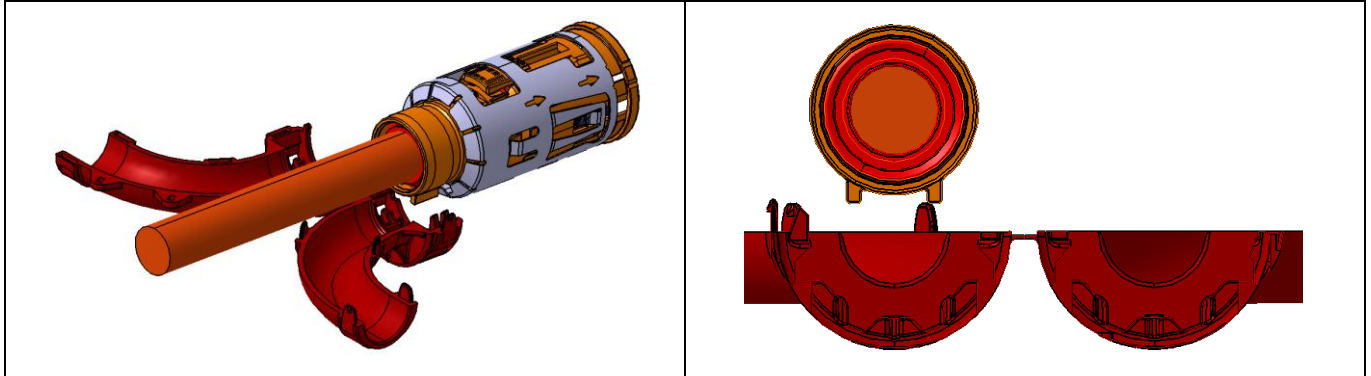
Each manufacturer is free to carry out this work step in an earlier point in production. Appropriate actions for handling the component and the influence on the equipment of previous work steps must be considered.

This document is not subject to change service!

6 Processing steps (optional parts)

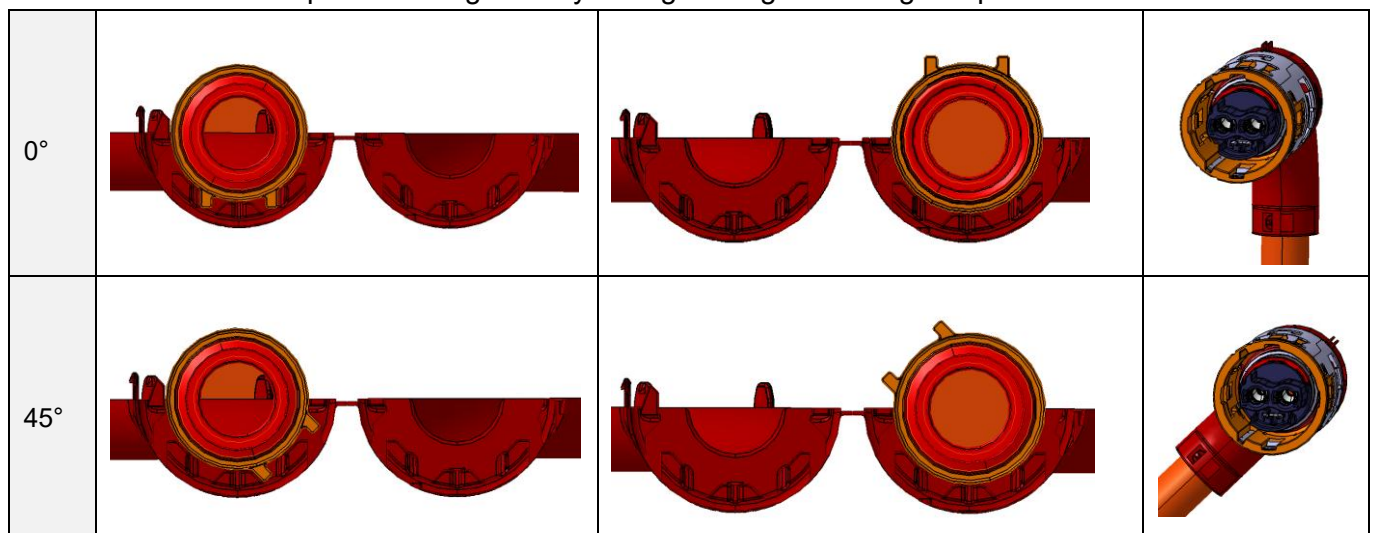
6.1 Assemble 90° angled cap

This process steps are only necessary if the 90° angled cap is used instead of the cover cap.



The orientation of the wire direction will be fixed with the polarization geometry of the connector housing. The wire direction of the angle cap is conceived to be set in 45° angles during the assembling process. The polarization geometry should be placed in one side of the half-shell to get a pre orientation. (left side) It is possible to place the connector into the angle cap without pre orientation (right side) but be aware during closing that the polarization geometry finds the correct position.

The position -90° can only be placed in one side, because on the other side there will be a collision of the half-shells with the polarization geometry during closing of the angle cap.



This document is not subject to change service!

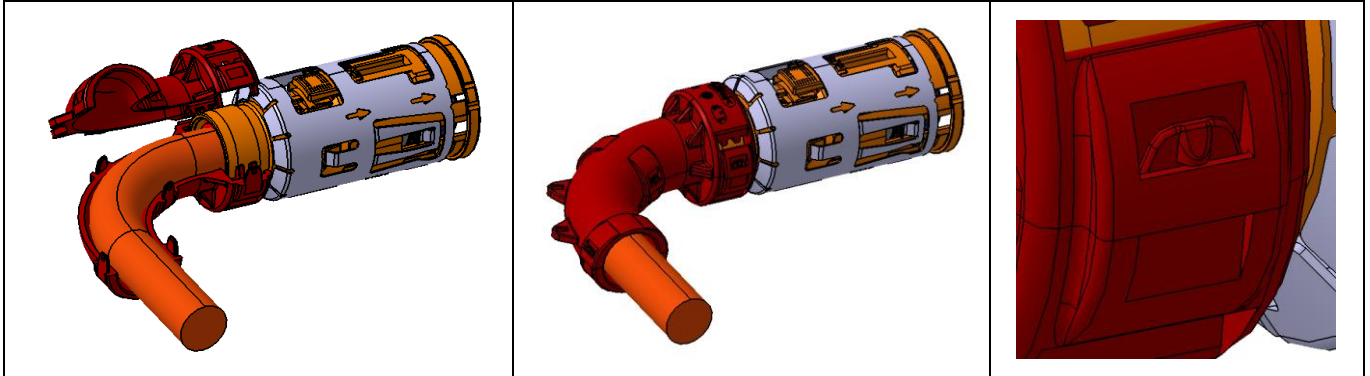


90°			
135°			
180°			
-135°			
-90°			
-45°			

This document is not subject to change service!



Bend the wire for 90° and insert it into the half-shell of the angled cap.

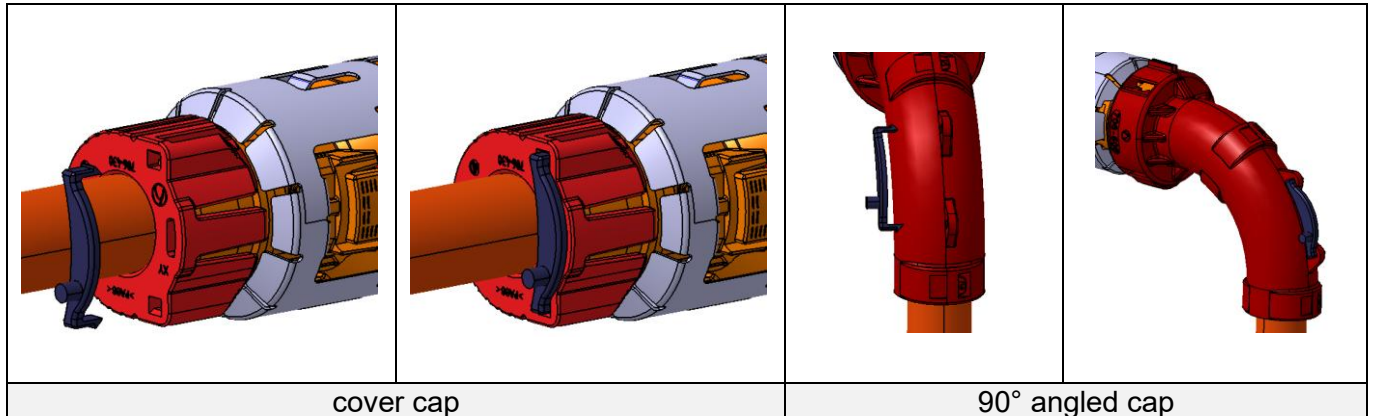


During closing the angled cap, make sure the wire insulation material doesn't get damaged. Take care that only the multi core cable is allowed under the angled cap. No Tape, protective tube, or other additional parts is allowed. All five latching hooks must be locked. Once the angled cap is closed, it is not possible to change the angle anymore.

This document is not subject to change service!

6.2 Assemble coding clip

If the customer is requesting an additional coding identification, a coding clip can be assembled onto the cover cap or the 90° angled cap. The coding clip has the same colour as the contact holder and is used for a simpler identification of the plugs coding.



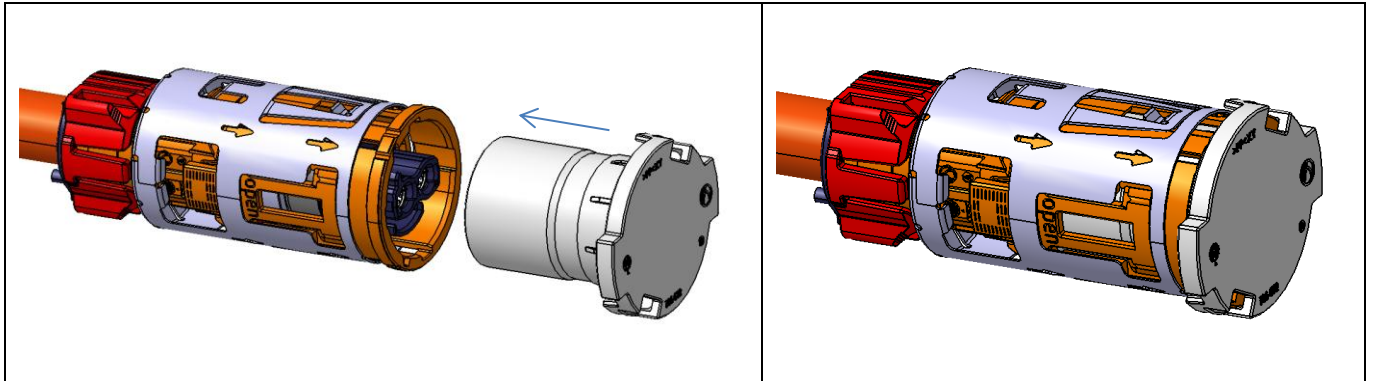
Ensure that the coding / color of the coding clip matches the coding / color of the built-in contact carrier. Therefore bars are attached to the coding clip according to a binary code which can be checked mechanically.

The design of the bars can be found in the individual drawing of the coding clip.

This document is not subject to change service!

6.3 Assemble transport protection cap

If the customer is requesting an additional transport protection of the connector interface, a transport protection cap can be assembled onto the connector housing.



Insert the transport protection cap until both locking elements snap over the front collar of the connector housing. It is possible to turn the transport protection cap 360° during and after the assembling.

6.4 Stacking of produced harnesses

For an orderly and controlled stacking of the harnesses to quantitatively free defined bundles.

This document is not subject to change service!

7 Technical information

7.1 General requirements

Damage on the single components is not allowed during the whole production process.

7.2 Technical cleanliness

In general, pay attention to the cleanliness on the connector and inside of the connector. Metallic particles generated during the assembly process, must be removed with a suitable device. Inside the connector and on the connector, there are no metallic particles > 1,000 µm allowed.

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

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

BMW-specific requirements according to QV11111 for assembled connector can be seen in the following table. The surface information can be found in the customer drawings.

Technical cleanliness acc. to QV11111			
HV system (assembled final product without cable)			
Requirement class (t.b.d. -> BMW manufacturer)			
Reference size A (1,000 cm ²)			
Number of allowable particles by length size class			
		NOT shiny metallic	Shiny metallic
G	150 - 200 µm	-	-
H	200- 400 µm	1,200	1,200
I	400 – 600 µm	130	130
J	600 – 1,000 µm	60	15
K	1,000 – 1,500 µm	4	-

It is also important to protect the component from further contamination during transport. Appropriate packaging must be provided. A protective cap is available from Hirschmann Automotive as an Option.

This document is not subject to change service!

7.3 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 GmbH. 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

Concept of automation HPS40-2

7.4 Sample preparation for shielding retention force

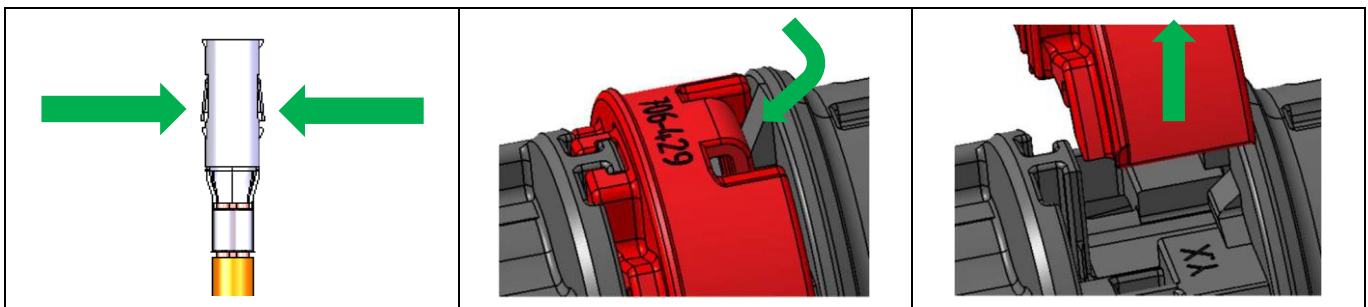
This chapter details the test setup in connection with **Chapters "4.10.1 Error! Reference source not found."** and **Chapters "5.11.1 Error! Reference source not found."** for the HPS40-2 2+2 female connector MCC 2.5 mm², HPS40-2 2+2 female connector MCC 4.0 mm² and HPS40-2 2+2 female connector MCC 6.0 mm².

To check the shielding retention force, the test specimens must be prepared accordingly. If production without HCT4 female terminals is not possible, additional manipulation options are described below. It is important to note that the manipulated connectors are to be used exclusively for testing purposes and must not be used in vehicles!

7.4.1 Manipulation of primary and secondary locking

This method of manipulation is applicable if production without HCT4 female terminals is not possible. For this, the locking hooks of the HCT4 female terminal must be bent inwards, for example with a screwdriver. Additionally, the locking hook of the secondary lock must be bent inwards and removed, as shown in Figures.

Representation 2.5 mm², 4.0 mm² & 6.0 mm² MCC manipulation of primary and secondary locking (Sample preparation for shielding retention force)

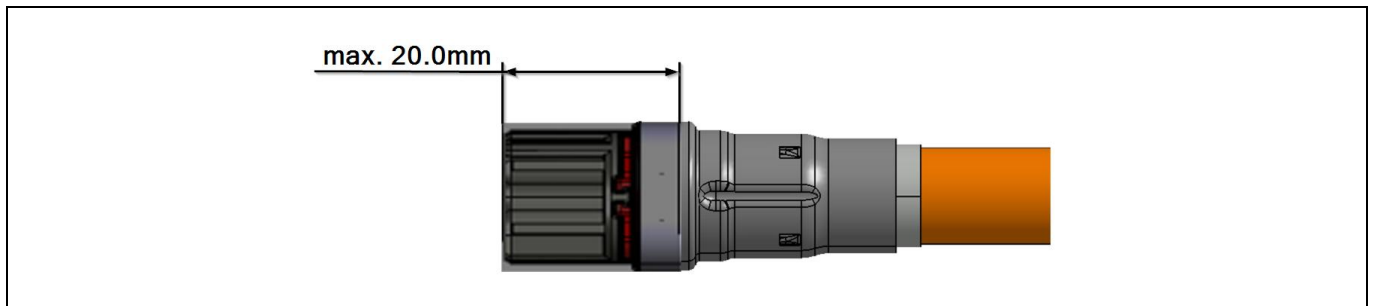


This document is not subject to change service!

7.4.2 Removal of HCT4 female terminals after shielding crimping

This method of manipulation is applicable if production without HCT4 female terminals is not possible and the manipulation method in **Chapter “8.4.1 Manipulation of primary and secondary locking”** cannot be implemented either. In this case, the gray-marked area, as shown in below **Error! Reference source not found.**, must be removed, for example by cutting.

Representation 2.5 mm², 4.0 mm² & 6.0 mm² MCC removal of HCT4 female terminals after shielding crimping (Sample preparation for shielding retention force)





8 Change of documentation

Version	Description	Change date	Editor
1	First edition	08/ 2015	Breuss L.
2	Update made for the serial design	03/ 2016	Breuss L.
3	English version added	09/ 2016	Shaw S.
4	Update shield pressing and measuring devices	04/ 2017	Breuss L.
5	Correct number of Kroschu cable	05/ 2017	Breuss L.
6	Added Kroschu cable typ	09/ 2017	Breuss L.
7	Dimension d and g corrected	11/ 2017	Breuss L.
8	90° angled cap and transport protection cap added	03/ 2018	Breuss L.
9	Connector Rotation angle added and locking of cover cap specified	11/ 2018	Breuss L.
10	In-Line version added & savety ring specified	02/ 2019	Bas Ü.
11	In-Line Version reorganized, Product version specified precisely,	06/ 2019	Bas Ü.
12	Angled cap and torsion specified	03/ 2020	Breuss L.
13	Added Coficab cable typ	05/ 2020	Breuss L.
14	added stress relief with rotative orientation= not approved	05/ 2020	Shaw S.
15	rotative orientation specified precisely, general comments adapted= not approved	01/ 2021	Bas Ü.
16	Comments and part usage for rotative orientation adapted= not approved	04/ 2021	Bas Ü.
17	chapter 2.3/4.7/5.7: NBKBE wire added; chapter 3.1: NBKBE wire added; production location of validated wires added; chapter 3.8: Female locking device unit OEM specific HA part number added, 807-652-502 removed; chapter 4.4/5.4: definition of foil overlap adapted/added; chapter 4.5/5.5: Dimension L4 - addition "measurement in straightened length" added; chapter 4.9.1/5.10.1: Dimension L10 – addition/definition as tool related dimension; chapter 4.9.2/5.10.2: Dimension L11 - addition/definition as tool related dimension; chapter 4.9.2/5.10.2: controll measurement of the embossing height g - max. thickness of the measuring blades changed to 0,3mm;	02/ 2022	Kleiner T.

This document is not subject to change service!



18	Chapter 4.5 / 5.5: added dimension L4.1 Chapter 4.6 / 5.6: dimension L6 as info-dimension in brackets Chapter 4.7 / 5.7 : added dimension L5.1 Chapter 4.9 / 5.9 : dimension L9 as info-dimension in brackets	03/ 2022	Campehl F.
19	H+S wire added Hot annealed Shield Sleeve for H+S wire added Chapter 4.9.2 Crimping of the shielding by two half-shells for H+S wire added Chapter 5.10.2 Crimping of the shielding by two half-shells for H+S wire added Coficab wire added	06/ 2022	Feldhofer V.
20	Chapter: 5.9.3: Stamping height g changed from 16.40±0.1mm to 16.50±0.1 for new applications. Additional text and picture "Risk of insulation failure" added. Chapter: 5.10.3: Stamping height g changed from 16.40±0.1mm to 16.50±0.1 for new applications. Additional text and picture "Risk of insulation failure" added.	09/ 2022	Kleiner T.
21	Chapter Customer releases added; Changed cleanliness requirement and added BMW specific requirement based on surface reference; BMW Number and special characteristics added;	10/ 2022	Breuss L.
22	Coficab FHRLR91X91XCB91X T3 cable added (not validated yet) Dimension L5.1 adapted to 41.3 mm or for rotative alignment to 39.3 mm Page reference to dimension table adapted on page 38,42,64,67,120,124,146 and 180 150 Dimension L9 adapted from 56 mm to 58.5 mm on page 34,60,117 and 143	12/ 2022	Natter T.
23	Update Design Specification	06/ 2023	Jussel E-M.
24	Adjusting data of the bottom line	07/ 2023	Jussel E-M.
25	Additional validation with Coficab China of wire FHRLR2G2GCB2G 600/1000V T180	08/ 2023	Jussel E-M.
26	Data on page 4,47,49,57,60,62,75,84	08/ 2023	Jussel E-M.
27	Topic 1.2: adjusted with additional "Miscellaneous" Page 72: update layout, picture, additional statement	10/ 2023	Jussel E-M.
28	Topic 1.3 + 2.1.: additional wire for supplier Aptiv	03/ 2024	Jussel E-M.
29	Page 4) Change of L from length to legal Topic 1.3 + 2.1 updated with comment "under development"	04/ 2024	Jussel E-M.
30	Added H&S wire 4.0 mm ² / Page 61) updated text	09/ 2024	Jussel E-M.

This document is not subject to change service!



31	Topic 1.3 + 2.1.: updated information to additional wire for supplier Aptiv (W)	01/ 2025	Jussel E-M.
32	Topic 4.5 + 5.5.: update of text about shielding	01/ 2025	Jussel E-M.
33	Topic 4.3: update of text and dimension	01/ 2025	Jussel E-M.
34	Topic 1.3/ row "T" added comment (under development) Topic 2.1/ Aptiv 4 mm ² added comment (under development)	02/ 2025	Jussel E-M.
35	Topic 4.3: update dimension to min. 23.5 Topic 4.5: dimension incl. zero-cut removed Page 25: updated of dimension L6 Page 32: update of dimension L9 Topic 5.3: update dimension to min. 21.5 Topic 5.5: dimension incl. zero-cut removed Page 49: updated of dimension L6 Page 57: update of dimension L9	02/ 2025 (not approved DRAFT)	Jussel E-M.
36	Page 7,8: additional Coficab wire	03/ 2025 (not approved DRAFT)	Jussel E-M.
37	Page 20: Comment added regarding process on page 19. Page 44: Comment on process added. Pages 5, 6, 8: Comment on Aptiv cable adjusted. Page 4: Special characteristics, customer "Diverse": L1 characteristic changed to F2 characteristic; L2 characteristic changed to F3 characteristic. Pages 5–6: Coficab number corrected; NBKBE number corrected; addition of Kroschu bulk cable with silicone in-house compound; Cablena bulk cable added. Pages 7–8: Production sites for Coficab bulk cables added; Cablena added; Bitzlink "Leoni" number corrected; NBKBE number corrected. Page 8: New index 807-656-522 added. Page 12: Comment "only valid for H&S cable" added. Page 13: Comment "only valid for H&S cable" added. Pages 23, 47: Sentence adjusted – correct variant at strain relief. Pages 24, 48: Comment regarding processing of shielding braid adjusted; dimension L4 modified and L4.2 added. Pages 33, 62: Tolerance for L8 dimension widened. Pages 29, 37: Coficab number corrected; NBKBE number corrected; addition of Kroschu bulk cable with silicone in-house compound; Cablena bulk cable added. Pages 39, 63: Text added regarding shielding pull-off force.	10/ 2025	Jussel E-M./ Kleiner T.

This document is not subject to change service!



	<p>Pages 38–39, 62–63: Special characteristics, customer “Diverse”: F2 & F3 characteristics added.</p> <p>Page 69: L12 dimension – tolerance range widened and nominal dimension with tolerance range adjusted for new applications.</p> <p>Page 72: Adjustment of recommended WKM equipment; note added regarding support of the metal CPA during assembly of the CPA housing.</p>		
38	<p>Page 5) Chapter numbering</p> <p>Page 8) Correction to cable material overview</p> <p>Page 57) Correction Tolerance L8</p>	11/ 2025	Jussel E-M.
39	<p>Page 4) Customer releases adjusted dimension</p> <p>Page 36,37,38,61,62,63) Plunger and anvil geometry of the wire shield pressing = added and updated</p> <p>Supplier name updated from Leoni to Bitzlink “Leoni”</p> <p>Page 39) Check measurement of the embossing height “f” = updated text; Added picture for measuring device width</p> <p>Page 64) Added picture for measuring device width</p> <p>Page 82,83) Added topic 8.4</p>	01/ 2026	Jussel E-M.
40	<p>Topic 2.2 added locking sleeve for HPS40-2 TAC</p> <p>Topic 2.3 added contact carriers for HPS40-2 TAC</p> <p>Topic 2.4 added shielding sleeves</p> <p>Topic 2.5 added strain reliefs</p> <p>Topic 3.1 adapted Information text</p> <p>Topic 3.4 added Information text</p> <p>Topic 4 reworked processing steps – combined processing steps of build up with processing steps of build up for rotative orientation</p> <p>Topic 4.3 reworked table of stripping lengths of L1</p> <p>Topic 4.5 added table to define L4, L4.1 and L4.2 for used strain relief</p> <p>Topic 4.6 added table to define L5 for used strain relief</p> <p>Topic 4.8 added table to define L5.1 for used strain relief</p> <p>Topic 4.10 repositioned chapter for rotative orientation and added for which components it is applicable</p> <p>Topic 4.11.1 added table to define which crimping geometry can be used for which strain relief</p>	04/ 2026	Feldhofer V.

This document is not subject to change service!