

**Class 1**

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## EV Charge Inlet Combo 1



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## 1. SCOPE

### 1.1. Content

This specification describes the assembly and handling of the vehicle charge inlets of combined charging system Type1 (CCS1) compatible with configuration EE of IEC62196-3 for conductive charging of electric vehicles with AC current and DC current for fast charging. This specification applies to manual assembly of the components in series production configuration.

This specification though recommends an optimal way for assemble the charge inlet assuring the required performance of the product, it does not exclude other alternative way of assemblies or verification steps (excluding international standard bonded) based on harness maker's know-how when required product performance guaranteed.

### 1.2. Processing Note

The processor is responsible for the quality of the manufacturing process to ensure the correct function of the system. The warranty and liability are excluded if quality deficiency or damages occur due to non-compliance to this specification or use of not specified or not released tools, cables and components.

## 2. APPLICABLE DOCUMENTS

The following technical documents, if referred to, are part of this specification. In case of a contradiction between this specification and the product drawing or this specification and the specified documentation, the product specification has priority.

### 2.1. TE Connectivity Documents

#### a) Customer drawings for inlet type Combo1 90 Degree

CHARGE INLET KIT. COMBO 1, 90 DEGREE	2388501
CHARGE INLET ASSY WITH LED CCS1	2381070-1
DIA 3.6MM, PIN TERMINAL, AC 6SQMM	2293266-3
DIA 2.8MM, PIN TERMINAL, PE 25SQMM	2293267-5
PROTECTION CAP, TE, WATER DRAIN	2292534-1
SEALING	2120571-1
DIA 8MM, PIN TERMINAL	2306180-1
CABLE EXIT, RECT, COMBO, LEFT	1-2303200-1
CABLE EXIT, RECT, COMBO RIGHT	1-2303200-2
FAMILY SEAL, AC	2366865-4
STRAIN RELIEF, AC	2367140-2
COVER, CABLE SEAL, AC	2296057-2
FAMILY SEAL, COMBO DC	2366539-1
COVER, CABLE SEAL, COMBO DC	2366667-1
MQS BLINDSTOPFEN	963143-1
FLAP, ASSY, INLET COMBO 1, LEFT, LED	2358664-5
FLAP, ASSY, INLET COMBO 1, RIGHT, LED	2358664-7

#### b) Specifications / Spezifikationen

108-94838	Product Spec. Vehicle Charge Inlets Combo 1
114-13000	Application Specification Micro Mate-N-Lock Connectors
108-94519	Product Specification Vehicle Charge Inlet Actuator GEN 2

## 2.2. General Documentation

### Cable Specifications of Prescribed Cables

TE Connectivity advice to do not use Polyvinyl chloride, Polyurethane or Polyolefin insulated cables as they do not comply with the general LV214 requirement. Due to low performance of cable insulation after heat exposure, it can cause leakage issues during the lifetime because of low compression set between cables and seals.

Alternative cables except listed below and other than Silicone Rubber insulated being used in this application are not permitted without prior validation by TE Connectivity and consideration of the general risk on water tightness is obligatory where TE Connectivity is not accountable.

#### AC-cable: cross-section 2 x 6,0mm<sup>2</sup>

Supplier	COROPLAST
Outer Diameter	12.5±0.3 mm
Min. bending radius	3xD (static)
Cable description	<i>FHLR2GCB2G 2x6.0mm<sup>2</sup> similar LV216-2 Class F (T200) TPJLR.18.007, Issue 3</i>
Supplier Part No.:	9-2641 (2 x 6,0 mm <sup>2</sup> )

#### DC-HV-Cable : Cross-section 70mm<sup>2</sup>

Supplier	HUBER+SUHNER
Outer Diameter	17.0±0.3 mm
Cable description	<i>FHLR4GC13X-1x70 T150</i>
Part No.	84100298

#### PE-cable: cross-section 25mm<sup>2</sup>

Supplier	HUBER+SUHNER
Outer Diameter	8.20mm ±0.20 mm
Cable description	<i>AUTOL 155 25MM2P GNYE</i>
Supplier Part No.	85066283

#### Signal-cable: cross-section 0,5mm<sup>2</sup>

Supplier	SEVERAL
Outer Diameter	1.6-0.2 mm
Cable description	<i>FLRY-0.5 A</i>
Supplier Part No.:	515274

### 3. APPLICATION TOOLS

To produce a correct wire crimp, as validated by TE with the wires listed in this specification, following application tools are required.

Wire Size [mm <sup>2</sup> ]	Stripping Length single wire for crimp [mm]	Crimp /WELD height CH <sub>1</sub> [mm]	Cable Specification	Supplier	Contact P/N	Geometry	Applicator	TE Crimp Validation is based on crimp press stroke / cycle time
0.5	3.2 ± 0.1	0.89 ± 0.05	FLRY-A 0.5mm <sup>2</sup>	SEVERAL	0-794606-1	F	2151022-1	G-Terminator PN 354500-1 Cycle Time:<500ms
6	13,0 ± 1	3,7 ± 0,1	FHLR2G2GCB2 G 2x6.0mm <sup>2</sup>	COROPLAST	2293266-3	W	7-528041-0	Hanke 971-200. Cycle time: 1.7 - 2.5s Stroke: 44mm
25	18,0 ± 1	6,3 ± 0,1	AUTOL 155 25MM2P GNYE 25mm <sup>2</sup>	HUBER & SUHNER	2293267-5		2276149-6	
70	Right 19,0±1,0 Left 28,0 ±1,0	9,3±0,15	Radox ELASTOMER 70mm <sup>2</sup>	HUBER & SUHNER	2306180-1	F	541915-2	-

Table 1

Crimp Die Sets are subject to wear and their condition and quality have to be monitored. Suspect and/or worn Die Sets have not to be used for production of these crimps. Die Sets are available as spare parts.

### 4. WIRES

#### 4.1. Assessment of the wires

To ensure the required electrical crimp contractability with stable crimp resistance a permissible maximum storage period of 8 months for unprocessed cable (referring to cable manufacturer production date) has to be respected.

#### 4.2. Wire selection

The contact system is released for the application with wires specified in chapter 2.2  
The released contact-wire-combinations and crimp parameters are given in table 1.

Other wires require the validation and approval of the TE engineering department.  
The wires are applied as single wire terminations. Double terminations are not intended.

#### 4.3. Wire preparation

The cable has to be cut accurately with a 90 deg angle.

The cable insulation must be stripped before crimping. The stripping length of the outer insulation and shield is defined in the following Assembly Steps.

The insulation must be cut accurately and pulled off from the conductor. Offcut of insulation must not remain on the conductor. Single strands may not be damaged, fanned out, cut or pulled out. Furthermore, the operator should avoid touching the bare single strands and the strands shall not be twisted. All single strands need to be caught in the crimp and not a single strand must remain outside the crimp.

## 5. REQUIREMENTS ON THE CRIMPED CONTACT WITH W-CRIMP SHAPE (CLOSED BARREL)

The following terms shown below are used in this specification, see figure 1.

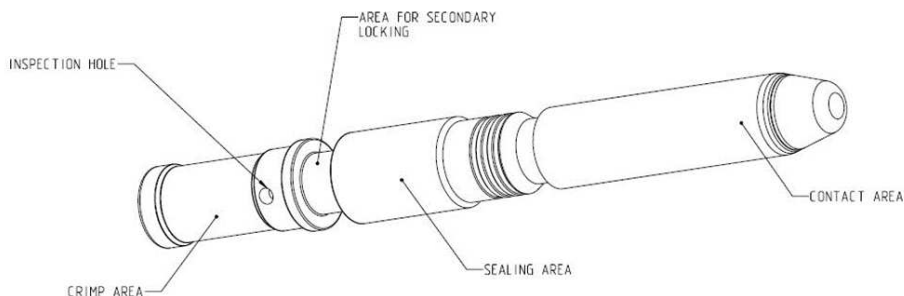


Figure 1

### 5.1. Conductor position

The single strands of the conductor are clamped inside the crimp area. All single strands need to be caught in the crimp and not a single strand must remain outside the crimp. The wire end must be fully inserted into the crimp area and has to be checked via the inspection hole after crimping. Insulation must not be inside of the crimping area, see figure 2.

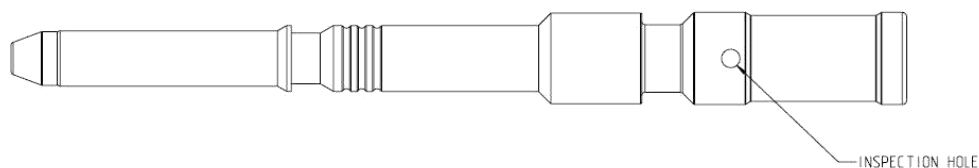


Figure 2

### 5.2. Crimp Geometry

The crimp geometry, crimp heights including their corresponding tolerances as well as wire sizes are given in table 1.

The crimp height is the key quality feature of a crimp connection. The measurement allows a non-destructing examination and a continuous process inspection. It is provided for every wire size and contact. The crimp height is given in table 1.

Crimp height and width may also be measured in a cross-section image. The mechanical operated measurement though is preferred.

During the application process the crimp height must be checked. This is valid for each batch and after every change or switchover of contact reel or wire bundle or applicator respective it's setup or components.

The crimp height has to be measured over both extensions in middle of the crimp, figure 3:



Figure 3 (picture exemplarily)

### 5.3. Cross Sections

When creating cross-sections, the correct grinding layer must be selected. The Grinding layer had to be at middle of crimp area and may not be inside of serration, see figure 4.

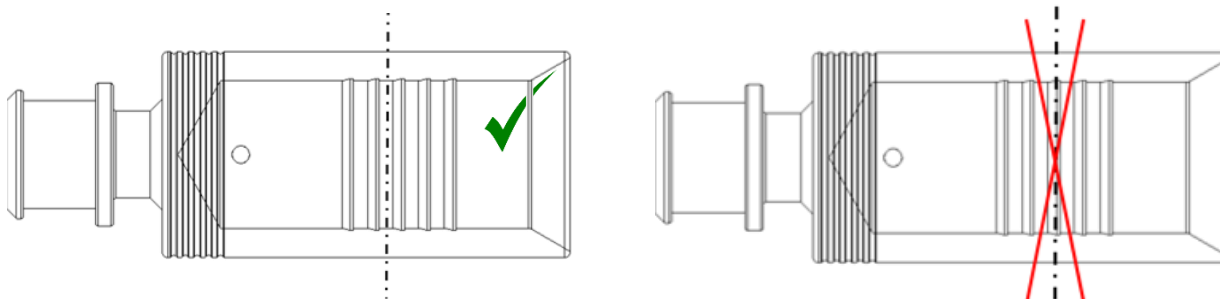


Figure 4 (picture exemplarily)

### 5.4. Wire pull-out forces

Measurement of wire pull-out forces from the wire crimp is a supporting manufacturing control.

The pull-out forces must fulfill the requirements according product specification 108-94777.



### 5.5. Crimp Position

The TE applicator positions the contacts in the crimping tool at middle position as shown, figure 5 and 6. Correct position and condition of applicator has to be checked for every production lot.

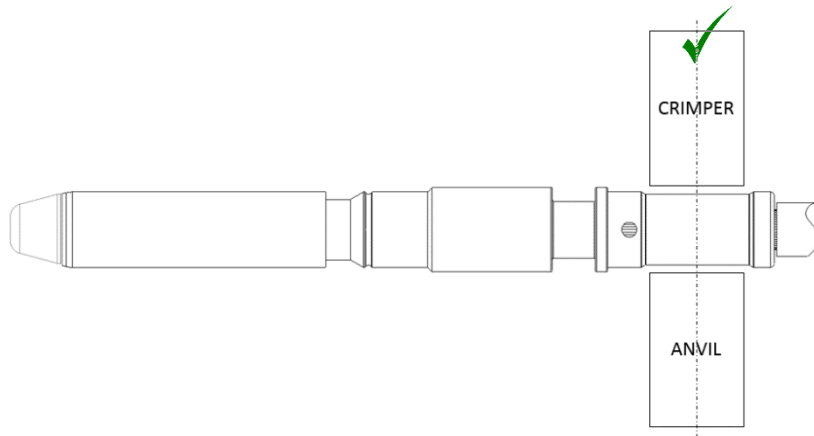


Figure 5 (picture exemplarily)

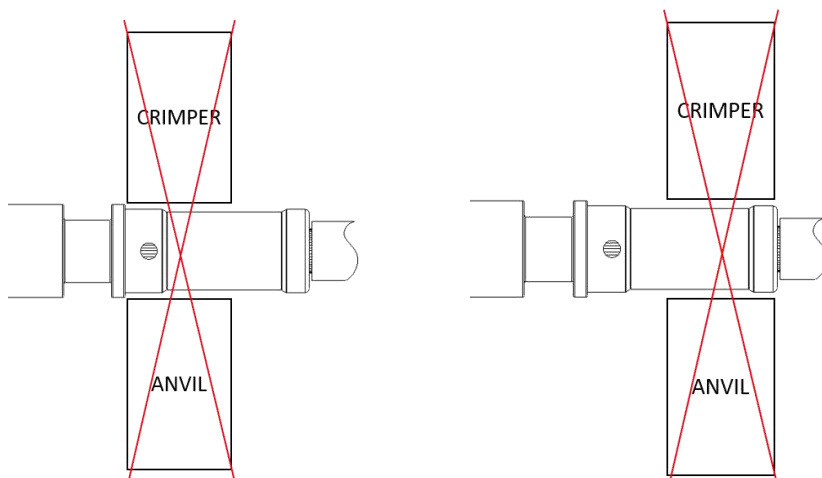


Figure 6 (picture exemplarily)

### 5.6. Contact area

During processing and following processing, the contact area may not be damaged or bended.

### 5.7. Sealing area

During processing and following processing, the sealing area may not be damaged or bended

### 5.8. Shape and position tolerances

Measuring the shape and position deviation is not always necessary, if the contact is obviously straight by eye. In case a measurement is required, the measurement equipment required at least a 10-time better measuring precision compared with the requirement tolerances, see figure 7 and 8.

Meeting the specific shape and position tolerances must be ensured before the contact is inserted into the housing.

If contacts are bent during the application process and exceed the specified tolerances these must not be bent back or reworked but must be scrapped.

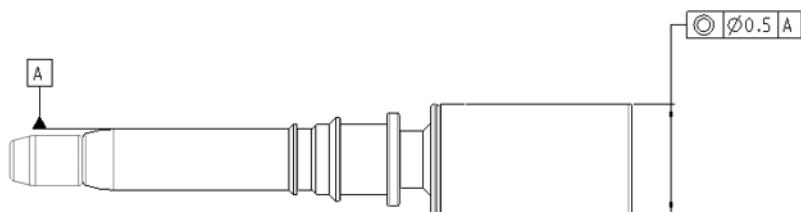


Figure 7 (picture exemplarily)

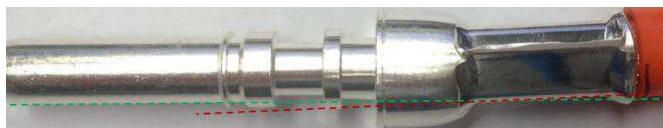


Figure 8 (picture exemplarily)

### 5.9. Measuring equipment and measuring position

As measuring equipment for measuring crimp height, a digital caliper with accuracy of measuring 0.01mm is the minimum requirement. Measuring of crimp height had to be done according as following always in middle of crimp area across whole crimp, see figure 9 and figure 3.



Figure 9 (pic exemplarily)

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## 6. REQUIREMENTS ON THE CRIMPED CONTACT WITH F-CRIMP SHAPE

The crimp of the 70mm<sup>2</sup> cables on 90 DEG DC power contacts with F-shaped crimp geometry has to be processed according to Application Specification 114-94436.

7. ASSEMBLY INSTRUCTIONS  
 7.1. Assembly overview Charge Inlet Combo1

**Charge Inlet Combo 1 Left 90Degree Kit**

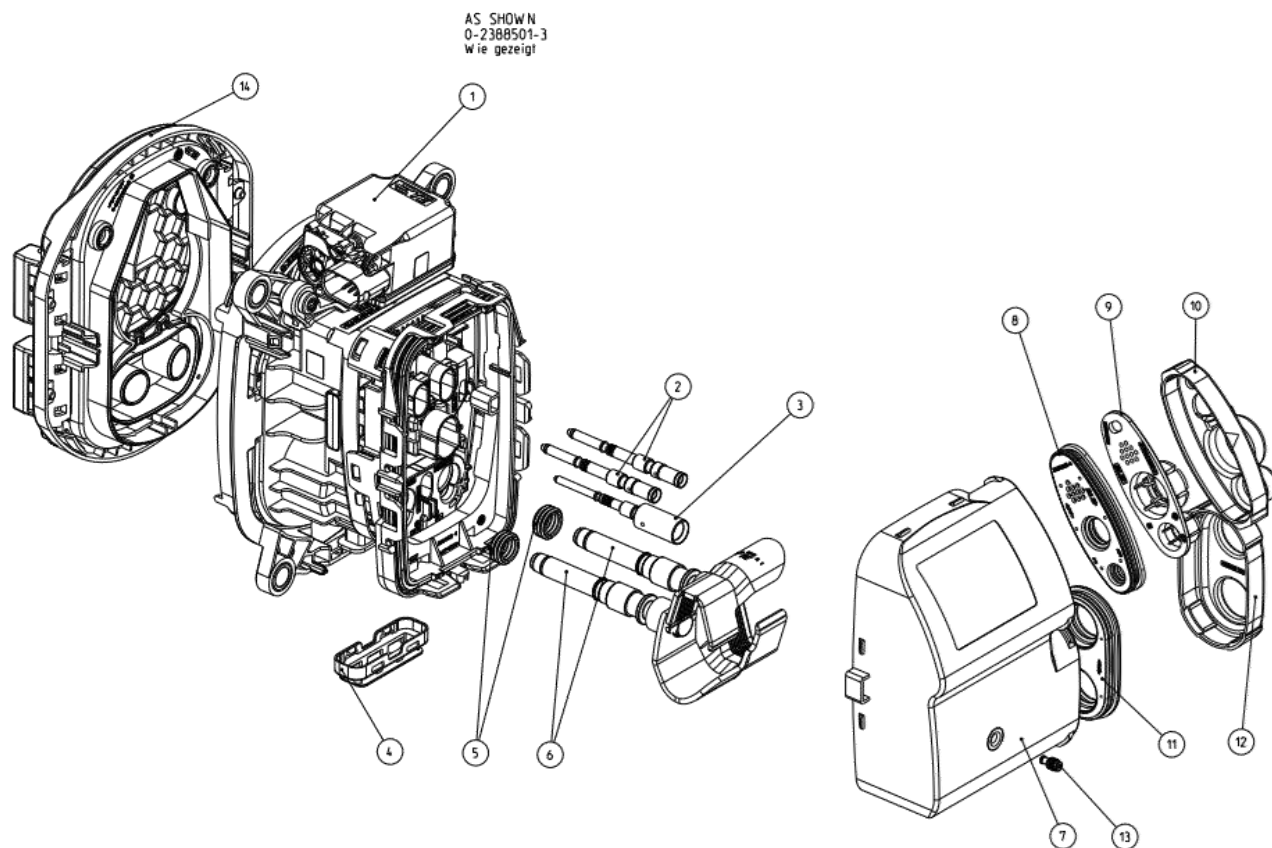


Figure 10

NO FLAP  
 CABLE EXIT LEFT  
 Keine Klappeneinheit  
 Kabelausgang links  
 0-2388501-1

FLAP OPEN LEFT  
 CABLE EXIT LEFT  
 Öffnung der Klappeneinheit nach links  
 Kabelausgang links  
 0-2388501-3

FLAP OPEN RIGHT  
 CABLE EXIT LEFT  
 Öffnung der Klappeneinheit nach rechts  
 Kabelausgang links  
 0-2388501-5

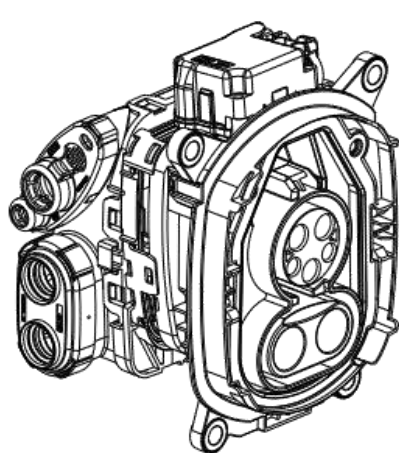


Figure10a

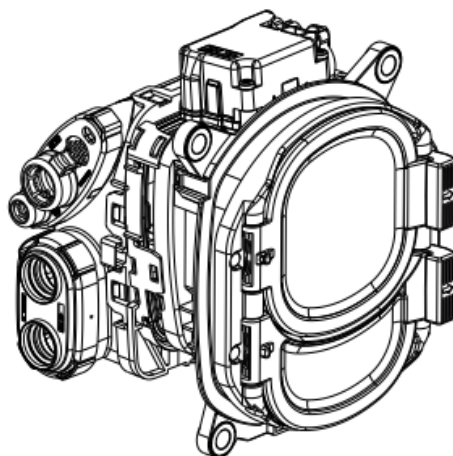


Figure10b

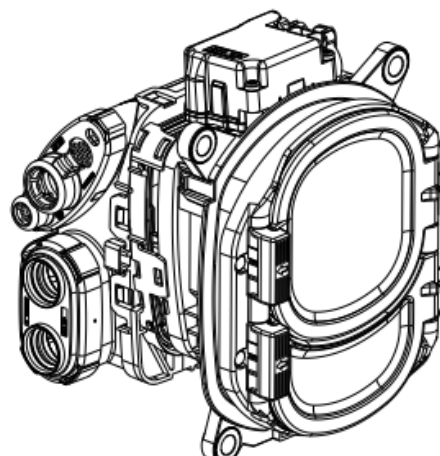


Figure10c

### Charge Inlet Combo 1 Right 90Degree Kit

AS SHOWN  
0-2388501-4  
Wie gezeigt

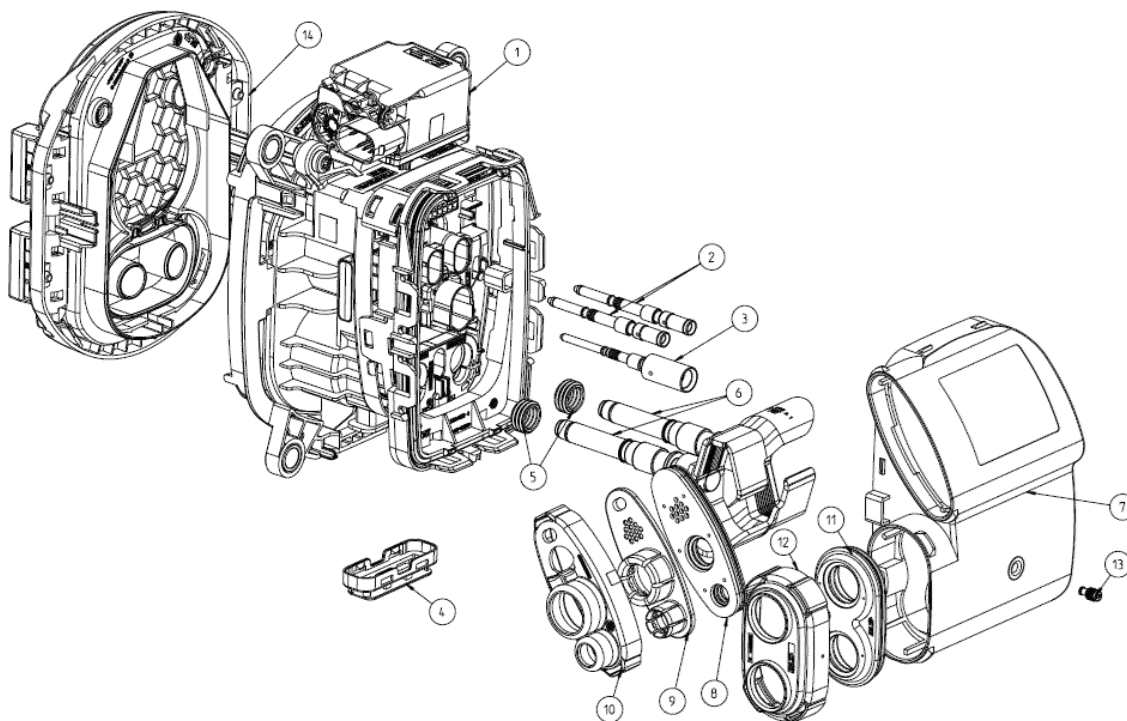


Figure 11

NO FLAP  
CABLE EXIT RIGHT  
Keine Klappeneinheit  
Kabelausgang rechts  
0-2388501-2

FLAP OPEN LEFT  
CABLE EXIT RIGHT  
Öffnung der Klappeneinheit nach links  
Kabelausgang rechts  
0-2388501-4

FLAP OPEN RIGHT  
CABLE EXIT RIGHT  
Öffnung der Klappeneinheit nach rechts  
Kabelausgang rechts  
0-2388501-6

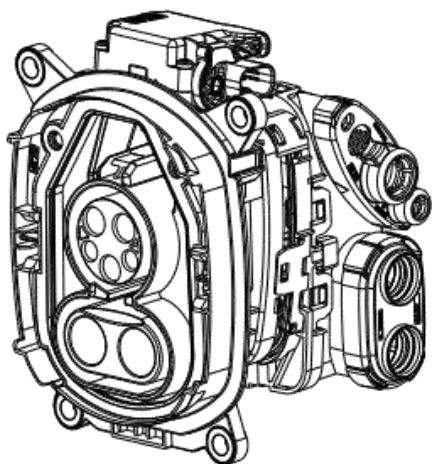


Figure 11a

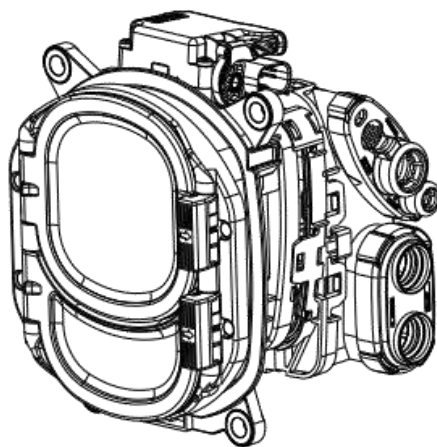


Figure 11b

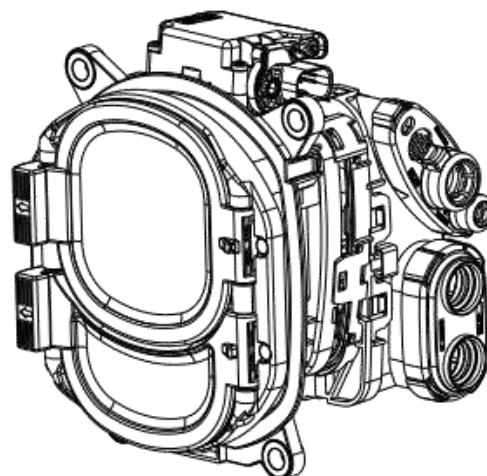


Figure 11c

## 7.2.1 Parts to order for 12V Actuator Variants

Charge Inlet Combo 1 90 Degree			Charge Inlet Left Without Flap Unit	Charge Inlet Right Without Flap Unit
Variant			1-phase AC 6mm <sup>2</sup> Ground 25mm <sup>2</sup> DC 70mm <sup>2</sup>	1-phase AC 6mm <sup>2</sup> Ground 25mm <sup>2</sup> DC 70mm <sup>2</sup>
Part			P/N	P/N
Pos	Qty.	Name / Bezeichnung		
1	1	CHARGE INLET ASSY WITH LED CCS1	2381070-1	2381070-1
-	1	12P MICRO MNL HSG (Additional part for charge inlet cabling)	1-794617-2	1-794617-2
-	7	CONTACT MICRO MNL (0.5mm <sup>2</sup> ) (Additional part for charge inlet cabling)	0-794606-1	0-794606-1
2	2	PIN DIA 3.6, RIGID, POWER AC, ASSY (6mm <sup>2</sup> )	2293266-3	2293266-3
3	1	PIN DIA 2.8, RIDIG, PE (25mm <sup>2</sup> )	2293267-5	2293267-5
4	1	PROTECTION CAP, TE, WATER DRAIN	2292534-1	2292534-1
5	2	SEALING	2120571-1	2120571-1
6	2	PIN DIA 8.0, 90 DEG, CONTACT, ASSY TYP 1, (70mm <sup>2</sup> )	2306180-1	2306180-1
7	1	CABLE EXIT DC SIDE, COMBO	1-2303200-1	1-2303200-2
8	1	FAMILY SEAL, AC (PE 25mm <sup>2</sup> , AC 2x 6mm <sup>2</sup> , Signal 11x 0.35mm <sup>2</sup> or 0,5mm <sup>2</sup> )	2366865-4	2366865-4
9	1	STRAIN RELIEF, AC	2367140-2	2367140-2
10	1	COVER, CABLE SEAL, AC	2296057-2	2296057-2
11	1	FAMILY SEAL, COMBO DC (70mm <sup>2</sup> )	2366539-1	2366539-1
12	1	COVER, CABLE SEAL, DC	2366667-1	2366667-1
13	1	MQS CAVITY PLUG FOR CENTERLINE 4 MM	963143-1	963143-1
-	-	4POS MQS Connector HSG, Seals and Contacts (Additional part for charge inlet cabling)	p/n acc. Prod. Spec. 108-94519	p/n acc. Prod. Spec. 108-94519
-	1	Optional: FLAP, SLIM COMBO 1, ASSY (left)	2358664-5	
-	1	Optional: FLAP, SLIM COMBO 1, ASSY (right)	2358664-7	

Table 2

## 7.2.2 Parts to order for 24V Actuator Variants

Charge Inlet Combo 1 90 Degree			Charge Inlet Left Without Flap Unit	Charge Inlet Right Without Flap Unit
Variant			1-phase AC 6mm <sup>2</sup> Ground 25mm <sup>2</sup> DC 70mm <sup>2</sup>	1-phase AC 6mm <sup>2</sup> Ground 25mm <sup>2</sup> DC 70mm <sup>2</sup>
Part			P/N	P/N
Pos	Qty.	Name / Bezeichnung		
1	1	CHARGE INLET ASSY WITH LED CCS1	2381070-2	2381070-2
-	1	12P MICRO MNL HSG (Additional part for charge inlet cabling)	1-794617-2	1-794617-2
-	7	CONTACT MICRO MNL (0.5mm <sup>2</sup> ) (Additional part for charge inlet cabling)	0-794606-1	0-794606-1
2	2	PIN DIA 3.6, RIGID, POWER AC, ASSY (6mm <sup>2</sup> )	2293266-3	2293266-3
3	1	PIN DIA 2.8, RIDIG, PE (25mm <sup>2</sup> )	2293267-5	2293267-5
4	1	PROTECTION CAP, TE, WATER DRAIN	2292534-1	2292534-1
5	2	SEALING	2120571-1	2120571-1
6	2	PIN DIA 8.0, 90 DEG, CONTACT, ASSY TYP 1, (70mm <sup>2</sup> )	2306180-1	2306180-1
7	1	CABLE EXIT DC SIDE, COMBO	1-2303200-1	1-2303200-2
8	1	FAMILY SEAL, AC (PE 25mm <sup>2</sup> , AC 2x 6mm <sup>2</sup> , Signal 11x 0.35mm <sup>2</sup> or 0,5mm <sup>2</sup> )	2366865-4	2366865-4
9	1	STRAIN RELIEF, AC	2367140-2	2367140-2
10	1	COVER, CABLE SEAL, AC	2296057-2	2296057-2
11	1	FAMILY SEAL, COMBO DC (70mm <sup>2</sup> )	2366539-1	2366539-1
12	1	COVER, CABLE SEAL, DC	2366667-1	2366667-1
13	1	MQS CAVITY PLUG FOR CENTERLINE 4 MM	963143-1	963143-1
-	-	4POS MQS Connector HSG, Seals and Contacts (Additional part for charge inlet cabling)	p/n acc. Prod. Spec. 108-94519	p/n acc. Prod. Spec. 108-94519
-	1	Optional: FLAP, SLIM COMBO 1, ASSY (left)	2358664-5	
-	1	Optional: FLAP, SLIM COMBO 1, ASSY (right)	2358664-7	

Table 3

### 7.3 Assembly Configurations Cable Exit

The inlet is designed for alternative cable exit directions to the left or right. These configurations are shown in figure 12 and 12a. The definition is according to view from the Charging Inlet front.

To the left side

To the right side

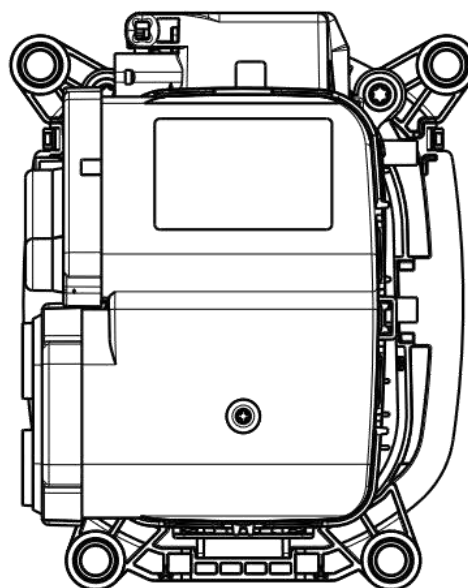
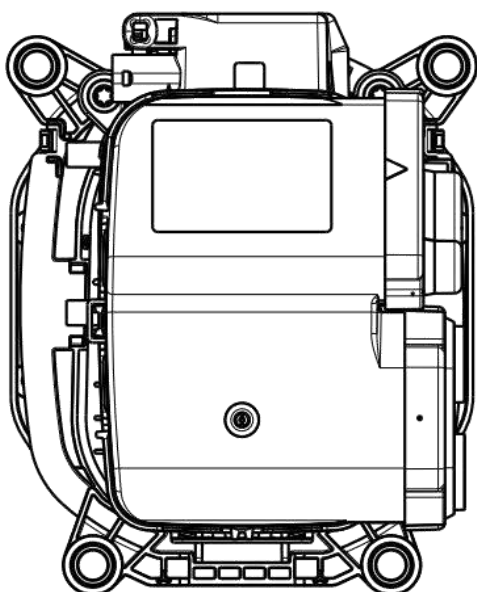


Figure 12

Figure 12a

### 7.4 Kits to order

Sets optional including Flap Unit Assembly see Table 3.

Additional parts according to table 2 above must be considered for Charge Inlet cabling!

See Figure 10 and 11.

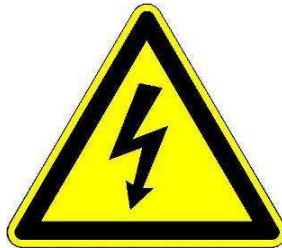
<b>PN 0-2388501-1</b> No Flap Unit Cable Exit left 12V Actuator	<b>PN 0-2388501-2</b> No Flap Unit Cable Exit right 12V Actuator	<b>PN 0-2388501-3</b> Flap open left Cable Exit left 12V Actuator	<b>PN 0-2388501-4</b> Flap open left Cable Exit right 12V Actuator	<b>PN 0-2388501-5</b> Flap open right Cable Exit left 12V Actuator	<b>PN 0-2388501-6</b> Flap open right Cable Exit right 12V Actuator
<b>PN 1-2388501-1</b> No Flap Unit Cable Exit left 24V Actuator	<b>PN 1-2388501-2</b> No Flap Unit Cable Exit right 24V Actuator	<b>PN 1-2388501-3</b> Flap open left Cable Exit left 24V Actuator	<b>PN 1-2388501-4</b> Flap open left Cable Exit right 24V Actuator	<b>PN 1-2388501-5</b> Flap open right Cable Exit left 24V Actuator	<b>PN 1-2388501-6</b> Flap open right Cable Exit right 24V Actuator

Table 4



## 7.5 Security Advice / Sicherheitshinweis

**ATTENTION!**  
**- HIGH VOLTAGE APPLICATION -**  
**CABLE INSULATION MUST NOT BE DAMAGED!**



**ACHTUNG!**  
**- HOCHSPANNUNGSANWENDUNG -**  
**LEITUNGSISOLATION DARF NICHT BESCHÄDIGT**  
**WERDEN!**

The assembly has only be performed by trained personnel.

Avoid prolonged or repeated skin contact with silver plated contacts (wear protective gloves)!

**ATTENTION!**  
**ESD SAFETY REQUIRED!**  
**THE PRINTED CIRCUIT BOARDS ARE STATIC SENSITIVE**  
**DEVICES, WHICH CAN BE DAMAGED IF TOUCHED WITHOUT THE**  
**NECESSARY ELECTROSTATIC DISCHARGE PRECAUTIONS!**  
**DURING HANDLING OF THE OPENED INLET ASSEMBLY ESD**  
**SAFETY IS REQUIRED!**



## 7.6 Assembly Steps

### Step 1

The COVER CABLE SEAL AC 2296057-2, STRAIN RELIEF AC 2367140-2 and FAMILY SEAL AC 2366865-4 must be pushed over the signal wires, the ground wire, and the AC-Multicore wire. Pay attention to place all wires at correct positions, figure 13. Especially ensure the correct position of the flange of the L-shaped FAMILY SEAL AC towards the STRAIN RELIEF, figure 13a

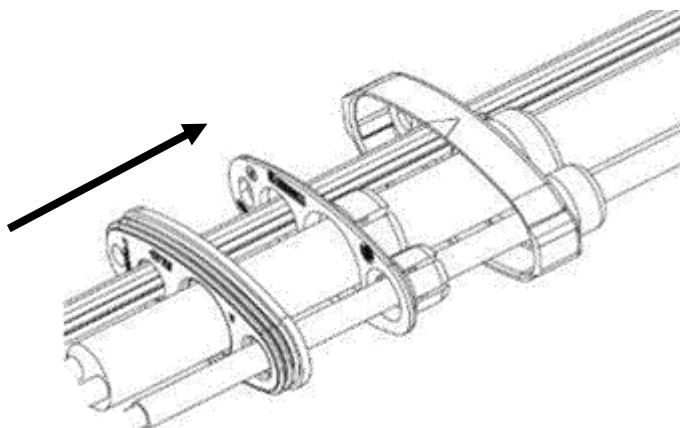


Figure 13

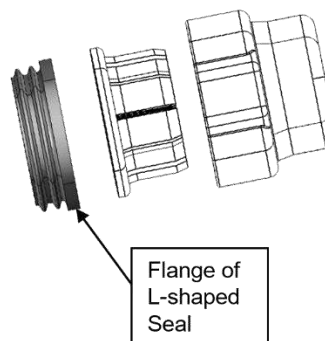


Figure 13a

### Step 2

Dismantle the wires and crimp the contacts: **2x6 mm<sup>2</sup> AC-Multicore Cable**

Remove outer insulation, shield and filler of AC-multicore-cable acc. figure 14 and table 4.

The given length of the single wires ensures that the outer sheath of the multicore cable seals to the FAMILY SEAL AC 2366865-4. Alternatively, a marking on the outer sheath in a certain distance to the cut off position can be used to ensure the proper position of the outer sheath in the FAMILY SEAL AC.

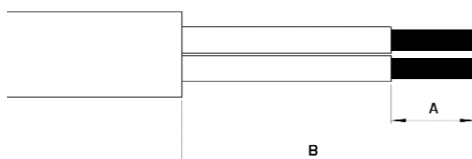


Figure 14

Wire Size	Removal of insulation dim. "A"	Length of single wires "B"
6 mm <sup>2</sup>	13 mm +/- 1mm	68 +/- 2 mm

Table 5

Crimp the conductors to the PIN DIA3.6 RIGID CONTACTS 2293266-3 with the specified tools listed in table 1. The crimp has to fulfil the requirements acc. Chapter 5.

**Step 3**

Dismantle the wires and crimp the contact: **25 mm<sup>2</sup> PE (ground) single wire**

Remove outer insulation acc. Figure 15 and table 5.

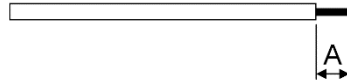


Figure 15

Wire Size	Removal of insulation dim. "A"
25 mm <sup>2</sup>	18 mm +/- 1mm

Table 6

Crimp the conductors to the PIN DIA 2.8 RIGID CONTACT 2293267-5 with the specified tools listed in table 1. The crimp has to fulfil the requirements acc. Chapter 5.

**Step 4**

Dismantle the wires and crimp the contacts: **Signal-Wires 0,5mm<sup>2</sup>**

Dismantle single wires acc. spec. 114-13000 and crimp the contacts 794606-1 acc. spec. 114-13000, see figure 16.

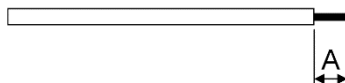


Figure 16

After Crimping the different cables, the subassembly of cables with cable exit components is in the condition shown in figure 17:

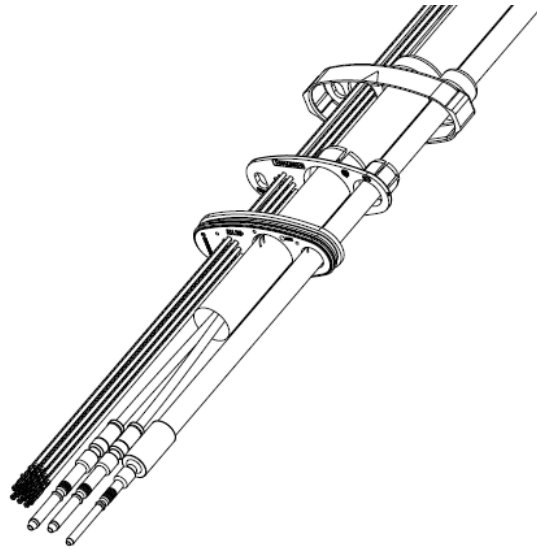


Figure 17 (schematic; crimp geometry not shown)

### Step 5

Push signal terminals 794606-1 (Micro Mate 'N' Lock) into the Connector Housing 1-794617-2 acc. application spec 114-13000. Pinning according figure 18 and table 6:

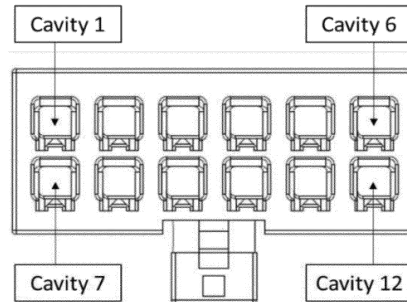


Figure 18

Cavity No.	Function
1	LED gn
2	LED rd
3	-
4	GND LED
5	LED wt
6	T DC+
7	Proxi
8	T GND
9	T DC-
10	T AC
11	PE S
12	CP

Table 7

After Micro Mate 'N' Lock connector housing assembly the subassembly of cables with cable exit components is complete, see figure 19:

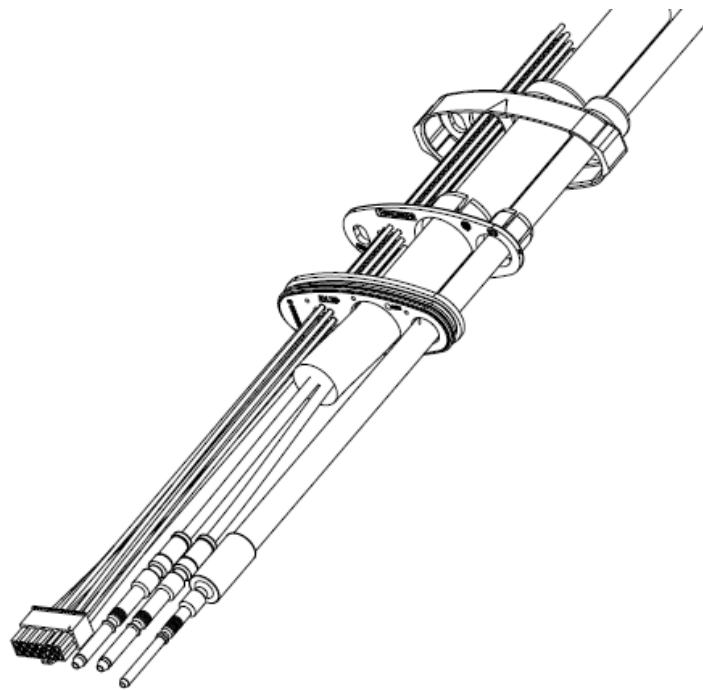


Figure 19 (schematic; crimp geometry not shown)

**Step 6**

The COVER CABLE SEAL DC 2366667-1 and FAMILY SEAL DC 2366539-1 must be pushed over the 70mm<sup>2</sup> DC-Power wires, figure 20. Especially ensure the correct position of the flange of the L-shaped FAMILY SEAL AC towards the COVER CABLE SEAL, figure 20a

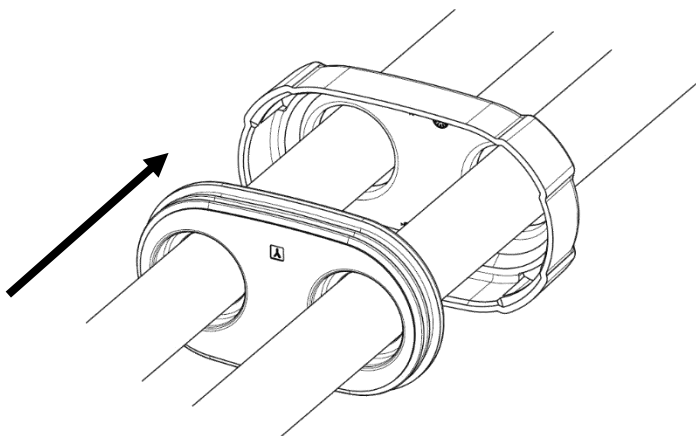


Figure 20

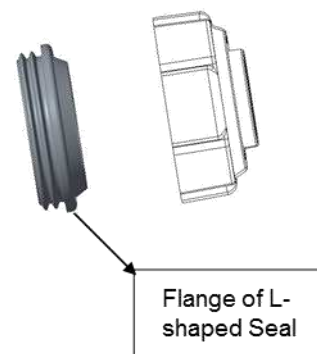


Figure 20a

Pass the cables through the DC area in the Cable Exit Combo Left 1-2303200-1 (figure 21) or Cable Exit Combo Right 1-2303200-2 (figure 21a)

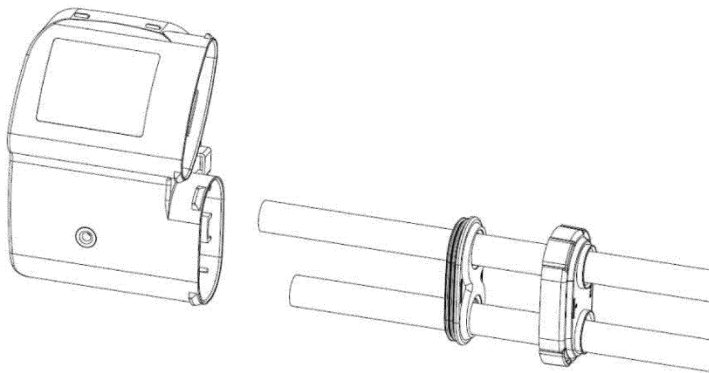


Figure 21

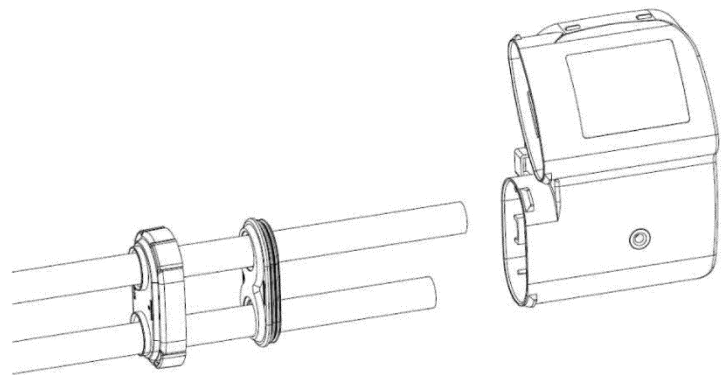


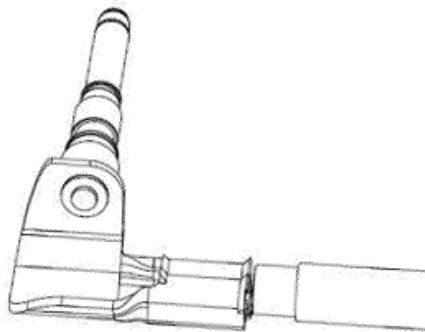
Figure 21a

**Step 7**

Dismantle the wires and crimp the contacts: **70 mm<sup>2</sup> DC Power Cables.**

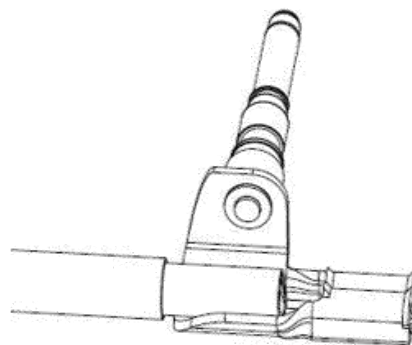
Dismantle single wires and crimp the contacts 2306180-1 according to spec. 114-94436

Remove inner isolation acc. dimension B (figure 22, 22a and 23 and table 7).



Cable direction right

Figure 22



Cable direction left

Figure 22a

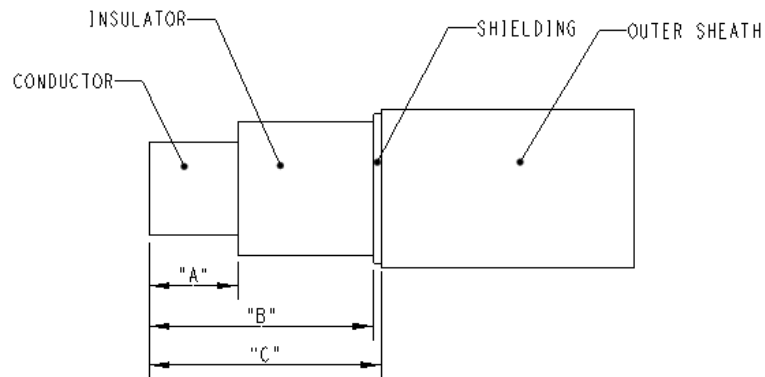


Figure 23

Dim	Cable direction RIGHT	Cable direction LEFT
Dim „A“	19 mm +/- 1mm	28 +/-1 mm
Dim „B“	29 mm +/- 1mm	63 +/-1 mm
Dim „C“	29 mm +/- 1mm	63 +/-1 mm

Table 8

For Charge Inlets with cable exit to the right (see figure 24), to the left (see figure 24a) the crimps need to be arranged as shown: DC- on the top cable position, DC+ on the lower.

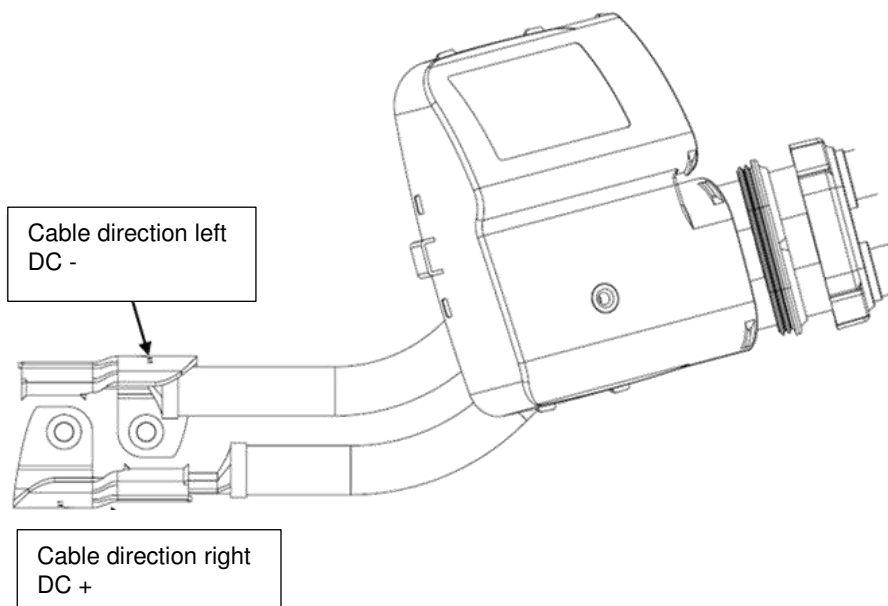


Figure 24

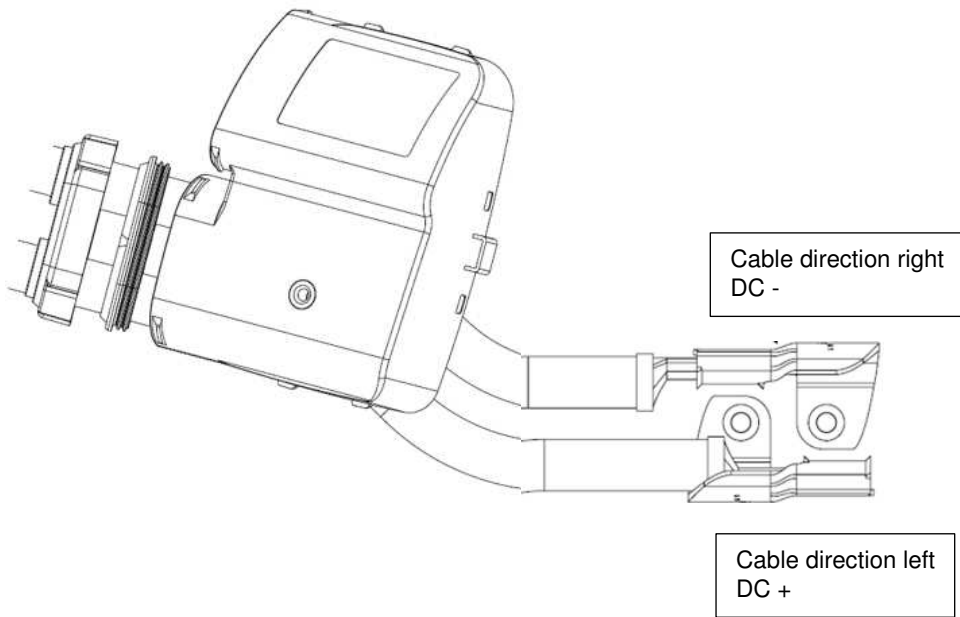


Figure 24a

**Step 8**

Assemble the DC contact seals 2120571-1 on the DC contact assemblies (figure 25). Pay attention to not damage the seal during handling. Make sure the seal does not twist or flip around, correct assembly is shown in figure 25a.

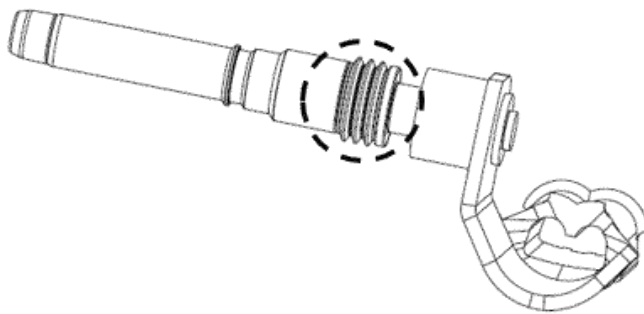


Figure 25

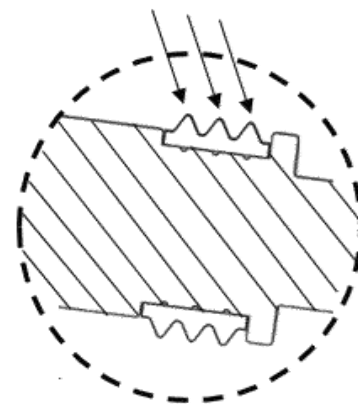


Figure 25a



**Step 9**

Pass the AC cable subassembly (figure 19) through the AC slot in Cable Exit 1-2303200-1 (figure 26). Pay attention on the symbol triangle and rectangle at the AC Seal Cover (figure 27 and 27a). Grounding cable is always in lower position at the cable exit.

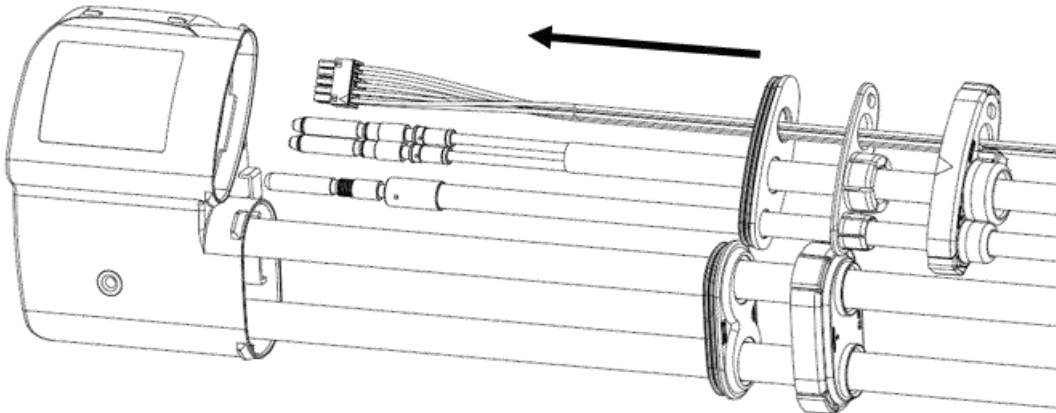


Figure 26 (exemplary)

Attention of symbol triangle or rectangle

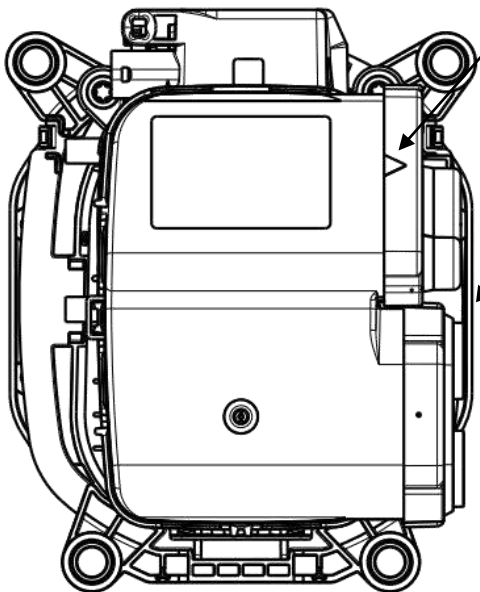


Figure 27

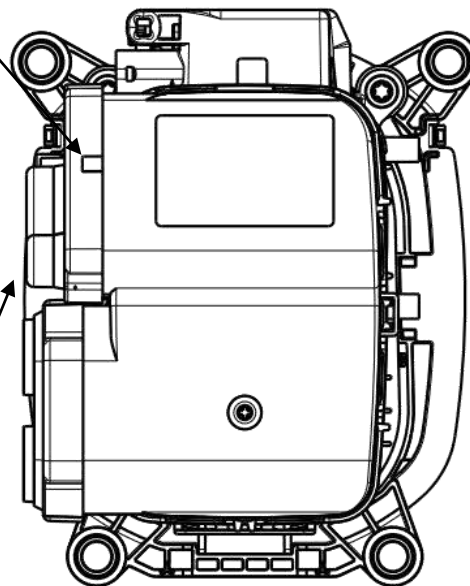


Figure 27a

PE cable must be always in lower position

### Step 10

Insert the Contacts from the backside into the Inlet Housing according to the cavity description (see figure 28) into their locking position, see figure 29. To ensure that the contacts are correctly inserted, pull with a low force on the cables (max. 10N). Figure 29a shows contacts assembled in end position.

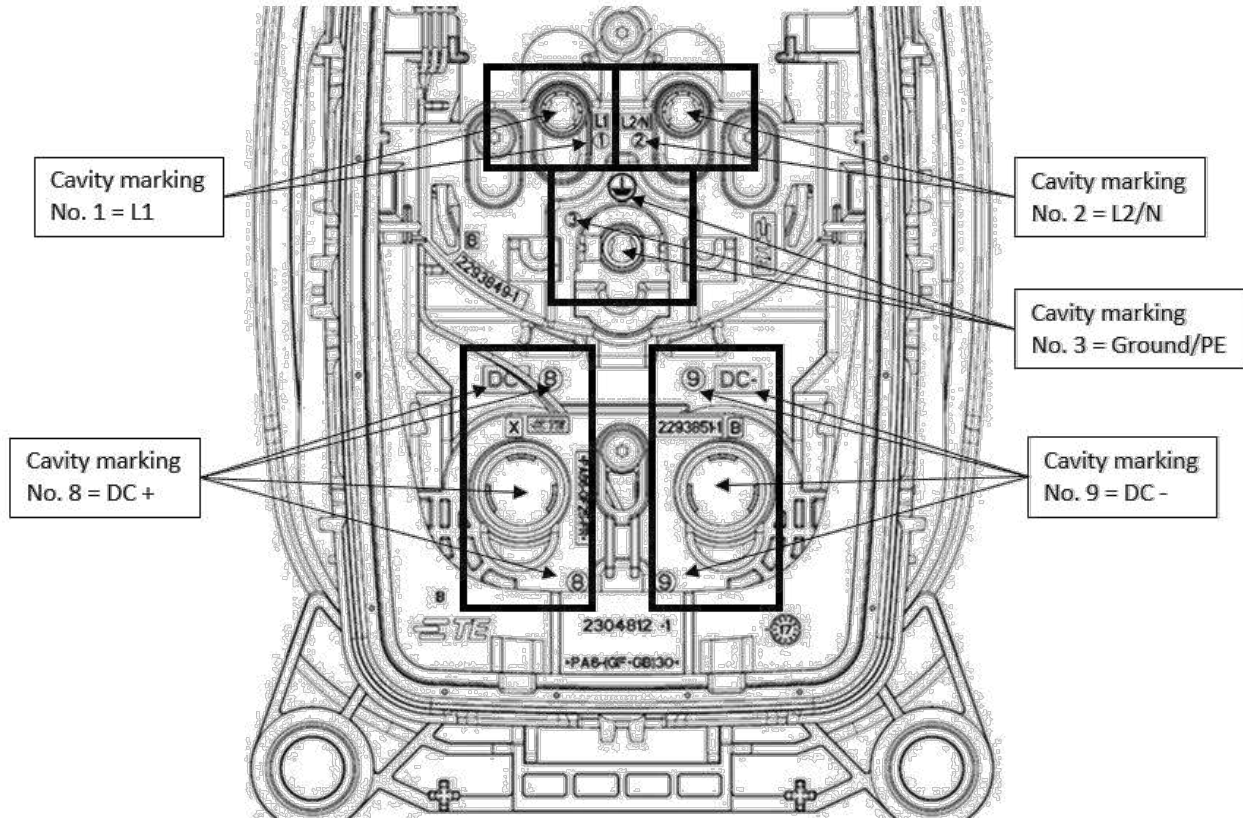


Figure 28

**ATTENTION:** The correct contact positions must be ensured BEFORE pushing the contacts into their cavities in locking position.

In case of wrong positioning of the contacts the complete assembly must be scrapped. There is no rework allowed (risk of damaging contacts and/or locking geometry in housing)!

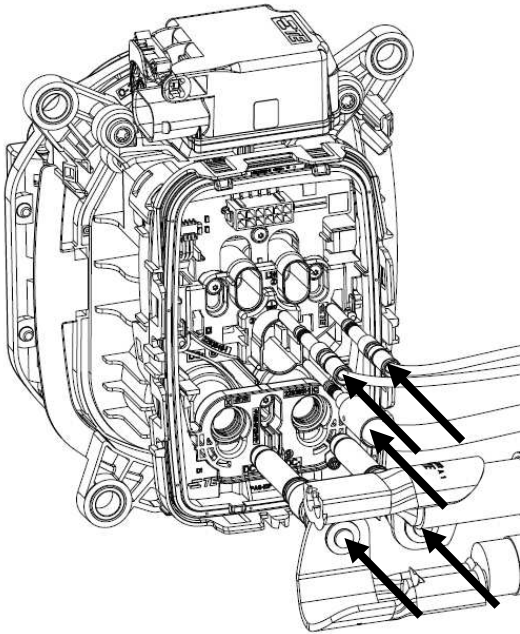


Figure 29

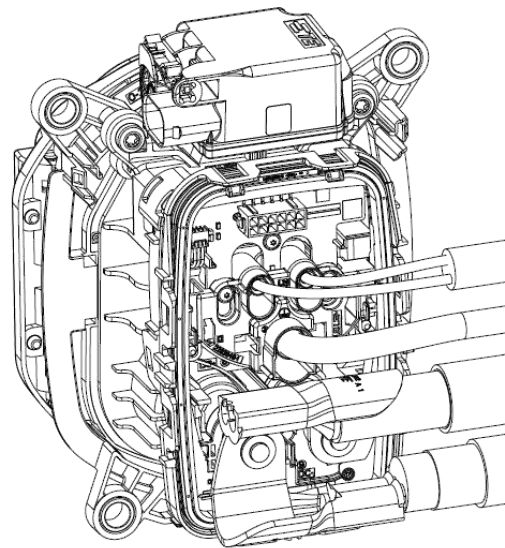


Figure 29a

Proposed sequence for contact insertion:

- 1.) 2x 6mm<sup>2</sup> AC Power Cable with contacts into L2/N and L1 cavities
- 2.) 25 mm<sup>2</sup> Ground Cable with contact into PE/ground cavity
- 3.) 2x 70mm<sup>2</sup> DC Power Cable with contacts into DC+ and DC- cavities

**Step 11**

After the contacts have been controlled for correct positioning and locking, both SECONDARY LOCKS must be pushed upwards (Figure 30). Ensure that both latches are properly engaged with the inlet housing, which must be controlled by the double audible click and by visible inspection. Secondary Locks in end position shown in figure 31 and 31a:

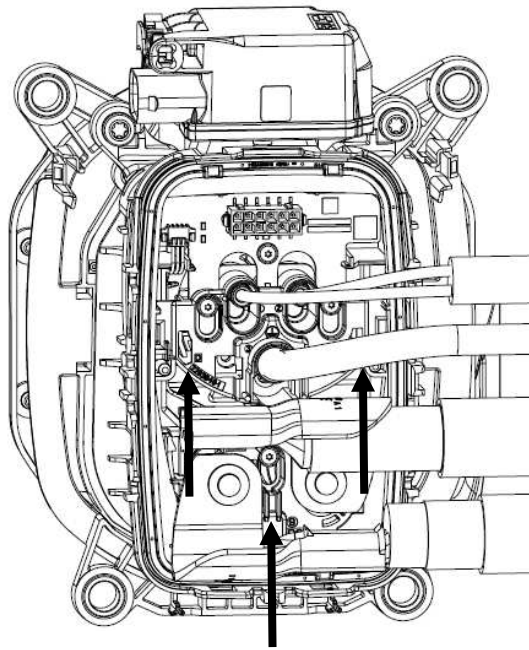


Figure 30

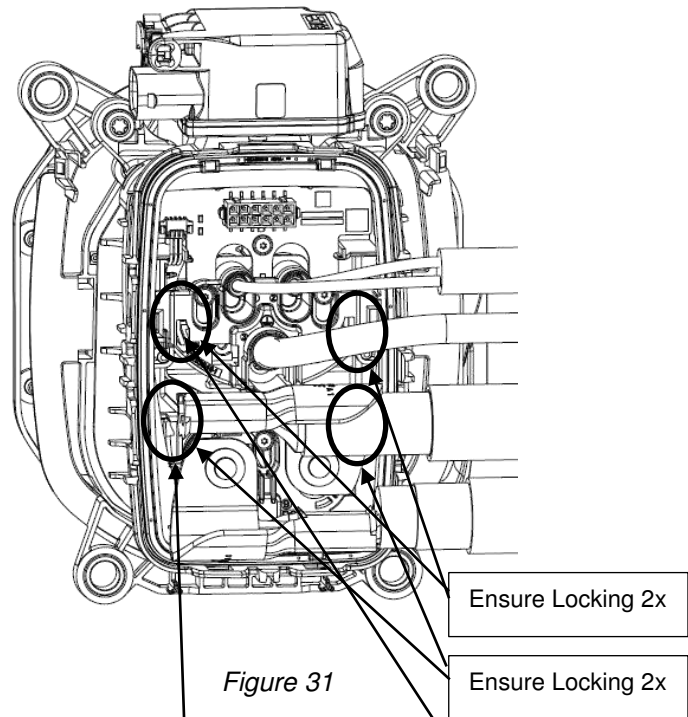


Figure 31

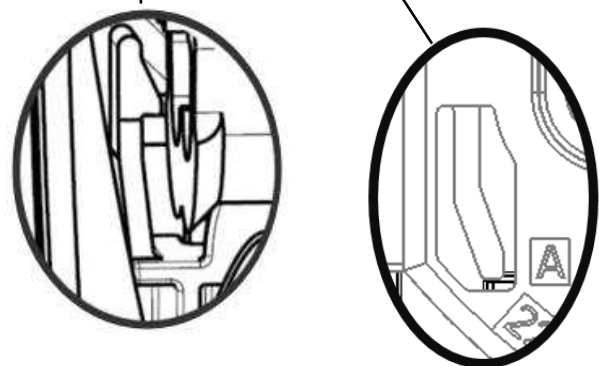


Figure 31a

### Step 12

After the contacts have been locked with the SECONDARY LOCKS in both AC and DC area, the ADAPTER with preassembled Peripheral Seals (1 seal rust red, 1 seal green) must be pushed in lock position (Figure 32). The press force must be applied on the marked locations on the surrounding collar to close the latches. Ensure that all 7 hooks are correctly engaged. (Figure 33).

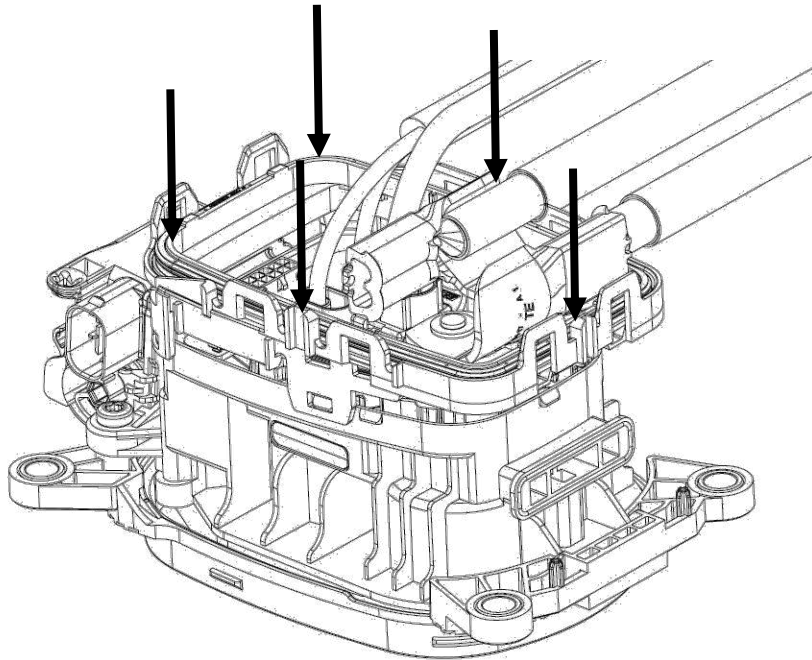


Figure 32

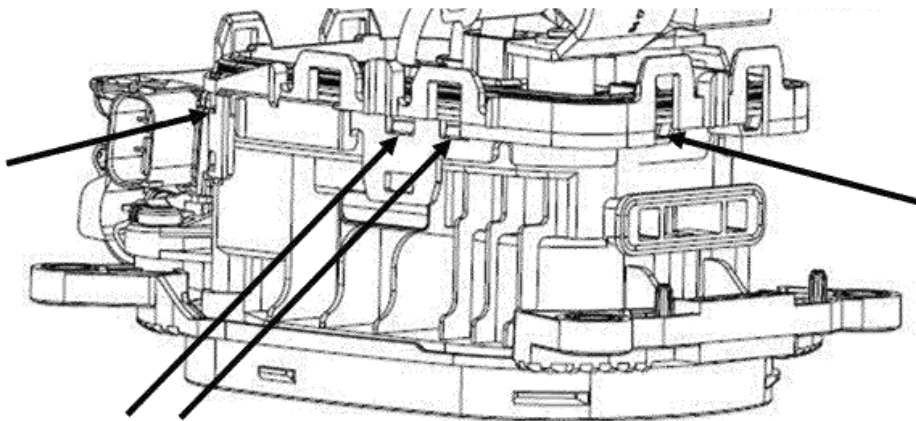


Figure 33

**Step 13**

Connect Micro Mate'N'Lock Connector to PCB-Header. Ensure the hook is properly engaged with the header (Figure 34).

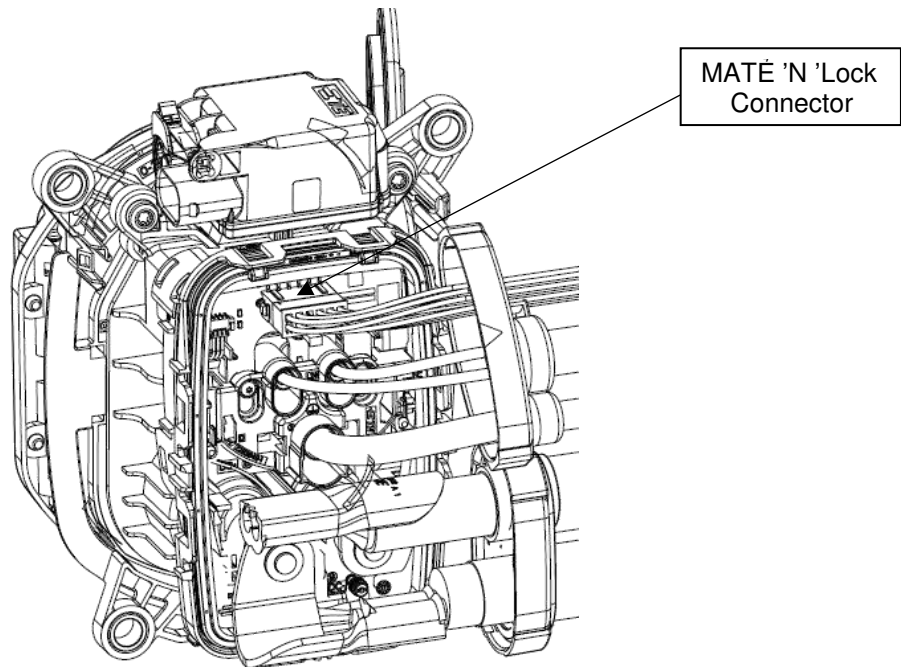


Figure 34

**Step 14**

Assemble the Cable Exit Cover Left 1-2303200-1 or Exit Cover Right 1-2303200-2 to the Inlet. Ensure that all 8 hooks are correctly engaged. (Figure 35). The press force must be applied on the marked locations close to the latches, see figure 35a.

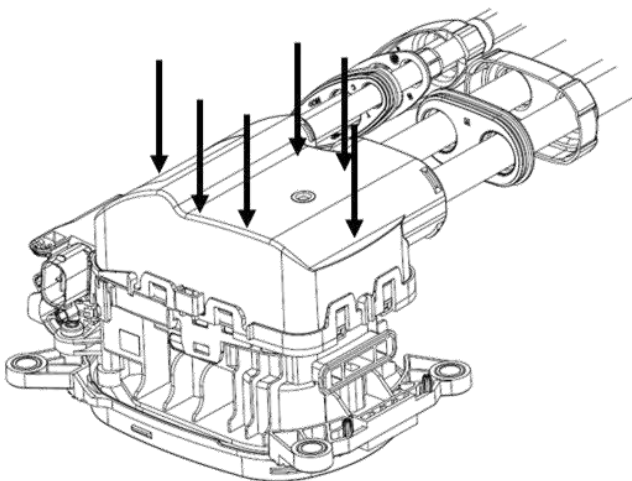


Figure 35

Press Areas to close all latches on the cover

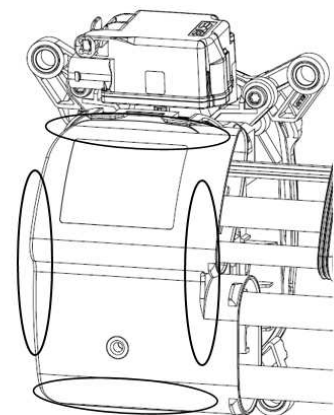


Figure 35a

**ATTENTION:** The Cable Exit Cover 1-2303200-1 and 1-2303200-2 needs to be aligned properly over the inlet and pushed vertically into position to make sure the seal slips correctly into the seating all around (figure 36)

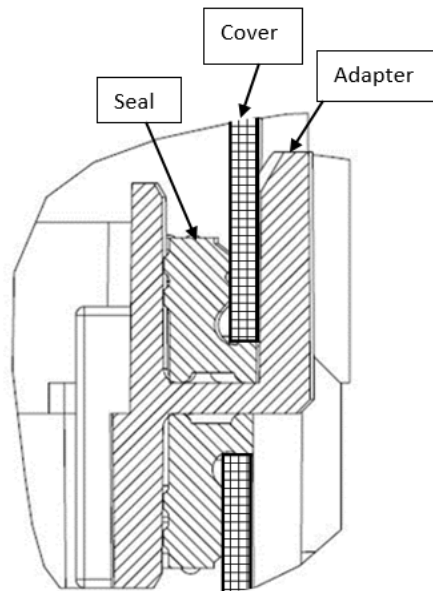


Figure 36

### Step 15

Move the STRAIN RELIEF AC 2367140-2 together with FAMILY SEAL AC 2366865-4 into their position in the CABLE EXIT LEFT 1-2303200-1 OR RIGHT 1-2303200-2, see figure 37.



**ATTENTION:** Ensure that the AC-Multicore cable is well positioned in the FAMILY SEAL, that all seal lips are safely placed on the outer isolation of the cables. (Figure 38)

Push the COVER CABLE SEAL AC 2296057-2 over it and snap it on the CABLE EXIT COVER LEFT 1-2303200-1 OR RIGHT 1-2303200-2. Ensure that both hooks are correctly engaged (double audible click), see figure 38.

Move the FAMILY SEAL DC 2366539-1 into position in the CABLE EXIT CABLE EXIT LEFT 1-2303200-1 OR RIGHT 1-2303200-2, see figure 38a.

Push the COVER CABLE SEAL 2366667-1 over it and snap it on the CABLE EXIT COVER LEFT 1-2303200-1 OR RIGHT 1-2303200-2. Ensure that all four hooks are correctly engaged (Quadro audible click), see figure 38a.

**ATTENTION:** Ensure that the DC power cables are well positioned in the FAMILY SEAL, that all seal lips are safely placed on the outer isolation of the cables. (Figure 38a)

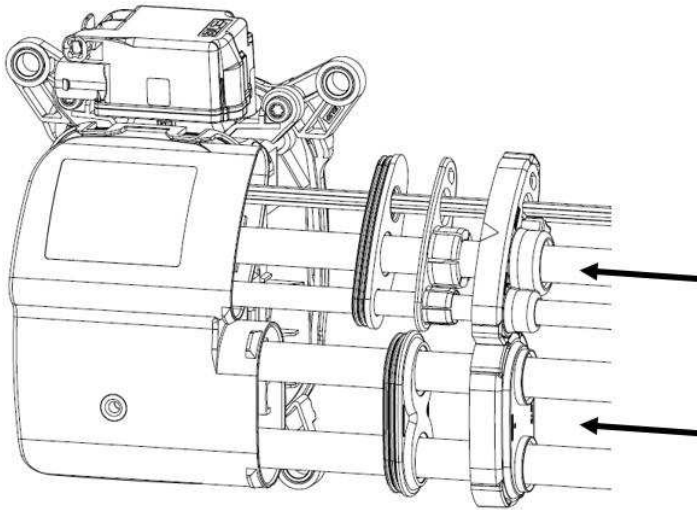


Figure 37

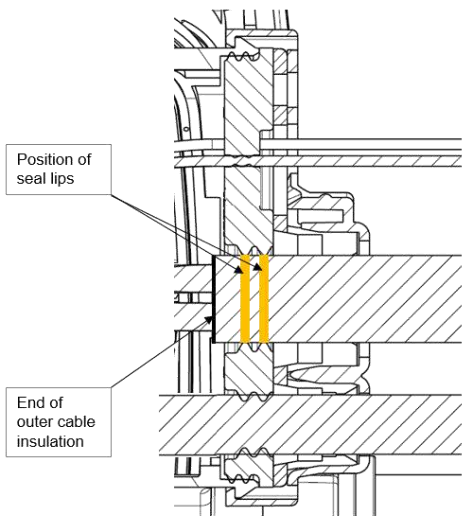
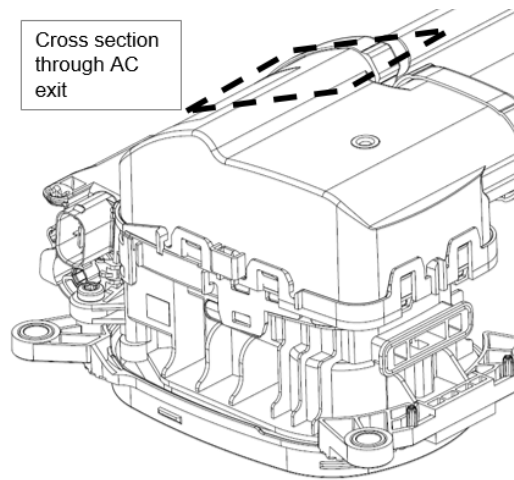


Figure 38 – AC seal lips



Cross section through AC exit

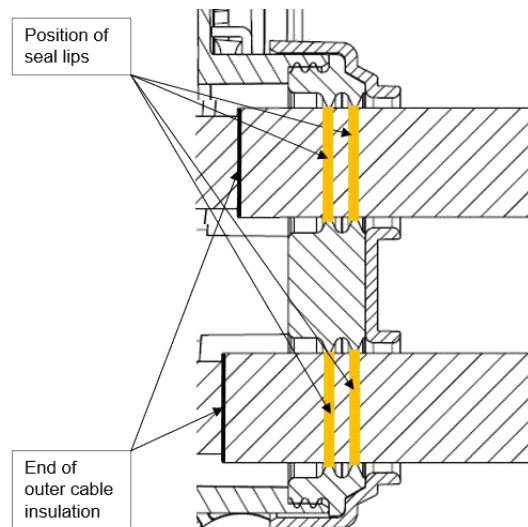
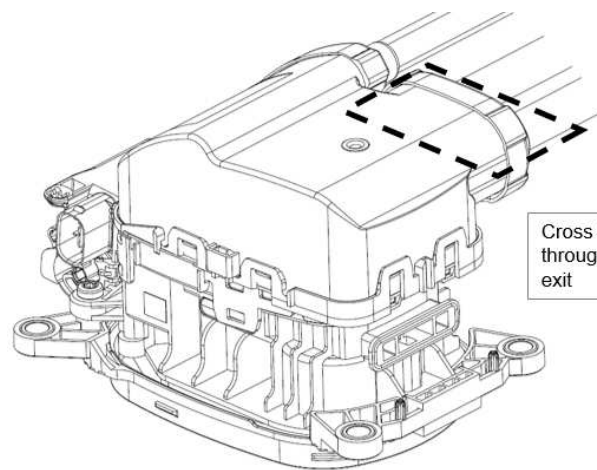


Figure 38a – DC seal lips

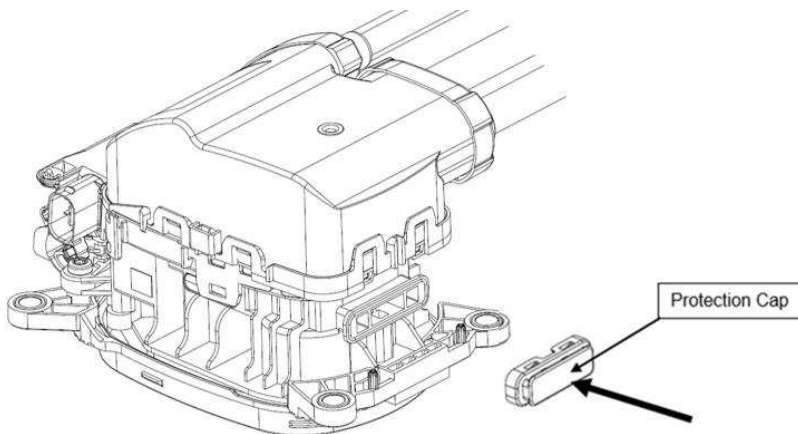


Cross section through DC exit



**Step 16**

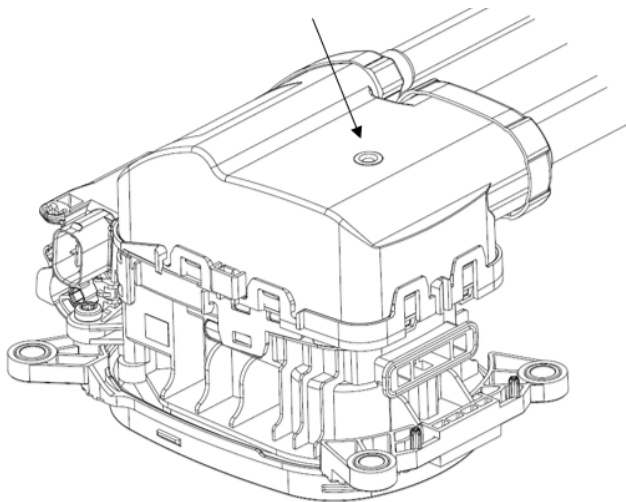
Assemble Protection Cap 2292534-1 at Inlet Housing, see figure 39.



*Figure 39*

**Step 17**

As part of the End of Line Test as listed in Chapter 7.7., perform the tightness check of the fully assembled charge inlet. The pressure port on the rear of CABLE EXIT COVER 1-2303200-1 (shown in figure 40) or 1-2303200-2 is designed to fit an elastic plastic tube (Polyurethane or similar) with an outer diameter of 4mm.



*Figure 40*

The tubular geometry of the pressure port has a reduced inner diameter towards the bottom to increase the pressure on the elastic tube when being inserted. The tube needs to be pushed that far into the pressure port that a reliable sufficient air tightness can be achieved, see figure 41 for exemplarily inserted tube.

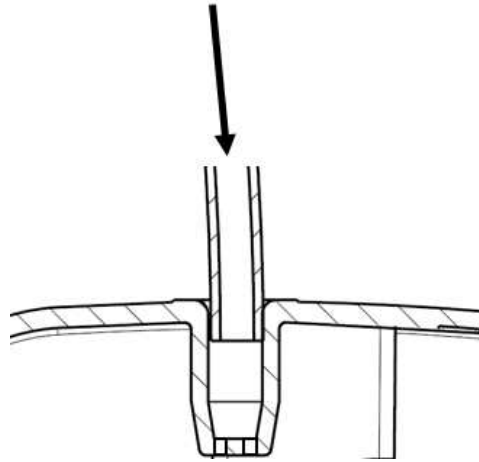


Figure 41

For the tightness check it is intended to perform an air differential pressure decay leak measurement test. Pressure profile is 0,1...0,15 bar, preferably under pressure. Acceptance criterion is pressure loss over time and has to be defined based on particularly prepared failure test samples

After successfully passed tightness check the pressure port needs to be closed with the MQS CAVITY PLUG 963143-1

The MQS CAVITY PLUG needs to be FULLY inserted into the pressure port, see figure 42. The bottom of the pressure port is closed with a cross geometry to avoid that the MQS Cavity Plug could be pushed through.

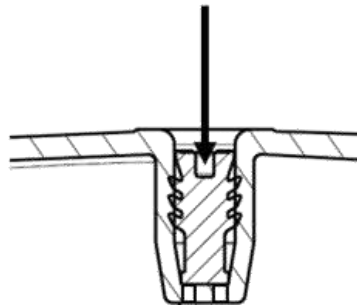




Figure 42

**Step 18**

For identification apply the label on this specified polished face on the CABLE EXIT (Figure 43). The label needs to include information acc. requirements of IEC 62196-x and IEC 61851 and SAE 1772. Additional information acc. to customer requirements can be applied here.

Marking acc. IEC62196-3 /SAE J1772:

Manufacturer's name or trademark	xxxxxxx
Type reference of identification number	Art: xxxxxxx
Rated currents, maximum voltages and frequency	Max. 32A, 250V~ 50-60Hz / Max. 200A, 600V
Number of phases	1L / N /  / DC+ / DC- 
Degree of protection	IP67

There may apply additional national marking requirements, depending on the market/country the vehicle will be configured for. Also, information acc. to customer requirements can be applied here. As a compatible label TE p/n 5-1768421-9 is recommended.

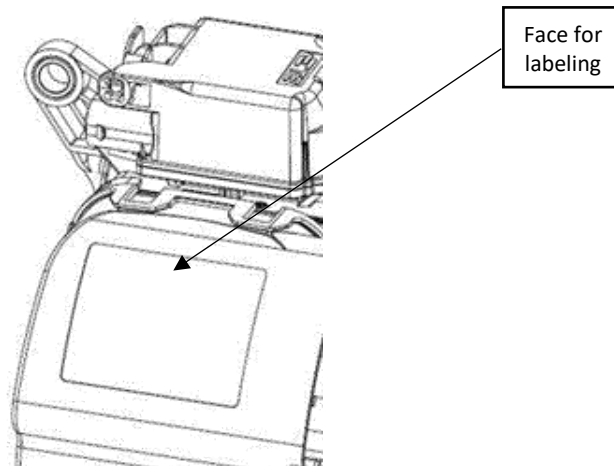


Figure 43

7.7 End of Line Test



The assembled Charge Inlet has to be tested electrically and mechanically to applicable requirements, including High Voltage test.

As a minimum, following tests have to be performed:

- Isolation Resistance:  
 Test Voltage: 500VDC  
 Inspection Duration: 1s  
 min. Riso: 200MOhm  
 pin-to-pin, excluding CP-to-Proxi and CP/Proxi-to-Ground
  - a) L1 versus N
  - b) L1+N versus Ground
  - c) L1+N versus AC multicore shield
  
- Dielectric withstand voltage:  
 Test Voltage: 2000VAC  
 Inspection Duration: 1s  
 max. Leakage current: 10mA  
 pin-to-pin, excluding CP-to-Proxi and CP/Proxi-to-Ground
  - a) L1 versus N
  - b) L1+N versus Ground
  - c) L1+N versus AC multicore shield
  - d) DC+ versus DC-
  - e) DC+ and DC- versus HV cable shield
  
- Correct Pinning of all Contacts
  
- Check for LED Signals as per below parameter.

Test Item	TEST VOLTAGE		GROUND PIN	PROPERTY @T <sub>amb</sub> = 25° ± 5° C	
	VALUE	PIN		LIGHT EMISSION	CURRENT
LED WHITE	11V ± 0.2V	5	4	WHITE	20mA + 4mA
LED GREEN	11V ± 0.2V	1	4	GREEN	20mA + 4mA
LED RED	11V ± 0.2V	2	4	RED	20mA + 4mA

- Check seals for correct seating by Tightness Check of completed Charge Inlet Harness Assy (Air pressure test)
  
- Check correct assembled MQS Cavity Plug in the pressure port after Tightness Check.
  
- Functionality check of actuator. Drive (first) in lock and (second) in unlock position. During this operation, the actuator pull ring / pull cable becomes pulled back in end position.

LTR	REVISION RECORD	DWN	APVP	DATE
A	INITIAL DOCUMENT	SUPRIYA S	DANAPPA H	09.08.2021
A1	REV. A1: ADD EOL PARAMETERS AT CHAPTER 7.7: INSULATION RESISTANCE D), DIELECTRIC WITHSTAND VOLTAGE D) AND E)	SUPRIYA S	DANAPPA H	17.08.2021
B	REV. B: CHAPTER 2 AND CHAPTER 3: PE CABLE, 25MM <sup>2</sup> SUPPLIER DETAILS CHANGED FROM RAYCHEM TO H&S	SRAVANI N S	KASHYAP P B	12.04.2023
B1	REV. B1: 24V ACTUATOR VARIANTS ADDED	AJITH JAMES	KASHYAP P B	12.02.2024

DRW SUPRIYA S	TE CONNECTIVITY GERMANY GMBH AMPÈRESTRASSE 12-14 D-64625 BENSHEIM CHK GERMANY		
CHK KASHYAP P B			
APVP DANAPPA HUGAR	NO 114-94722	REV B	LOC AI
TITLE	<p style="text-align: center;"><b>Application Specification</b>  <b>Vehicle Charge Inlet Type COMBO 1 acc. IEC62196-3</b></p>		