PROCESS SPECIFICATION

HPS40-1 3+2
Female Connector MCC

EVS-100071

HIRSCHMANN
AUTOMOTIVE

TABLE

1. General

1.1 Introduction

This process specification is valid for all versions and describes the product structure as well as the manufacturing of the HPS40-1 3+2 female connector MCC.

System number	Coding	HVIL Version	Wire cross section	CPA version
807-135-013	A	No	2.5 mm²	with CPA
807-135-009	A	Yes		
807-135-005	A	No		without CPA
807-135-001	A	Yes		

The manufacturer is responsible for the qualitative processing and the described version of the mentioned products in this process specification. In case of an incorrect processing, dissenting from this process specification, there will be no right of recourse in case of appearing quality problems.

1.2 Other current documents

A	Data sheet shielded cable COROPLAST 3x 2.5 mm²	Data sheet No.: 9-2641 (3x 2.5 mm²) Release A2/2011-03-08
B	Data sheet Kostal female terminal	DOC01129170-01 (07/12)
C	Kostal Process specification	DOC00074179 ÄSD: 06 ; Januar
D	Data sheet shielded cable Kroschu 2x 2.5 mm²	Data sheet No.: 64996918 (2x 2.5 mm²) Release 5/2015-11-26
E	Data sheet shielded cable Coroplast 2x 2.5 mm²	Data sheet No.: 9-2641 (2x 2.5 mm²) Release A10/2016-02-05
F	Data sheet shielded cable Leoni 2x 2.5 mm²	Data sheet No.: FHLR2G2GCB2G 00001 (2x 2.5mm²) Release 1.0/2012-07-17

2 Product structure (single components)

2.1 Sheated cable (see table)

Wire manufacturer	Wire cross section 2.5 mm²		
	Product description	**Manufacturer no.**	**Number of conductors x cross-section**
Leoni	FHLR2G2GCB2G	FHLR2G2GCB2G 00001	2x 2.5 mm²
Coroplast	FHLR2GCB2G	9-2641 (2x 2.5 mm²)	2x 2.5 mm²
	FHLR2G2GCB2G	9-2641 (3x 2.5 mm²)	3x 2.5 mm²
Kroschu	FHLR2G2GCB2G	64996918	2x 2.5 mm²

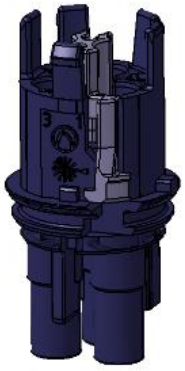
2.2 HPS40-1 3+2 locking sleeve

	
without CPA	with CPA

Hirschmann Automotive No.	Wire cross section	Product description
806-230-515	2.5 mm²	locking sleeve without CPA
806-230-516		locking sleeve with CPA

Delivery condition: The locking sleeves are delivered in a PE-bag/ cardboard box.

2.3 HPS40-1 3+2 female contact carrier

	
-501	-505

Hirschmann Automotive No.	Coding	Colour	HVIL Bridge	Wire cross section
807-137-501	A	Black	Yes	2.5 mm²
807-137-505	A	Black	No	

Delivery condition: The female contact carriers are in a poly bag and cardboard box.

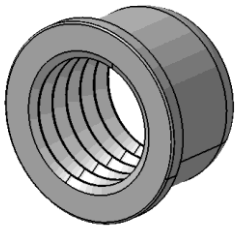
2.4 HPS40-1 2+2 shielding sleeve

-511

Hirschmann Automotive No.	Wire cross section
709-115-511	2.5 mm²

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

2.5 HPS40-1 3+2 stress relief

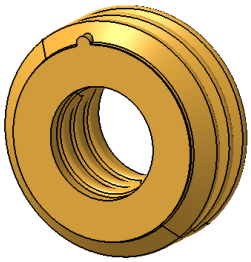
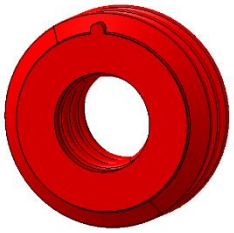
	
-518	-514

Hirschmann Automotive No.	Wire cross section
709-107-514	2x 2.5 mm²
709-107-518	3x 2.5 mm²

Wire manufacturer: The released HV cable for each stress relief is shown on the product drawing. (Hirschmann Automotive No. 807-135-…00)

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

2.6 HPS40-1 2+2 wire seal

	
-512	-514

Hirschmann Automotive No.	Colour	Wire cross section
709-113-512	Yellow	3x 2.5 mm²
709-113-514	Red	2x 2.5 mm²

Wire manufacturer: The released HV cable for each seal is shown on the product drawing. (Hirschmann Automotive GmbH Nr. 807-135-…00).

Delivery condition: The wire seals are delivered as bulk good.

2.7 HPS40-1 3+2 Cover Cap

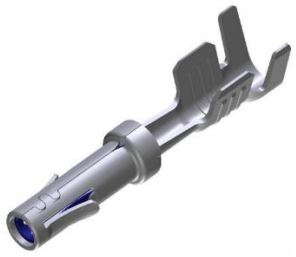
-514, -518

Hirschmann Automotive No.	Wire cross section
705-749-514	2x 2.5 mm²
705-749-518	3x 2.5 mm²

Wire manufacturer: The released HV cable for each cover cap is shown on the product drawing. (Hirschmann Automotive GmbH Nr. 805-972-…00).

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

2.8 HPS40-1 3+2 female pin



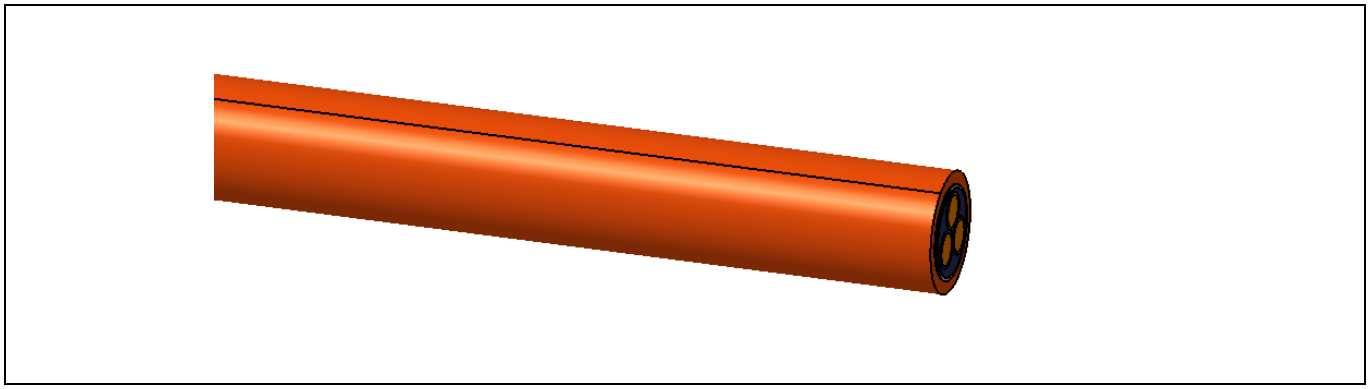
Kostal-No.	2 21 24 49288 0

Description Kostal	Wire cross section
3.1.2. LKS 1.5 Buchse high performance	2.5 mm²

3 Process steps

The following described process steps are used for the cross-sections 2.5 mm². The version with the 3x 2.5 mm² Coroplast cable and the terminal holder (Code A) were selected as reference samples.

3.1 Cut the shielded cable

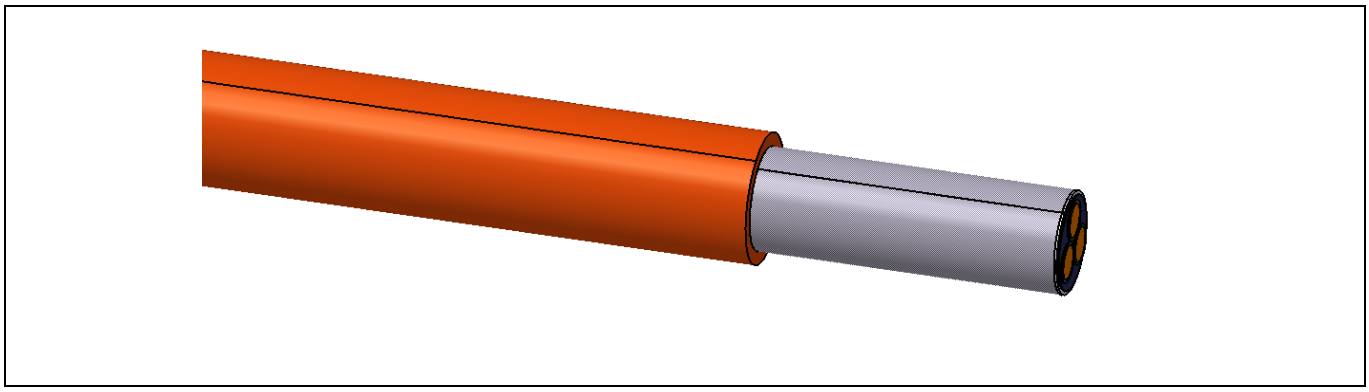


3.2 Assembly the single components

Push the cover cap (1), seal for wire (2) and locking sleeve (3) onto the shielded cable.

1	2	3
		

3.3 . Strip insolation of shielded cable

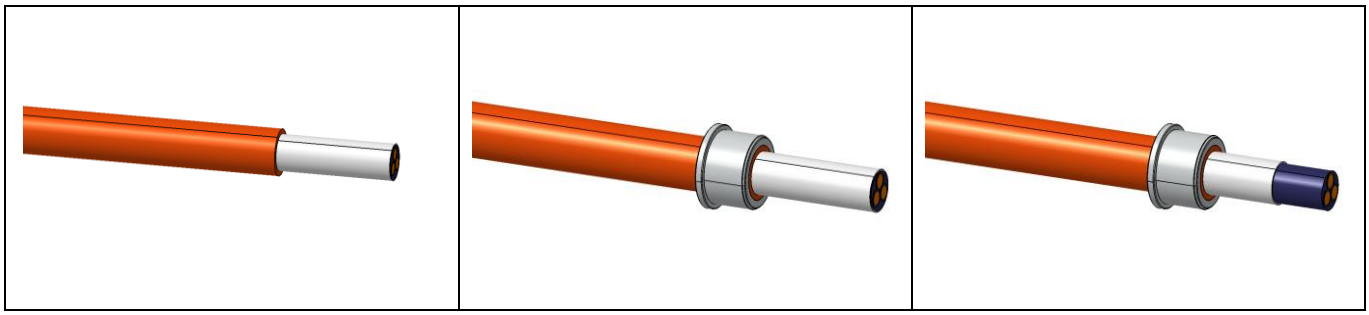


Stripping length:

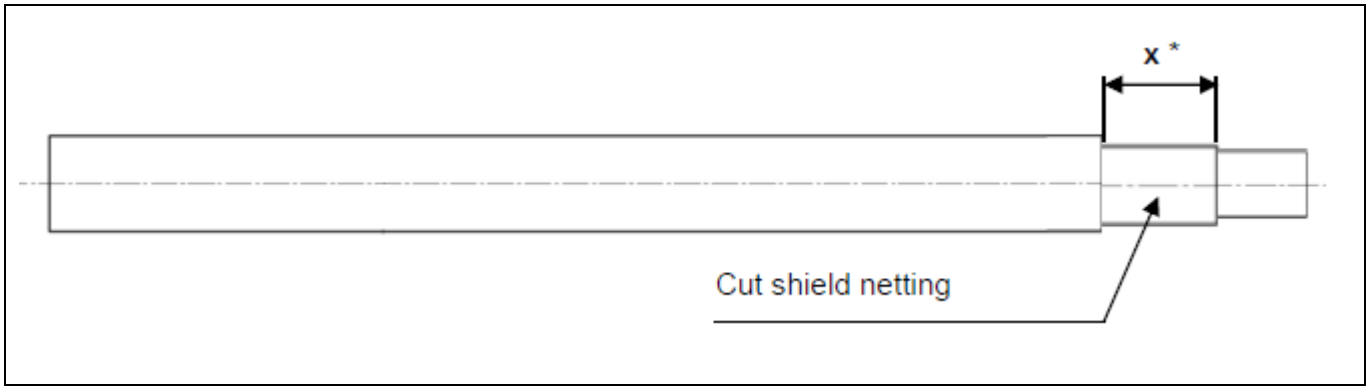
It´s not allowed that during the whole manufacturing process any damages on the shield netting appear.

3.4 Wire processing I

Remove foil and assemble stress relief



Length of the shield netting:



*The dimension x can vary. It depends on the selected production method by the different manufacturer.

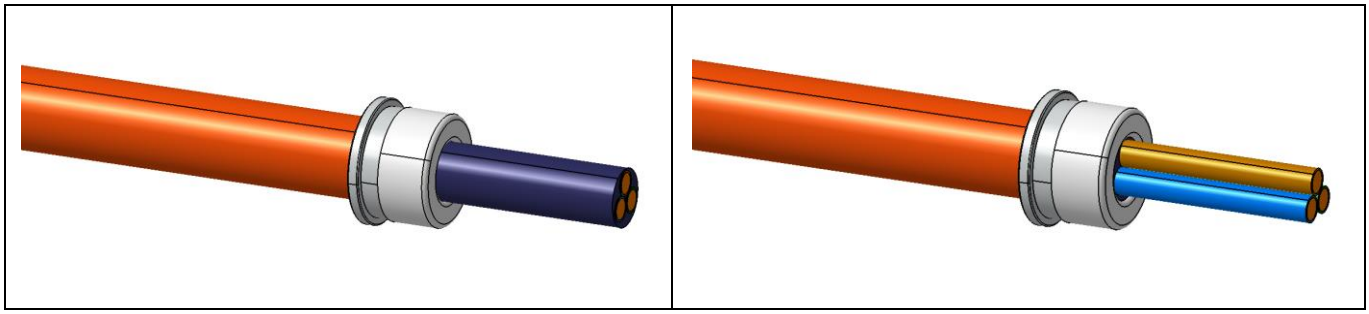
No residues or parts allowed on the cable after cutting the shield netting. This must be ensured with actions like the following:

- Prevention by removing the separated shield netting.
- Prevention by blowing out or suction of residues / parts from the shield netting.

Furthermore, it must be guaranteed, that after the next work step, a 70% overlapping of the shield netting over the position on the stress relief is given.

3.5 Wire processing II

Shield netting, reversed backwards, foil and filling removed

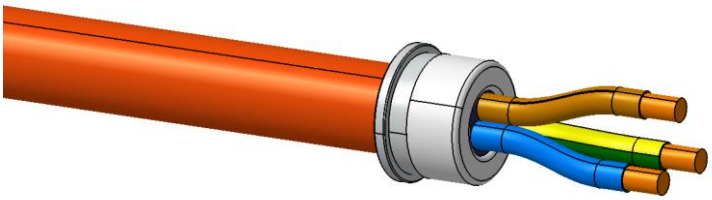


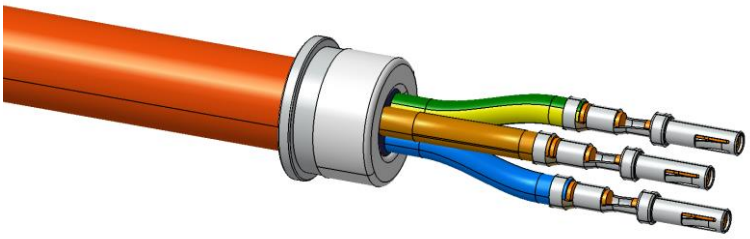
Depending on demand the twisted shield netting can be dissolved (brushed off)

Do not cause any mechanical damages on the single conductors during the manufacturing process.

3.6 Wire processing III

Strip single conductors, assemble Kostal female terminals

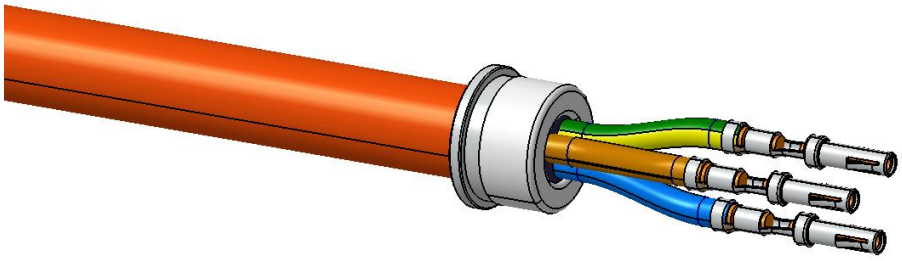
Stripping length according to KOSTAL process specification (DOC00074179).


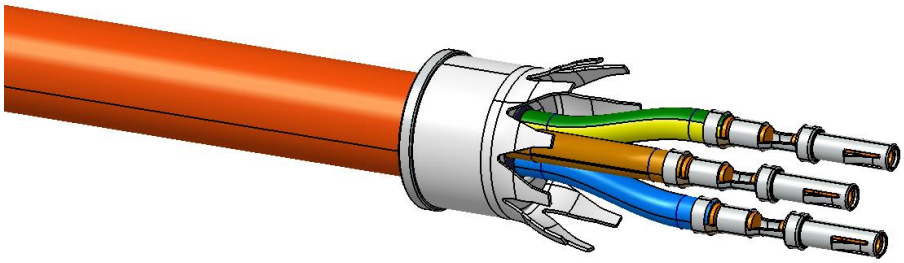
The assembly process of the Kostal LKS 1.5 female terminals is part of the KOSTAL process specification (DOC00074179) and will not be described in detail in the process specification HV 3+2 pole connector.


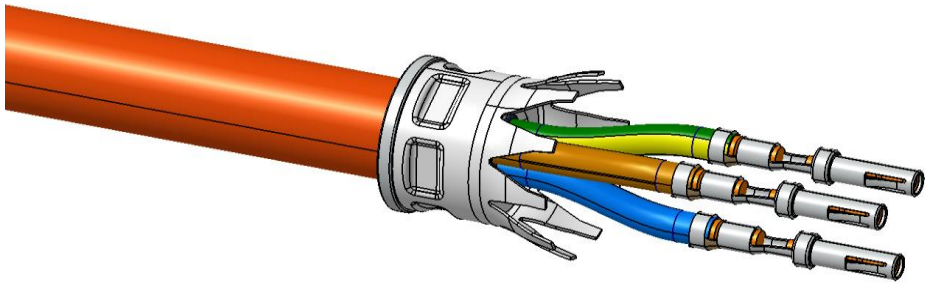
- Allowed misalignment of the KOSTAL LKS 1.5 female terminals after assembly.
  --> 0 to 0,8 mm

3.7 Assembly I – female terminal

Move stress relief, shield netting and shield crimp socket to position and press them together.

Stress relief


Shield crimp socket – Should not be damaged during the assembly process.


Hexagon geometry of pressing operation


- **Device for pressing operation**

The device for the pressing operation of the company “WKM” can be used for the exact positioning and pressing operation of the stress relief and the shield crimp socket.

Name of the device:	HV - Kabelverpressungsvorrichtung
Order number:	13 88 02
Name of the device:	Wechselmodul zur Leitungsvorbereitung HCT4

The above-mentioned device was developed and realized according to the process guidelines of Hirschmann Automotive GmbH. Single details, regarding the ordering, handling and process specification can be obtained directly at the manufacturer.

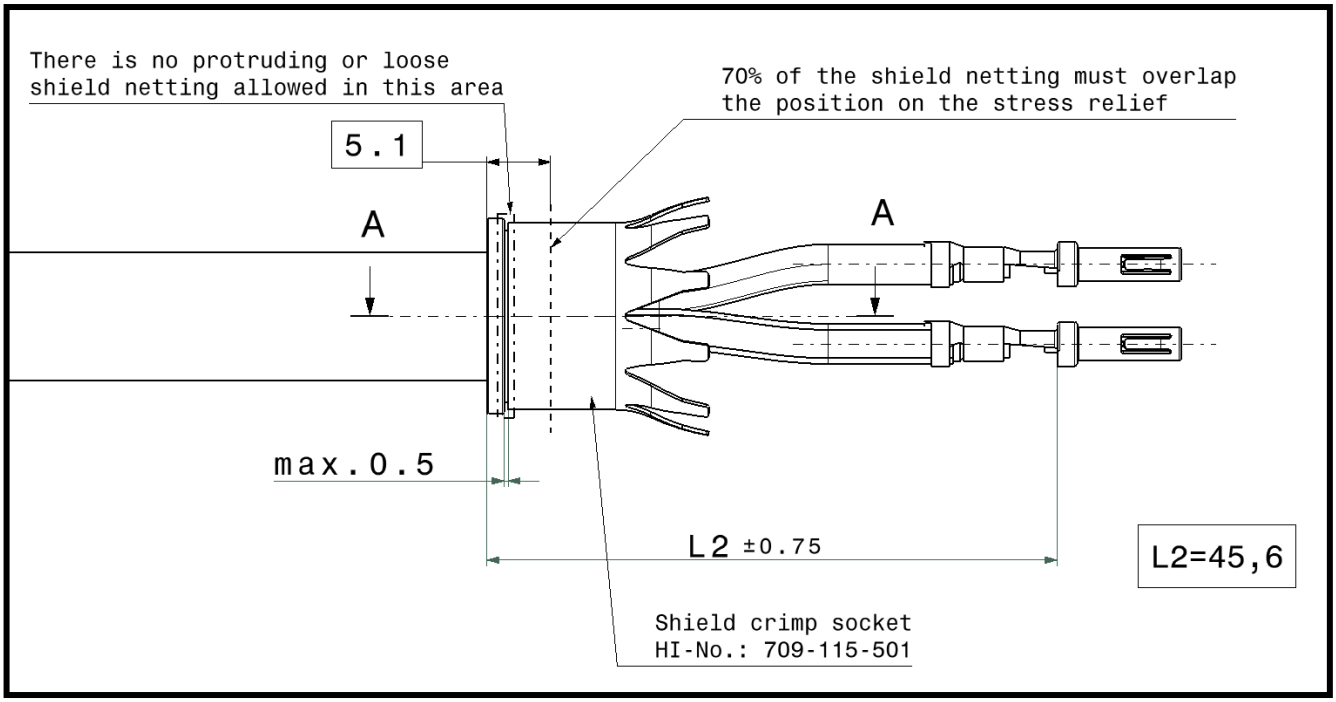
WKM - Maschinenbau GmbH
Oberes Ried 15
A-6833 Klaus
Tel. +43 5523 / 54907

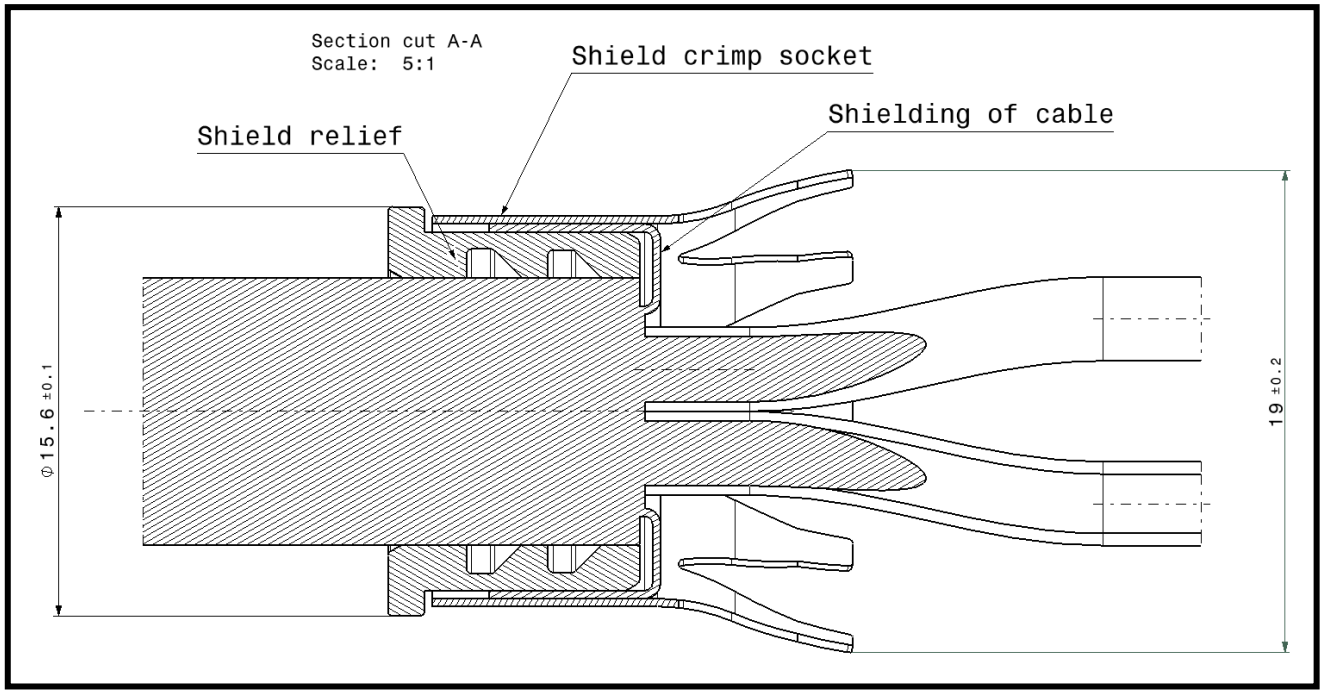
The ordering of a device for pressing operation is part from the different manufacturers. Therefore, only the pressing operation data will be described in detail in this process specification HPS40-1 3+2 female connector MCC.

- **Pressing operation data**

Dimensional parameters:

a) The stress relief, shield netting and shield crimp must be positioned in the device in a correct and precise position in relation to the preassembled Kostal LKS 1.5 female terminals. (Dimension 45.6 ± 0.75mm).
b) The circularity of the shield crimp socket must be guaranteed.
c) Before and after pressing operation, the specified dimensions on the following drawing must be kept.

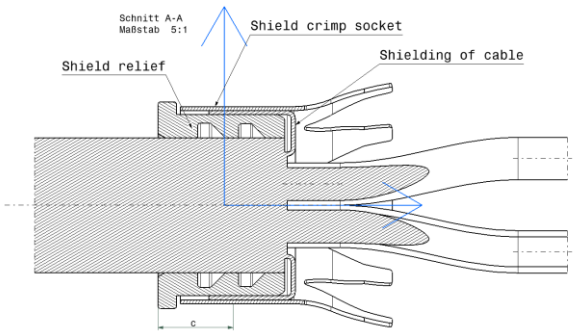

There is no protruding or loose
shield netting allowed in this area
70% of the shield netting must overlap
the position on the stress relief
5.1
A
A
max.0.5
L2 ±0.75
L2=45,6
Shield crimp socket
HI-No.: 709-115-501


Section cut A-A
Scale: 5:1
Shield crimp socket
Shielding of cable
Shield relief
ϕ15.6 ±0.1
19 ±0.2

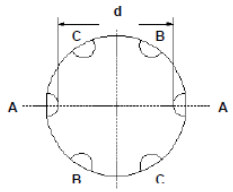
- **Pressing operation geometry**

Hexagonal geometry of pressing operation

Position of pressing operation:

	Wire cross section	Dimension c (mm)
	2.5 mm²	5.7 ± 0.3

Depth of pressing opteration:

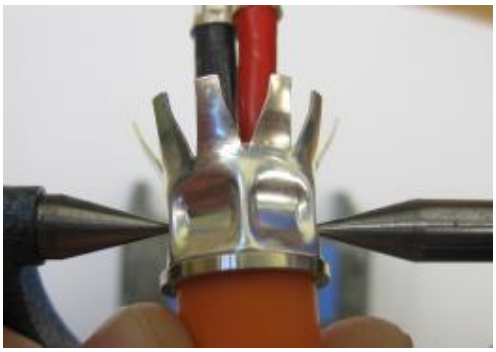
	Shield relief to shielded cable with shield netting.

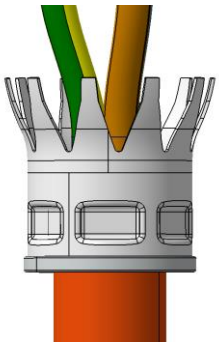
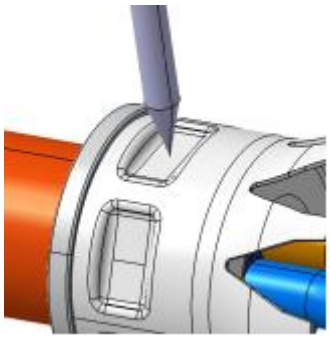
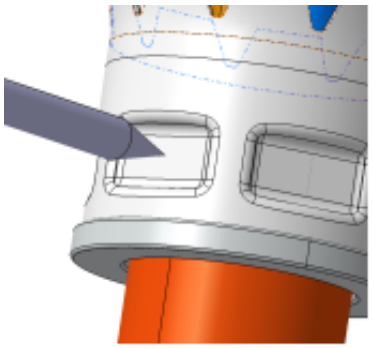
Wire manufacturer	Wire cross section	Dimension „d“ in mm
Leoni	2x 2.5 mm²	12.70 ± 0.25
Kroschu	2x 2.5 mm²	12.70 ± 0.25
Coroplast	2x 2.5 mm²	12.70 ± 0.25
	3x 2.5 mm²	12.40 ± 0.20

- **Check measurement of the depth of the pressing operation**

Use the measurement device to ensure the depth of the pressing operation is correct: to check dimension **"d"**, all three depths (A-A, B-B and C-C) must be measured. All measurement values must be within the given tolerance.

The measuring must be done with a point micrometer (Manufacturer Mitutoyo, measuring range 0-25 mm, measuring point 15°/R 0.30 mm).



Position measuring points: center to center		
		

Pull-off-force without shield neeting

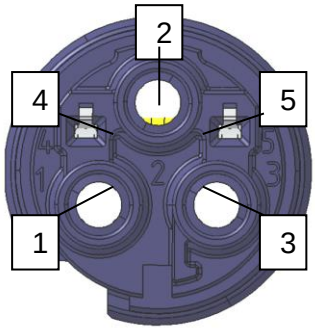
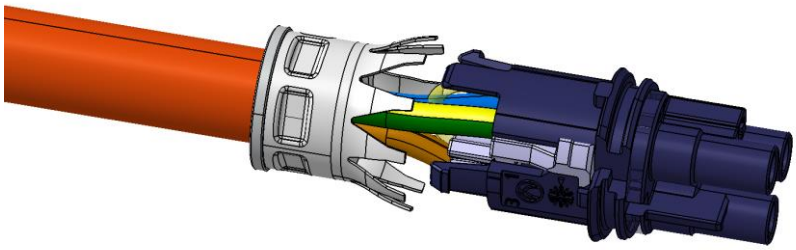
Wire cross section	Pull-off force
2.5 mm²	≥ 120 N

General specifications

Do not cause any mechanical damages on the following parts during the pressing operation.

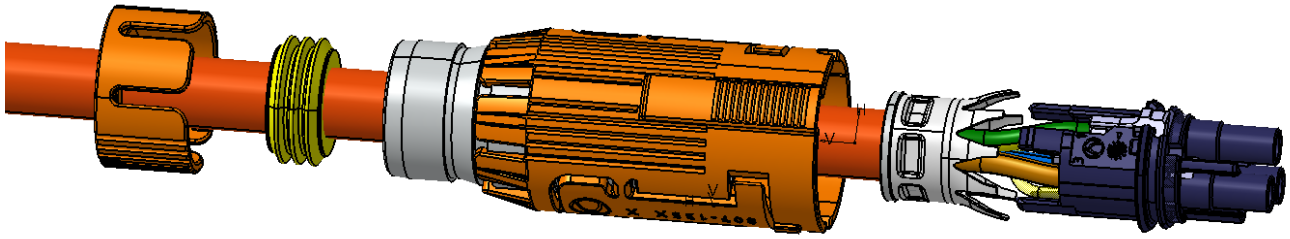
- Isolation of shielded cable
- Isolation of single conductors
- Shield relief
- Shield crimp socket
- Shield netting

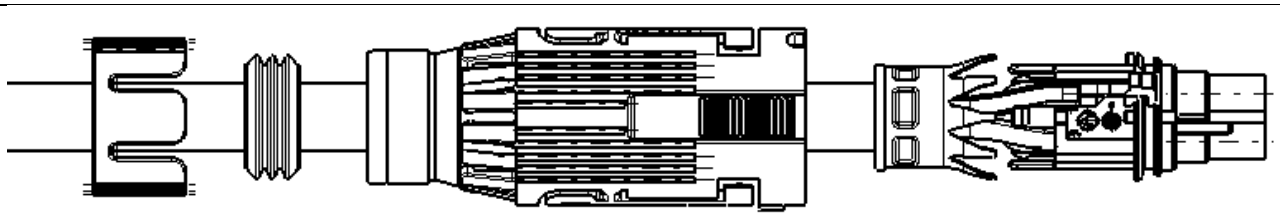
3.8 Assemby I - Female terminal LKS

	During assembling of the female terminal the locking lance of the contacts will be moved. When the female terminals are in end position, the locking lance will move audible back and the female terminals are in the pre-assembling position.
Assemble LKS 1.5 female terminals into terminal holder HV 3+2 pol (1).	
Press secondary lock (2).	

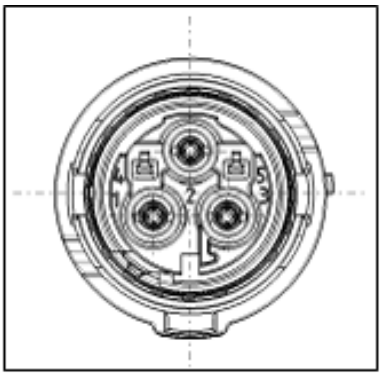
3.9 Positioning locking sleeve

Polarised and power-assisted assembly of the locking sleeve unit.





	Latching hoock	Latching nose



Polarisation characteristics
Locking device unit and terminals holder unit

The optimum mounting force and the distribution of the force acting are depending on the different types of the wires. At the machine supported production the max. forces have to be considered, to prevent damage on other components.

Even a compression and the related risk of damage of the HV wires must be avoided in the assembling process.

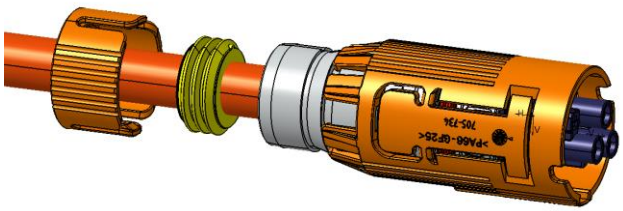
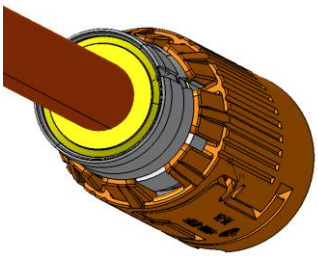
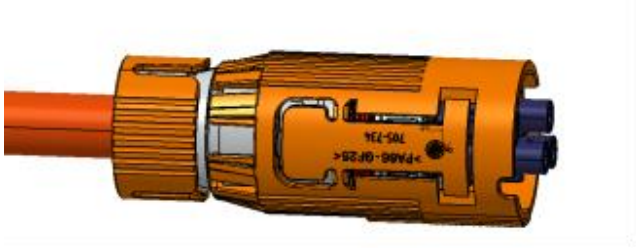
This can be achieved by a simultaneous pull + press and prevent the relative movement between terminal holder and cable. --> max. allowance of the compression of the HV single wire is 1 mm. Alternative it is possible to pull the cable until you reach the end position of the shield crimp socket. In a second step the contact holder must be pushed to achieve the final locking position.

Compressive force (contact holder)	Fmax = 200 N on terminal holder unit
Tensile force (HV cable)	Fmax = 120 N (170N*) on harness

- The shield crimp socket, all latching hooks, and the latching nose of the terminal holder unit, must be locked in the gaps of the locking device unit.
- Do not cause any mechanical damage on the shield crimp socket, the latching nose, neither on both latching hooks of the terminal holder unit. The sheath of the wire cannot be loosened of the stress relief.

*If necessary, the pulling force can be increased to 170 N, if there is no damage on the wire, also the sheath of the wire cannot be loosened of the stress relief.

3.10 Assembly seal and cover cap

Seal (1) and cover cap (2) have not to be damaged during the assembly process.	
	
Lock cover cap (2) in the cut-out (3) of the locking sleeve unit. Cover cap (2) is not locked against rotation.	
	

3.11 Delivery of produced harnesses

For a capable and controlled process delivery of the produced harnesses to quantitatively free defined bundles.

4 Technical information

4.1 General requirements

It is not allowed, that any damages appear on the single components during the whole production process.

4.2 Technical cleanliness

In generally, pay attention to the cleanliness at and inside of the connector. Metallic particles generated at the assembly process must be removed with a suitable measure. No metallic particles >1000µm allowed on the inside neither on the outside of the connector.

Metallic particles at each connector: CCC = N (J4/K0) according to VDA 19
All other particles at each connector: CCC = N (J4/K0) according to VDA 19

5 Change of documentation

Revision	Change Date	Editor
first edition	10/ 2013	Breuss L.
First release	01/ 2015	Weiss M.
Added 2x 2.5 mm² cables	07/ 2019	Shaw S.
Change of design	06/ 2023	Jussel E-M.
Adjusting data of the bottom line	07/ 2023	Jussel E-M.