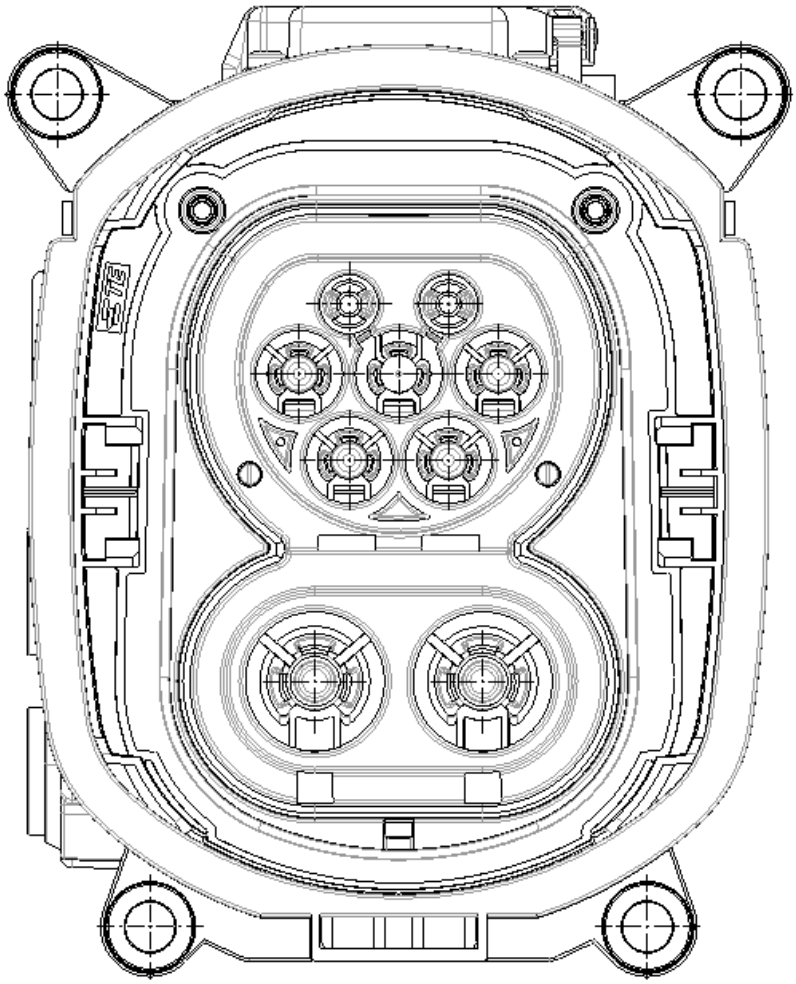
Class 1

EV Charge Inlet Combo2 (90°AC-DC)



| Indicates Change

Content

1. SCOPE

1.1. Content

This specification describes the assembly and handling of the vehicle charge inlets Combo 2 acc. 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.

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 Combo 2

CHARGE INLET KIT. COMBO 2, 90 DEGREE	2407175
INLET HSG, COMBO 2, ASSY	2407173
DIA 6MM, PIN TERMINAL, AC 6SQMM	2293269
DIA 6MM, PIN TERMINAL, PE 16SQMM	2293270
PROTECTION CAP CHARGE INLETS	2292534
SEALING	2120571
DIA 8MM, PIN TERMINAL	2306177
CABLE EXIT, RECT, COMBO, LEFT	2303200
FAMILIY SEAL, AC	2296040
STRAIN RELIEF, AC	2296056
COVER, CABLE SEAL, AC	2296057
FAMILY SEAL, COMBO DC	2303206
COVER, CABLE SEAL, COMBO DC	2303237
MQS BLINDSTOPFEN	963143

b) Specifications / Spezifikationen

108-94868	Product Spec. Vehicle Charge Inlets Combo 2
114-13000	Application Specification Micro Mate-N-Lock Connectors
108-94519	Product Specification Vehicle Charge Inlet Actuator GEN 2
114-94436	Application Specification 90 DEG Charger Inlet Contact System

2.2. General Documentation

Cable Specifications of Prescribed Cables

AC-cable: cross-section 4 x 6,0mm²

Supplier	COROPLAST
Outer Diameter	15,1 $^{-0,6}$ mm
Min. bending radius	3xD (static)
Cable description	*FHLR2G2GCB2G 4x6.0mm²* *similar LV216-2 class F (T200)* *TPJLR.18.007, Issue 3*
Supplier Part No.:	FLHR2G2GCB2G 4x6mm²

Supplier	Coficab
Outer Diameter	15,1 $^{-0,6}$ mm
Min. bending radius	3xD (static)
Cable description	*FHLR2G2GCB2G 4x6.0mm²* *similar LV216-2 class F (T200)* *TPJLR.18.007, Issue 3*
Supplier Part No.:	9-2641 (4x6mm²)

DC-HV-Cable : Cross-section 1 x 70mm²

Supplier *:*	HUBER+SUHNER
Outer Diameter	17.0±0.3 mm
Cable description*:*	*FHLR4GC13X-1x70 T150*
Part No.:	84100298

DC-cable: cross-section 50mm²

Supplier	COROPLAST
Outer Diameter	15.8 $^{-0,6}$ mm
Cable description	*FHLR2GCB2G 50mm²* *similar LV216-2 Tab. A.2*
Supplier Part No.:	9-2611 FHLR2GCB2G 50mm²

Supplier	COFICAB
Outer Diameter	15.8 $^{-0,6}$ mm
Cable description	*FHLR2GCB2G 50mm²* *similar LV216-2 Tab. A.2*
Supplier Part No.:	LGCBG500xyzw

PE-cable: cross-section 1x16mm²

Supplier	COFICAB
Outer Diameter	*8.3mm -0.9mm*
Cable description	*FLY 16/0.21 acc. LV112*
Supplier Part No.:	LLYF1600xxyy (xxyy -> color acc. to datasheet)

Signal-cable: cross-section 0,5mm²

Supplier	Several
Outer Diameter	1.6-0.2 mm
Cable description	*FLRY-0.5 A*

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 [mm²]	Stripping Length single wire for crimp [mm]	Crimp /WELD height CH_1 [mm]	Cable Specification	Supplier	Contact P/N	Geo-metry	Applicator	TE Crimp Validation is based on crimp press stroke / cycle time
0.5	Acc. to application specification 114-13000 (Crimped contact)							
6	13,0 ± 1	3,7 ± 0,1	FHLR2G2GCB2G 4x6.0mm²	COROPLAST COFICAB	2293269-3	W	2234179-1	HV-20 2348822-1[1]
16	16,0 ± 1	5.10 ± 0.1	FLY 16 / 0.21	COFICAB	2293270-4		2276149-8	
50	Right 19,0±1,0 Left 28,0 ±1,0	8.7 ± 0,15	FHLR2GCB2G 50mm²	COROPLAST COFICAB	2306177-1	F	2326060-1	HV-20 2348822-1[1]
70	Right 19,0±1,0 Left 28,0 ±1,0	9,3±0,15	Radox ELASTOMER 70mm²	HUBER & SUHNER	2306177-1	F	2326060-1	HV-20 2348822-1[1]

Table 1

1) Crimping press “HV Crimping Machine 528008-4 with adapter” & related applicators acc 114-94440 REV. B2 were used for product validation. They are still released for production, but no longer available in the TE Portfolio.

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 the 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 contactability 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.

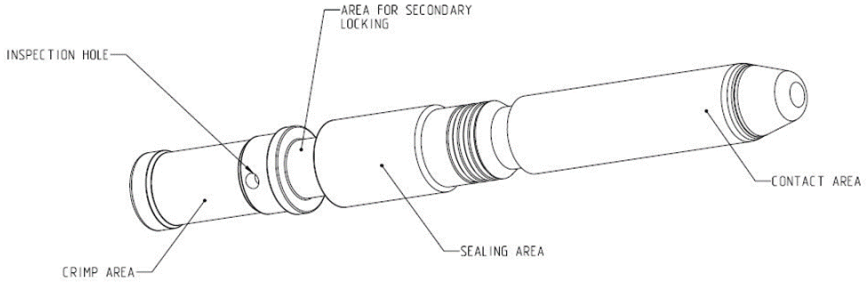


Figure 1

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 stand 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

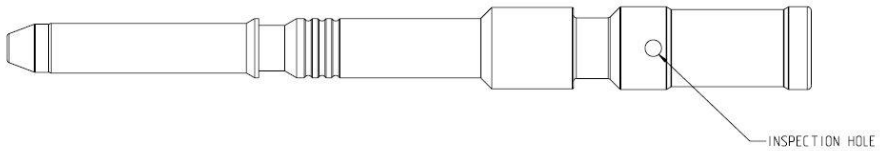


Figure 2

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-destroying examination and a continuous process inspection. It is provided for every wire size and contact.
The crimp height is given in table 2.

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:

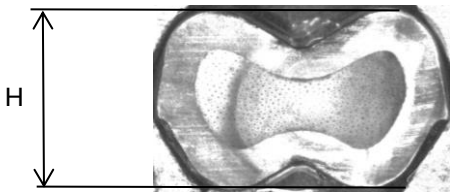


Figure 3 (picture exemplarily)

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.

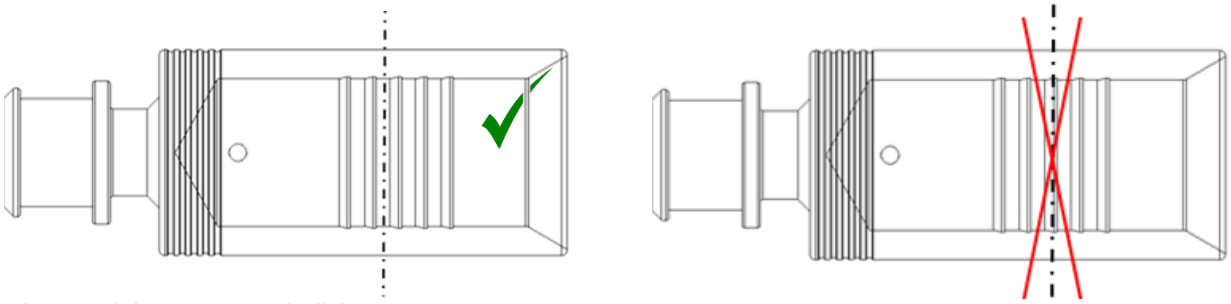


Figure 4 (picture exemplarily)

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 fulfil the requirements according product specification 108-94556

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.

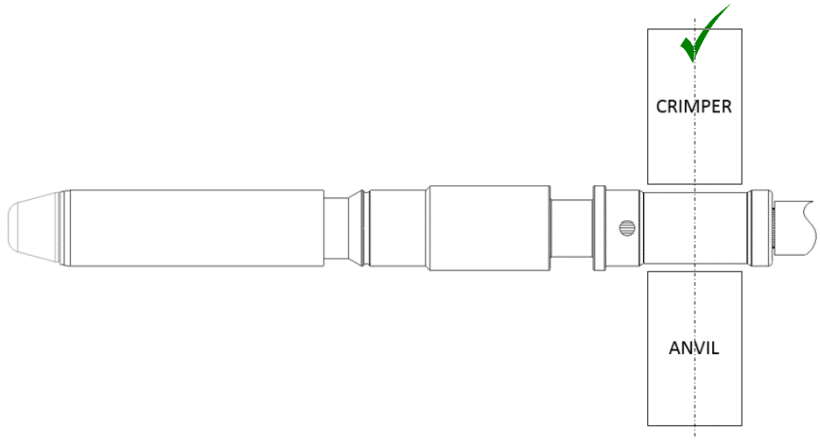


Figure 5 (picture exemplarily)

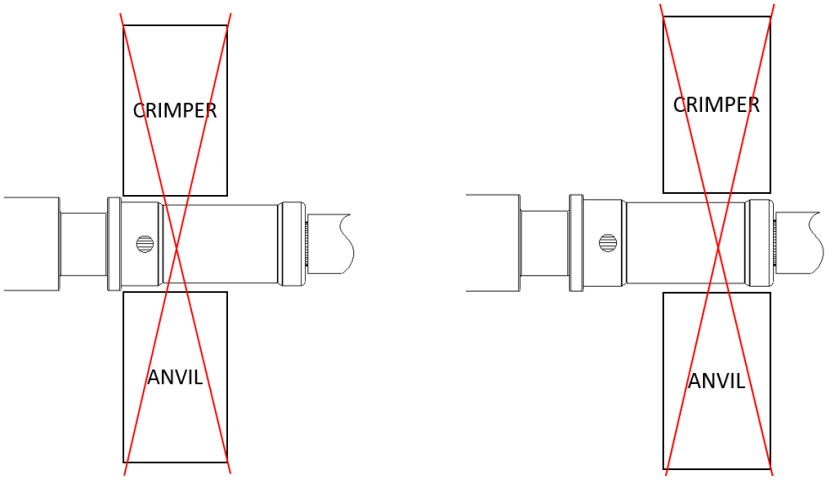


Figure 6 (picture exemplarily)

5.6. Contact area

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

5.7. Sealing area

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

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.

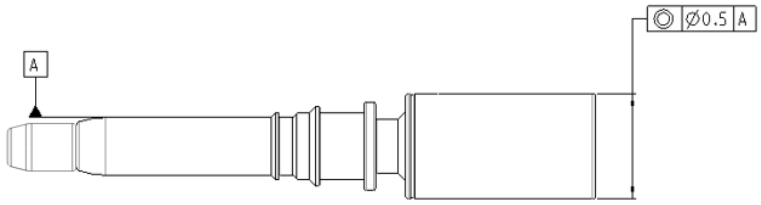


Figure 7 (picture exemplarily)

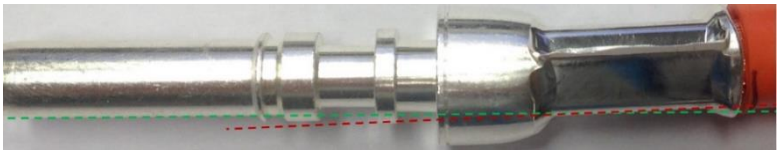


Figure 8 (picture exemplarily)

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 (picture exemplarily)

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

The crimp of the 70 mm² AND 50 mm² 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 Combo2

Charge Inlet Combo 2 Left 90 Degree Kit

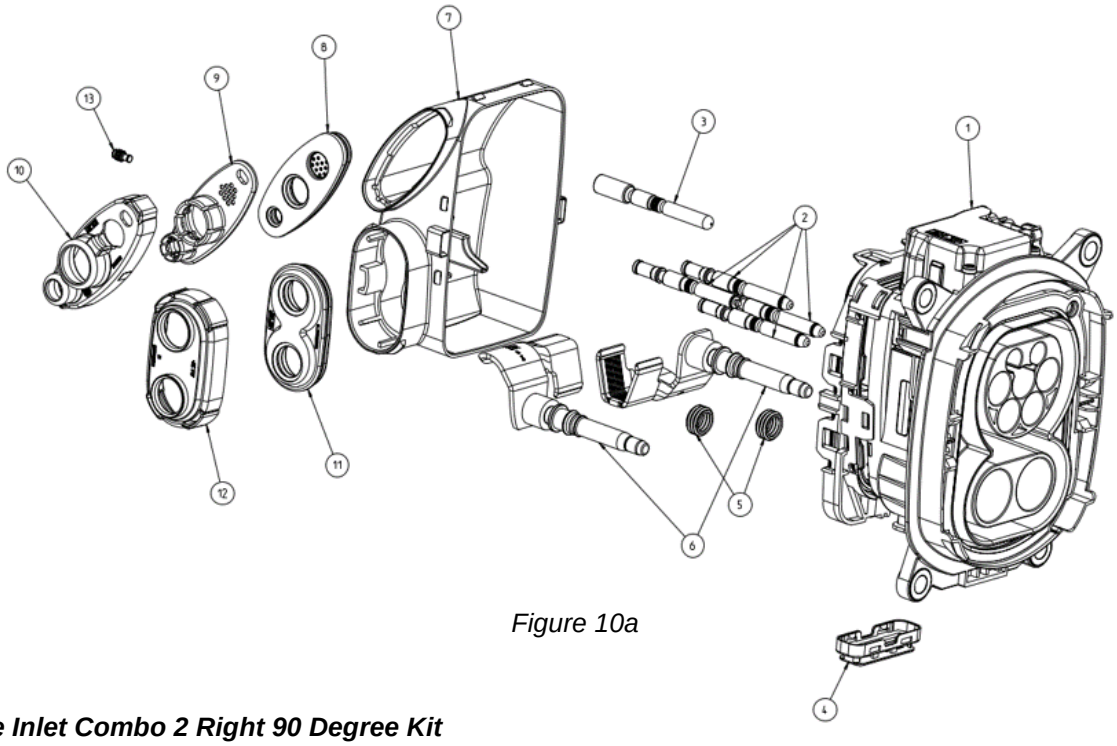


Figure 10a

Charge Inlet Combo 2 Right 90 Degree Kit

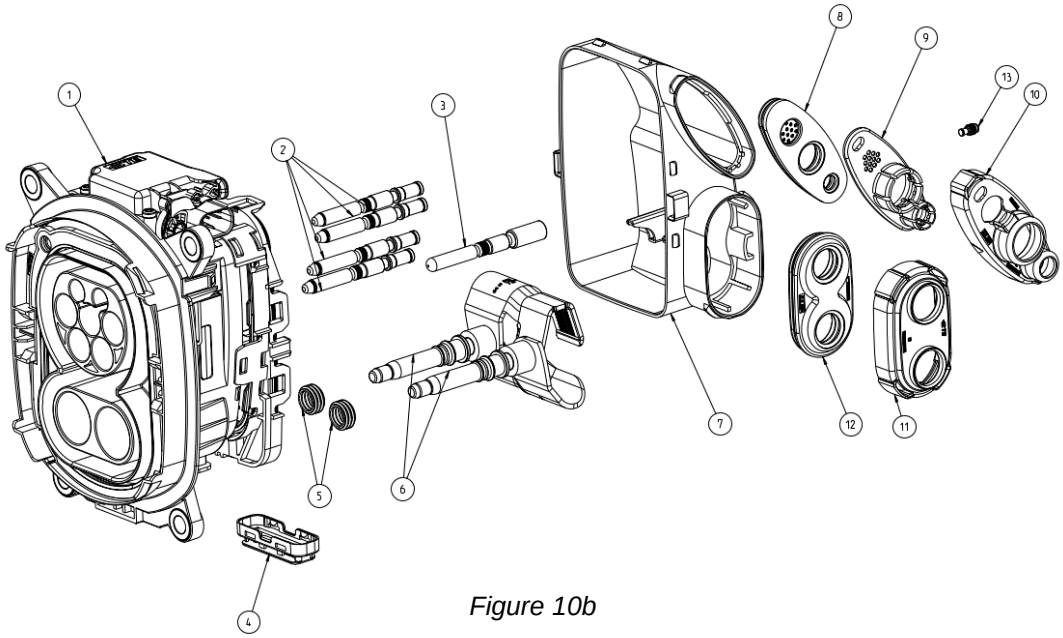


Figure 10b

7.2. Parts to order

Charge Inlet Combo 2 90 Degree		Charge Inlet Left				
Variant / Part		3-phase AC 6mm² Ground 16mm² DC 50mm² / 70mm²				
Pos.	Name / Bezeichnung	PN	2407175-1 AC-DC 90° LEFT DC-70mm²	2407175-2 AC-DC 90° RIGHT DC-70mm²	2407175-3 AC-DC 90° LEFT DC-50mm²	2407175-4 AC-DC 90° RIGHT DC-50mm²
1	INLET HSG, COMBO2, ASSY	2407173-4	1	1	1	1
-	12P MICRO MNL HSG (Additional part for charge inlet cabling)	1-794617-2	1	1	1	1
	CONTACT MICRO MNL (0.5mm²) (Additional part for charge inlet cabling)	2825493-1	11	11	11	11
2	PIN DIA 6.0, RIGID, POWER AC, ASSY (6mm²)	2293269-3	4	4	4	4
3	PIN DIA 6.0, RIDIG, PE (16mm²)	2293270-4	1	1	1	1
4	PROTECTION CAP, TE, WATER DRAIN	2292534-1	1	1	1	1
5	SEALING	2120571-1	2	2	2	2
6	PIN DIA 8.0, 90 DEG, CONTACT, ASSY TYP 2, (70mm²)	2306177-1	2	2	2	2
7	CABLE EXIT DC SIDE, COMBO LEFT	5-2303200-1	1	-	1	-
	CABLE EXIT DC SIDE, COMBO RIGHT	5-2303200-2	-	1	-	1
8	FAMILY SEAL, AC (PE 16mm², AC 4x 6mm², Signal 7x 0.35mm² or 0,5mm²)	1-2296040-2	1	1	1	1
9	STRAIN RELIEF, AC	2296056-2	1	1	1	1
10	COVER, CABLE SEAL, AC	5-2296057-3	1	1	1	1
11	FAMILY SEAL, COMBO DC (70mm²)	2303206-5	1	1	-	-
	FAMILY SEAL, COMBO DC (50mm²)	2303206-4	-	-	1	1
12	COVER, CABLE SEAL, DC	5-2303237-5	1	1	-	-
	COVER, CABLE SEAL, DC	5-2303237-4	-	-	1	1

13	**MQS CAVITY PLUG FOR CENTERLINE 4 MM**	**963143-1**	**1**	**1**	**1**	**1**
-	**4POS MQS Connector HSG, Seals and Contacts (Additional part for charge inlet cabling)**	**p/n acc. Prod. Spec. 108-94519**	**1**	**1**	**1**	**1**

Flap Options Available

Pos.	Quantity	Description	P/N
14	**1**	**Flap Assembly Left**	**2307051-2**
	1	**Flap Assembly Right**	**2307051-1**

Table 2

7.3. Assembly Configurations Cable Exit

The inlet is designed for alternative cable exit directions to the left or right. This configuration is shown in figure 11 and figure 12. The definition is according to the view from the Charging Inlet front. In this spec only left exit is shown

Configurations for cable exit sidewards:

Charge Inlet with Cable Exit on the left

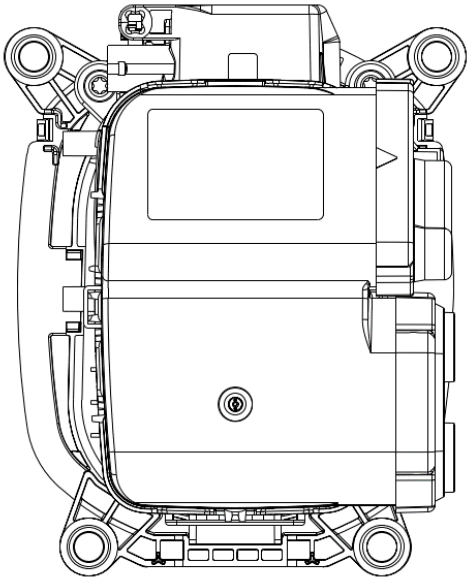


Figure 11

Charge Inlet with Cable Exit on the right

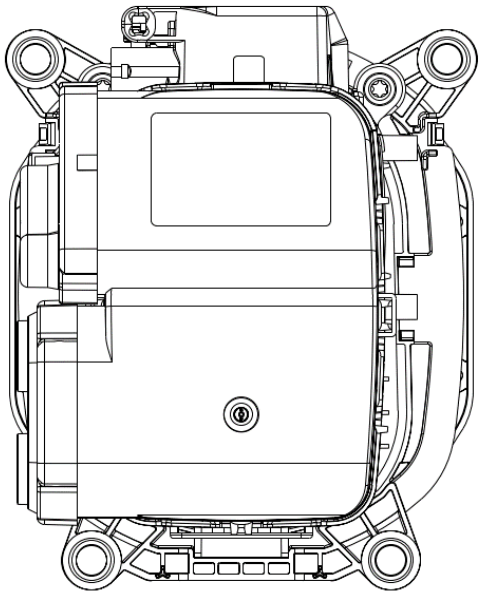
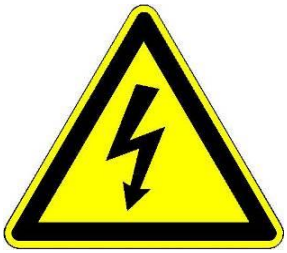


Figure 12

7.4. Security Advice

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



ATTENTION!

ESD safety required - The printed circuit boards are static sensitive devices, which can be damaged if touched without the necessary electrostatic discharge (ESD) precautions. During handling of the open inlet assembly ESD safety is required.

The assembly has only be performed by trained personnel.

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

7.5. Assembly Steps

Step 1
The COVER CABLE SEAL AC 5-2296057-3, STRAIN RELIEF AC 2296056-2 and FAMILY SEAL AC 1-2296040-2 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 13a. Especially ensure the correct position of the flange of the L-shaped FAMILY SEAL AC towards the STRAIN RELIEF, figure 13b

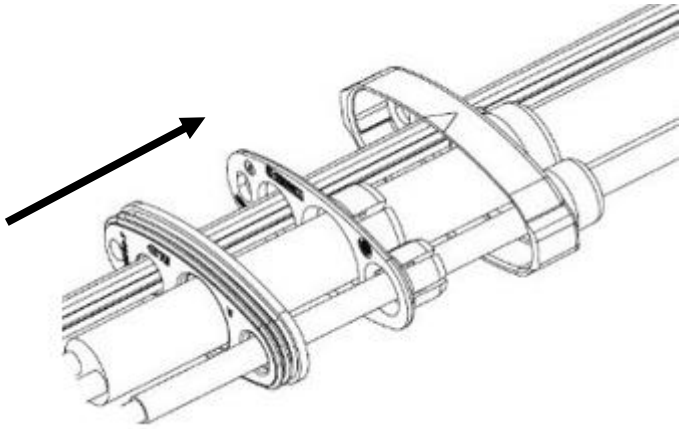


Figure 13a

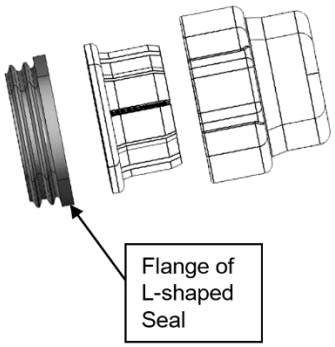


Figure 13b

Step 2

Dismantle the wires and crimp the contacts: **4x6 mm² AC-Multicore Cable**

Remove outer insolation, 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 2350592-5. 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.

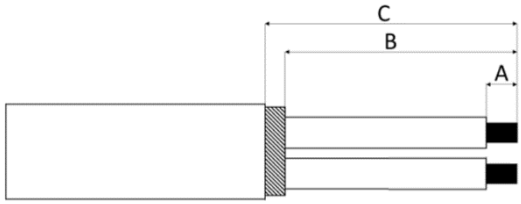


Figure 14 (schematic view)

A (Removal of single wire isolation)	B (Removal of shield)	C (Length of single wires)
13 ± 1 mm	65 ± 2 mm	68 ± 2 mm

Table 4

Crimp the conductors to the PIN DIA6,0 RIGID CONTACTS 2293269-3 with the specified tools listed in table 1. The crimp has to fulfil the requirements acc. Chapter 5.

Apply the PET tape Coroplast 837 X / 838 X (or similar) onto the cut shielding like shown in *Figure 14a*. It must be ensured that the excess shield is completely covered with tape.

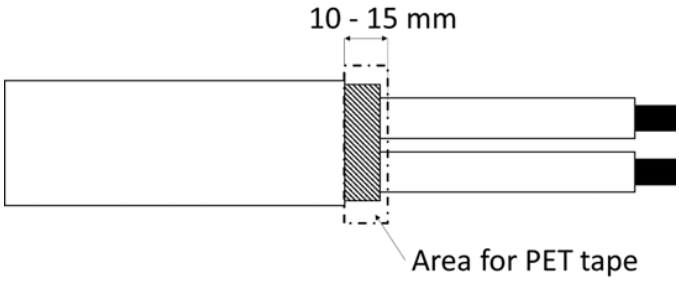


Figure 14a

Step 3

Dismantle the wires and crimp the contact: **16 mm² PE (ground) single wire**

Remove outer insolation acc. Figure 15 and table 5.

Figure 15

Wire Size	Removal of insulation dim. "A"
16 mm²	16 ± 1 mm

Table 5

Crimp the conductors to the PIN DIA 6,0 RIGID CONTACT 2293270-4 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 0,5mm²**

Dismantle single wires acc. spec. 114-13000 and crimp the contacts 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:

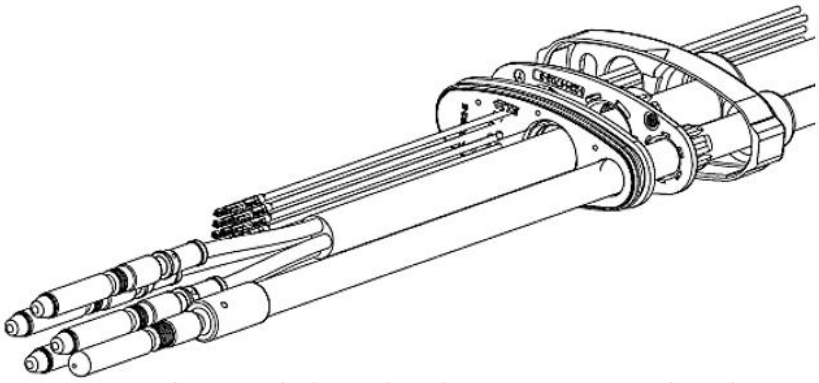


Figure 17 (schematic; crimp geometry not shown)

Step 5
Push signal terminals (Micro Mate'N'Lock) into the Connector Housing acc. application spec 114-13000. Pinning according to figure 18 and table 6:

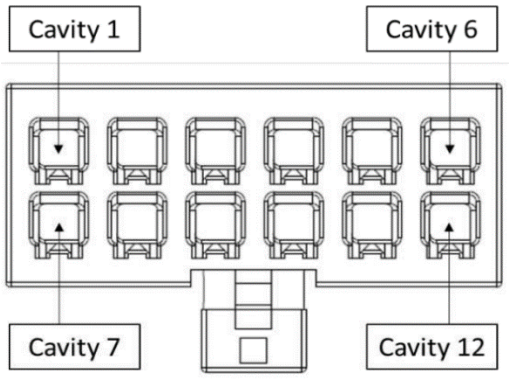


Figure 18

Cavity No.	Function
1	LED GN
2	LED RD
3	LED BL
4	GND LED
5	LED WH
6	T DC+
7	Proxi
8	T GND
9	T DC-
10	T AC
11	PE S
12	CP

Table 6

After 12P Micro Mate'N'Lock connector housing assembly the subassembly of cables with cable exit components is complete, see figure 19

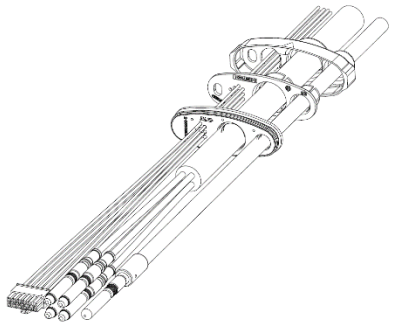


Figure 19 (schematic; crimp geometry not shown)

Step 6
The COVER CABLE SEAL DC 5-2303237-5 and FAMILY SEAL DC 2303206-5 must be pushed over the 70mm² DC-Power wires for 70mm² variants. For 50mm² variants, The COVER CABLE SEAL DC 5-2303237-4 and FAMILY SEAL DC 2303206-4 must be pushed over the 50mm² DC-Power wire as shown in figure 20. Especially ensure the correct position of the flange of the L-shaped FAMILY SEAL AC towards the COVER CABLE SEAL, figure 20a

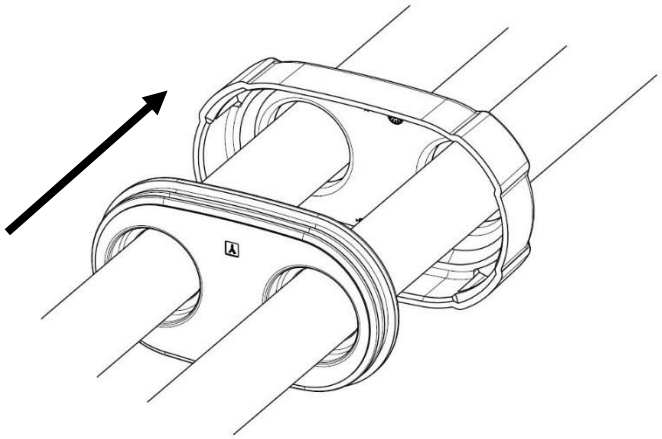


Figure 20

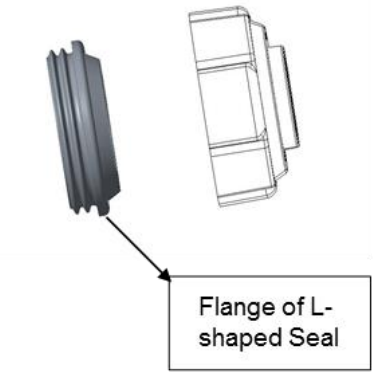


Figure 20a

Pass the cables through the DC area in the Cable Exit Combo Left 5-2303200-1 for Left exit variants (Figure 21a). For Right exit variants, Pass the cables through the DC area in the Cable Exit Combo Right 5-2303200-2.

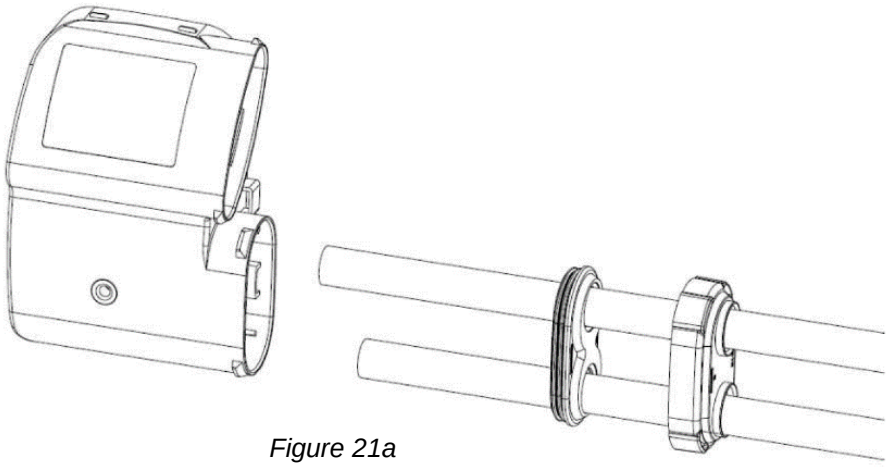


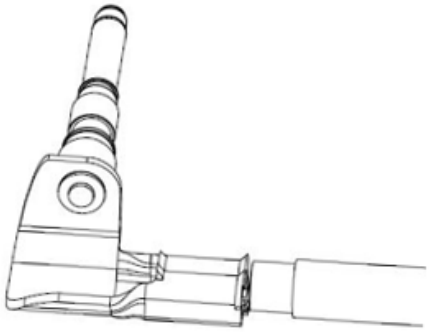
Figure 21a

Step 7

7.1 Dismantle the wires and crimp the contacts: **70 mm² and 50 mm² DC Power Cables.**

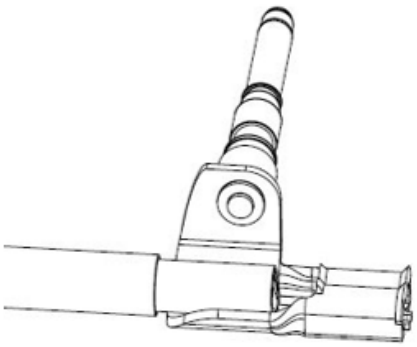
Dismantle single wires and crimp the contacts 2306177-1 according to spec. 114-94436

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



Cable direction right

Figure 22



Cable direction left

Figure 22a

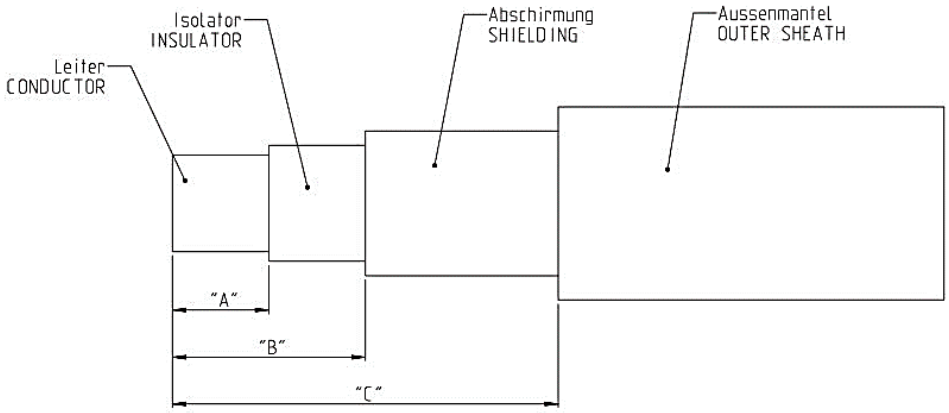


Figure 23

Dim	Cable direction RIGHT	Cable direction LEFT
Dim „A“	19 mm +/- 1mm	28 +/-1 mm
Dim „B“	27 mm +/- 1mm	61 +/-1 mm
Dim „C“	29 mm +/- 1mm	63 +/-1 mm

Table 7

To ensure HV safety, a minimum distance of 5 mm must be maintained between the shielding and the metal parts of the DC contact!

Apply the PET tape Coroplast 837 X / 838 X (or similar) onto the cut shielding like shown in *Figure 23*. It must be ensured that the excess shield is completely covered with tape.

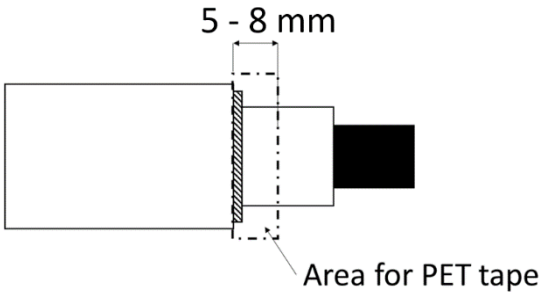


Figure 23

For charge inlets with Cable exit to the left and right (see figure 11) picture is indicated in **figure 24a and 24b),** the crimps need to be arranged as shown: DC- on the top cable position, DC+ on the lower.

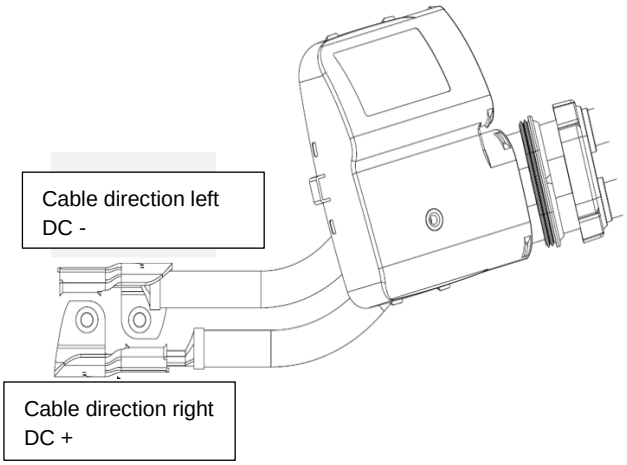


Figure 24a

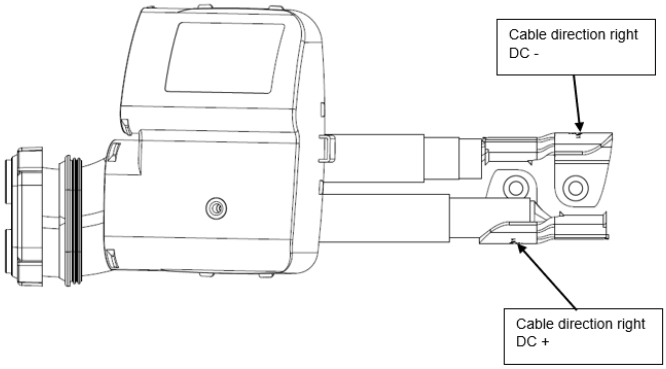


Figure 24a

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

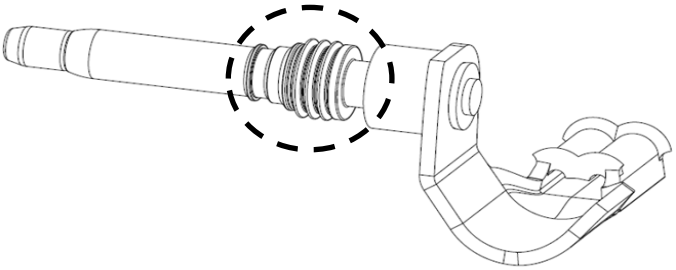


Figure 25

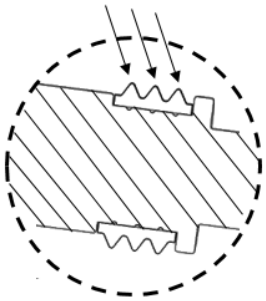


Figure 25a

Step 9

Pass the AC cable subassembly (figure 19) through the AC slot in Cable Exit (item 7) as shown in figure 26. Pay attention on the symbol triangle and rectangle at the AC Seal Cover (figure 27).
Grounding cable is always in lower position at the cable exit.

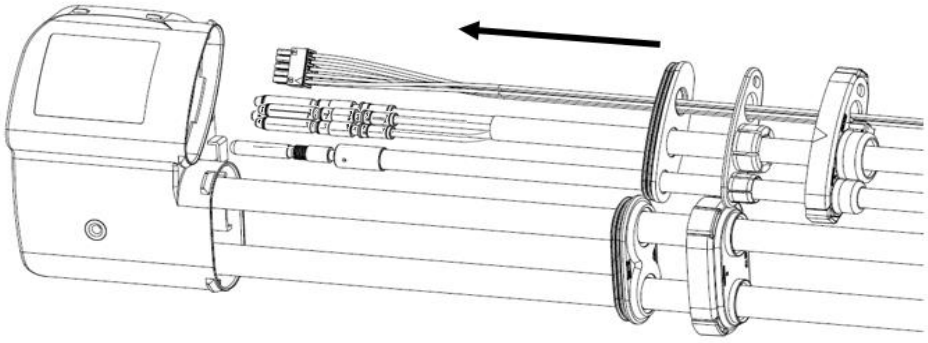


Figure 26

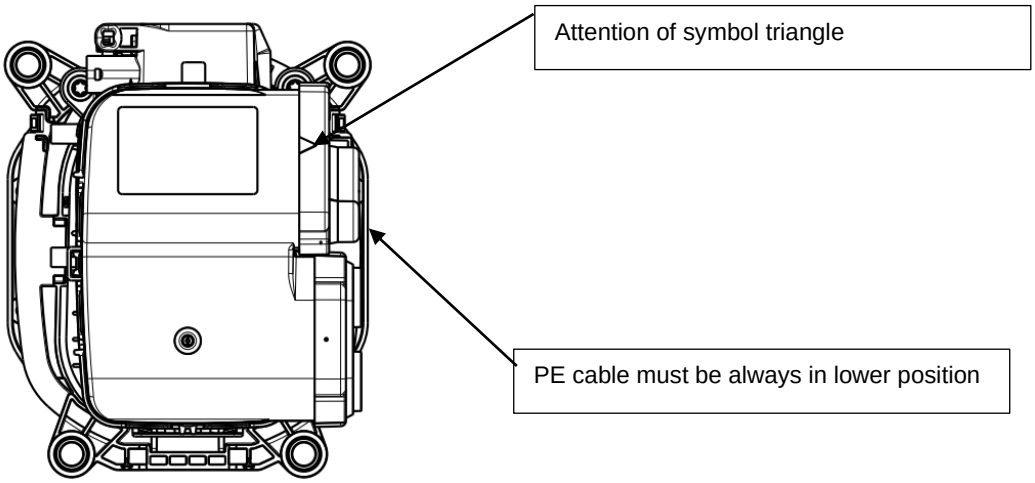


Figure 27

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 28a shows contacts assembled in end position.

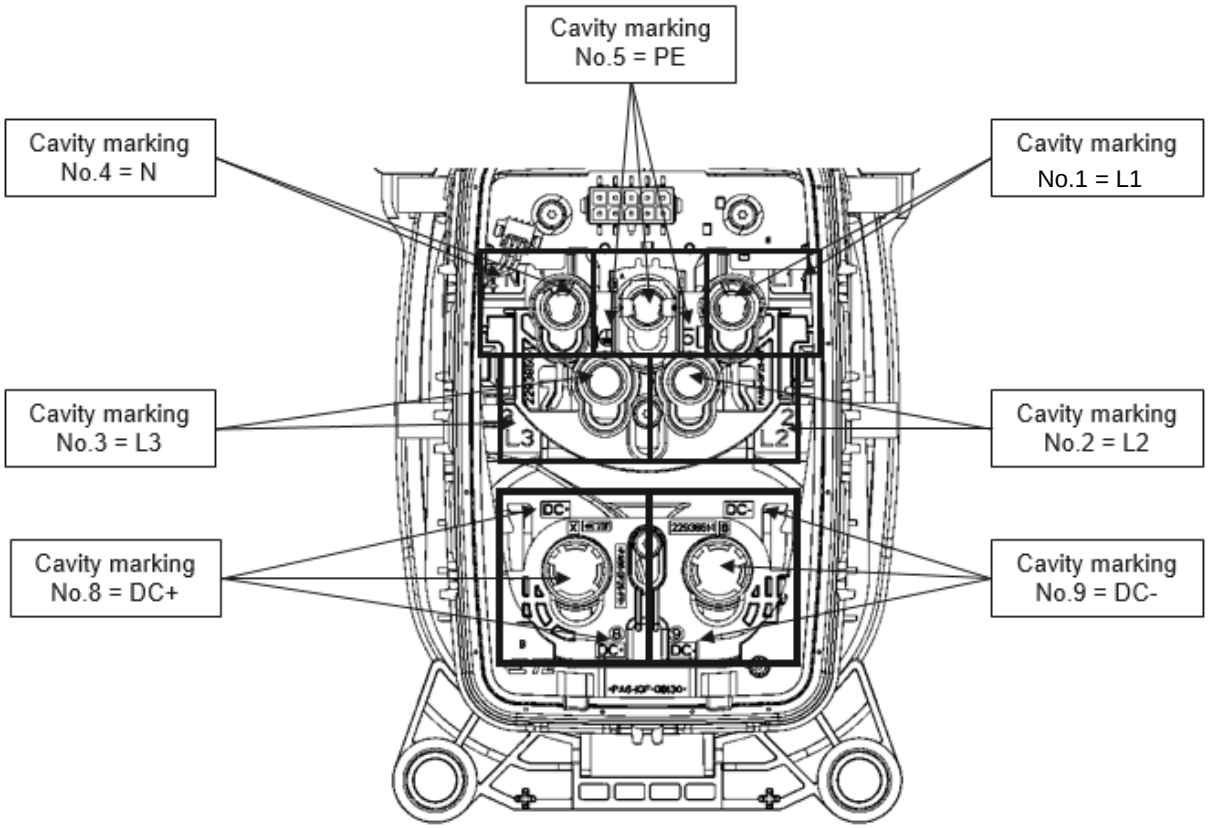


Figure 28

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)!

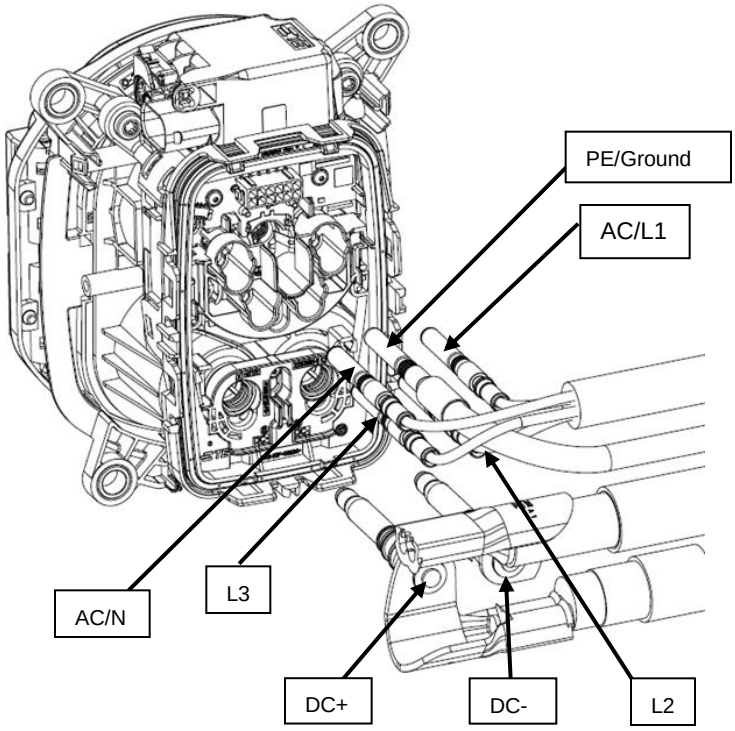


Figure 29a

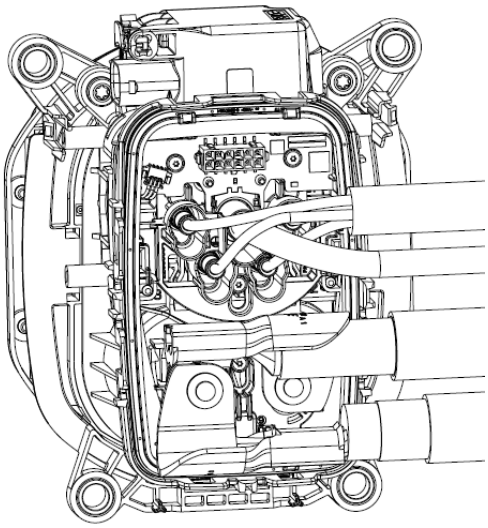


Figure 29b

Proposed sequence for contact insertion:
1.) 4x 6mm² AC Power Cable with contacts into L1, L2, L3 and N cavities
2.) 1x 16 mm² Ground Cable with contact into PE/ground cavity
3.) 2x 70mm² DC Power Cable with contacts into DC+ and DC- cavities for 70mm² variants and 2x50mm² For 50mm² variants.

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 31a and 31b:

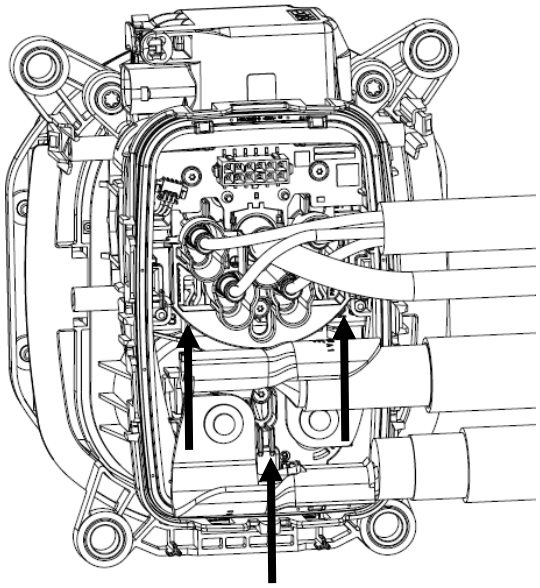


Figure 30

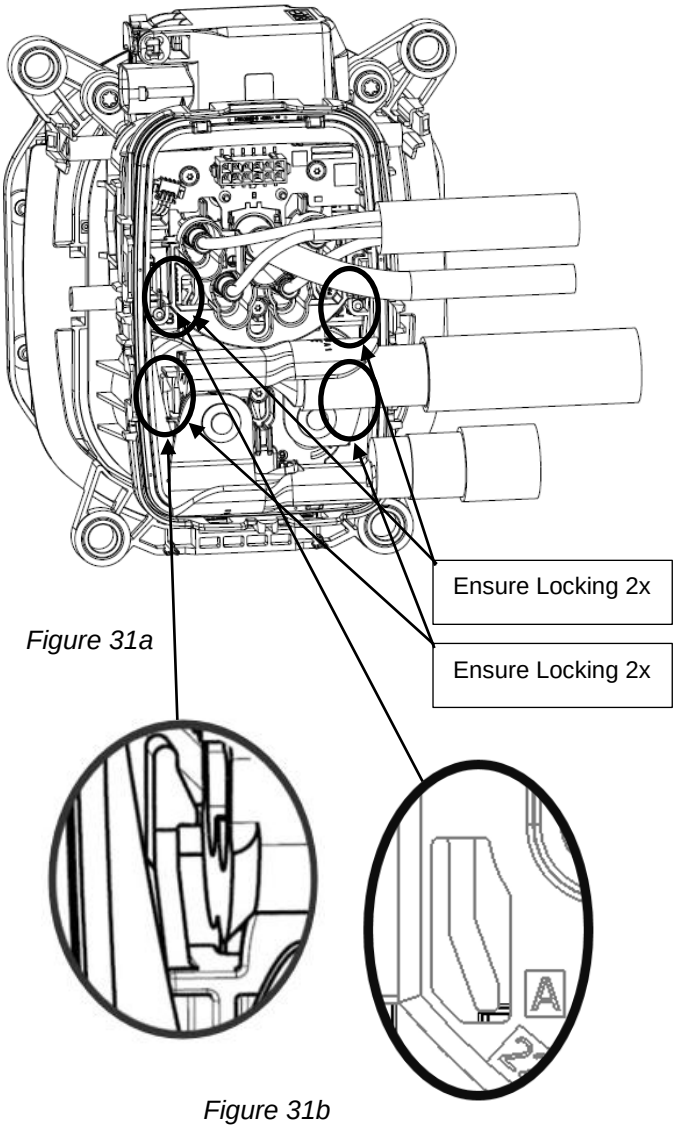


Figure 31a

Figure 31b

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) has to be pushed in lock position (Figure 32). The press force has to be applied on the marked locations on the surrounding collar to close the latches. Ensure that all 7 hooks are correctly engaged. (Figure 33).

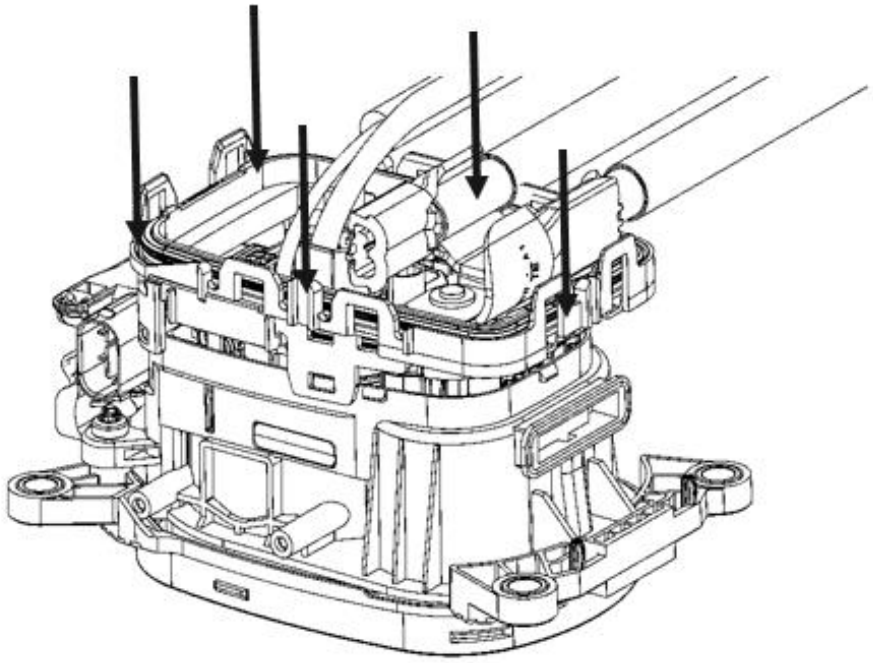


Figure 32 (Schematic view)

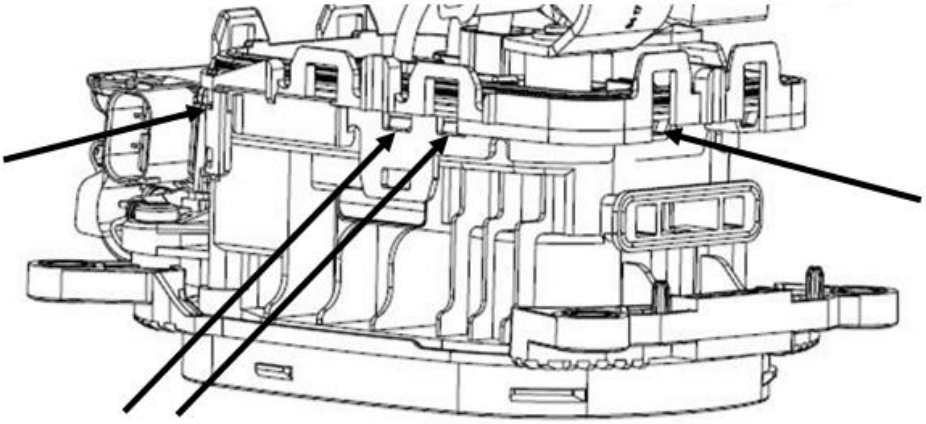


Figure 33

Step 13

Connect Micro Mate'N'Lock Connector to PCB-Header. Ensure the hook is properly engaged with the header, see figure 34.

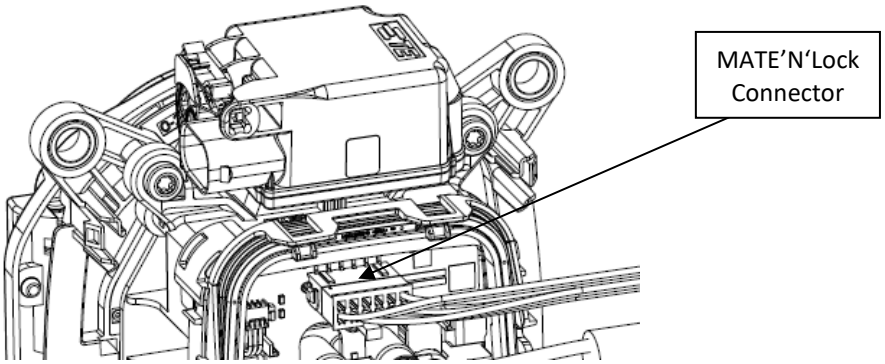


Figure 34

Step 14
Assemble the Cable Exit Cover Left **5-2303200-1** for left exit variants. For right exit variants, Assemble the Cable Exit Cover right **5-2303200-2.** Ensure that all 8 hooks are correctly engaged. (Figure 35a). The press force must be applied on the marked locations close to the latches, see figure 35b.

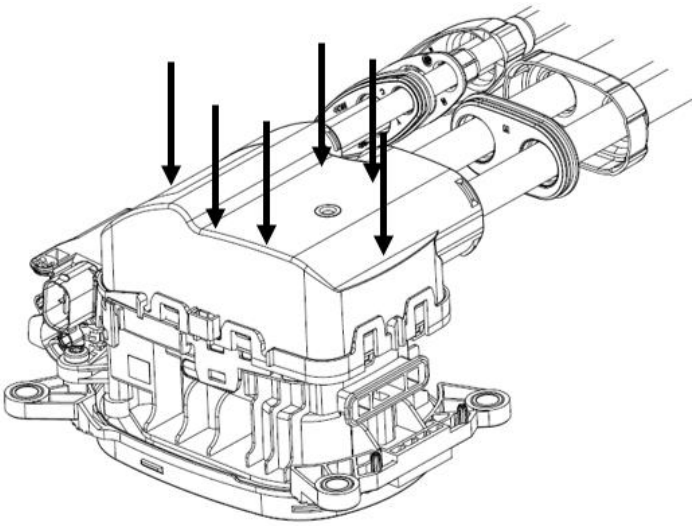


Figure 35a

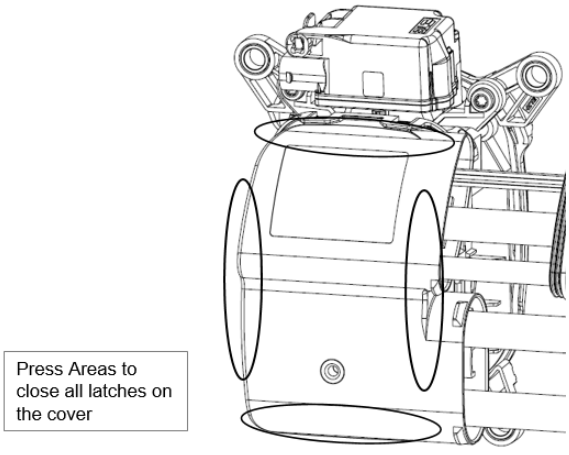


Figure 35b

ATTENTION: The Cable Exit Cover (item 7) 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)

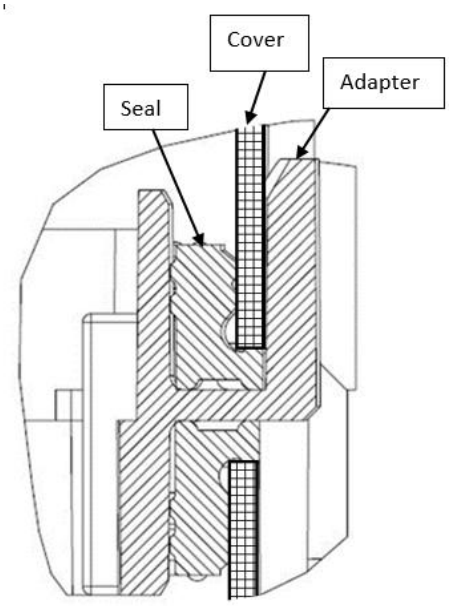


Figure 36

Step 15

Move the STRAIN RELIEF AC 2296056-2 together with FAMILY SEAL AC 1-2296040-2 into their position in the CABLE EXIT (Item 7). 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 5-2296057-3 over it and snap it on the CABLE EXIT (ITEM 7). Ensure that both hooks are correctly engaged (double audible click), see figure 38.

Move the FAMILY SEAL DC 2303206-5 for 70mm² variants and 2303206-4 for 50mm² variants into position in the CABLE EXIT (ITEM 7). see figure 38a.

Push the COVER CABLE SEAL DC 5-2303237-5 (for 70mm² variants) or COVER CABLE SEAL DC 5-2303237-4 (for 50mm² variants) over it and snap it on the CABLE EXIT (Item 7). Ensure that all four hooks are correctly engaged (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)

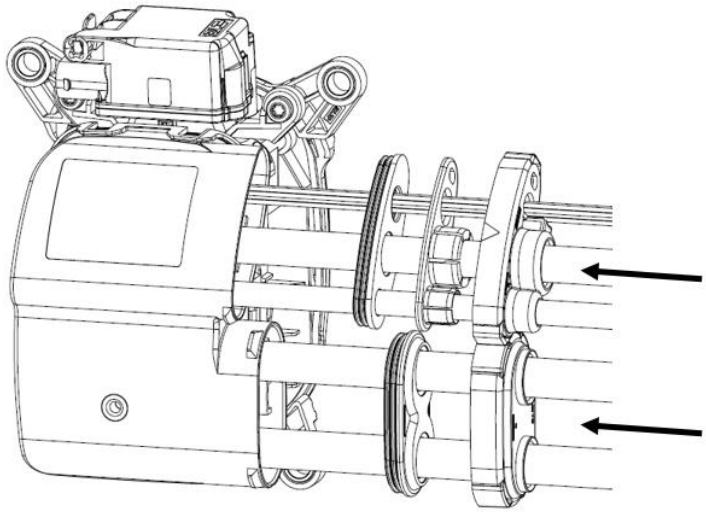
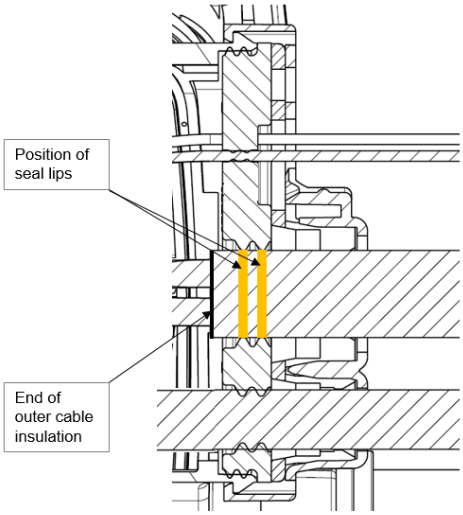


Figure 37



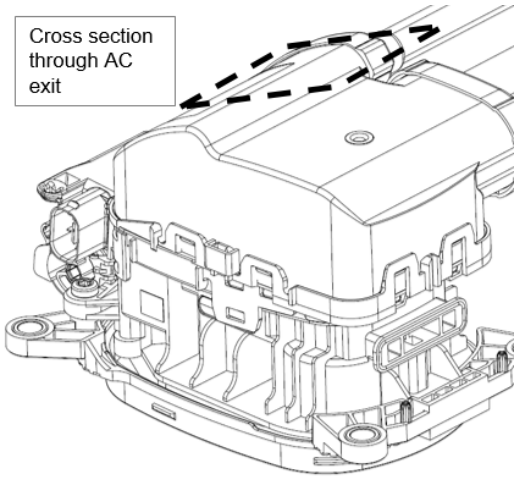
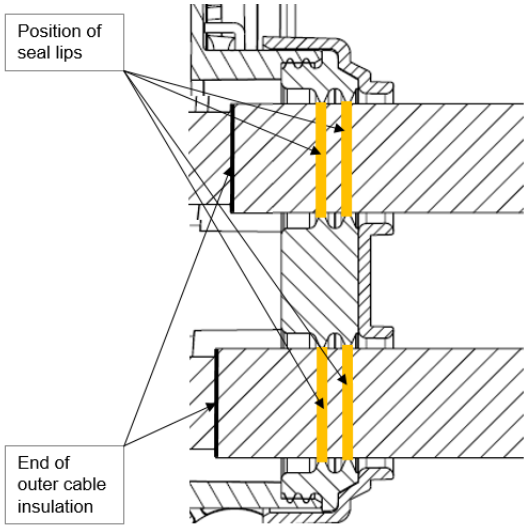


Figure 38 – AC seal lips



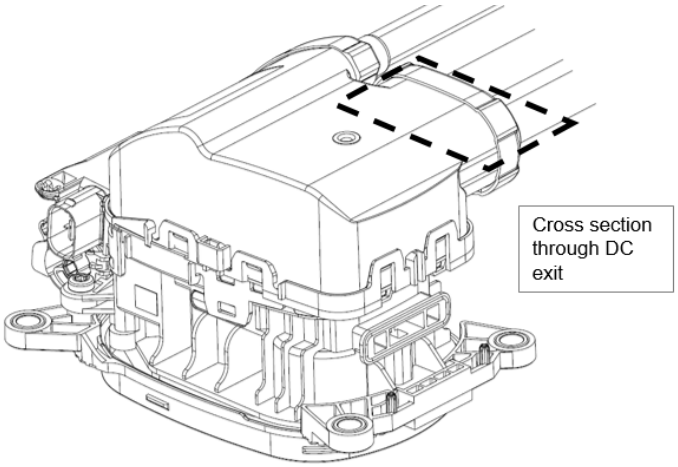


Figure 38a – DC seal lips

Step 16

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

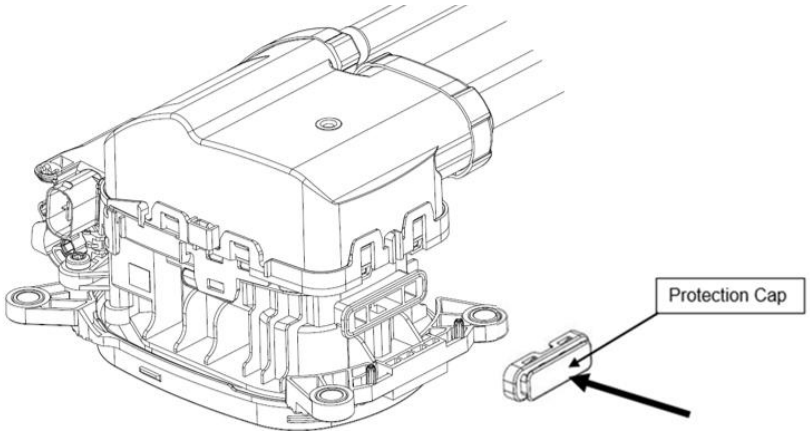


Figure 39

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 (item 7) as shown in figure 40 is designed to fit an elastic plastic tube (Polyurethane or similar) with an outer diameter of 4mm.

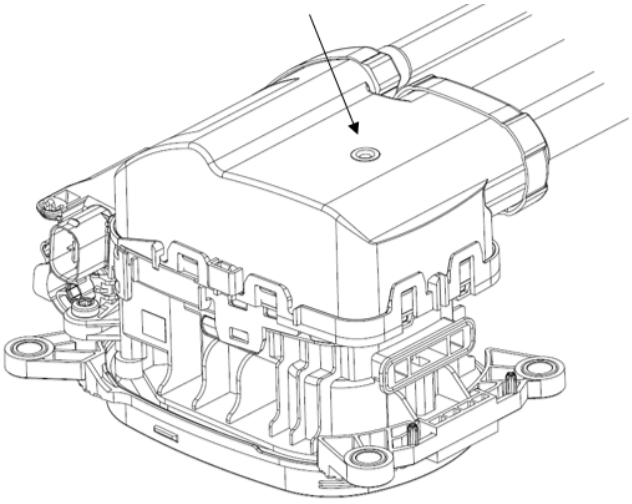


Figure 40

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.

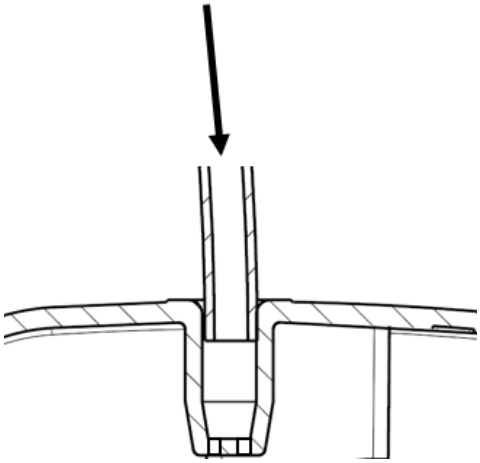


Figure 41

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.

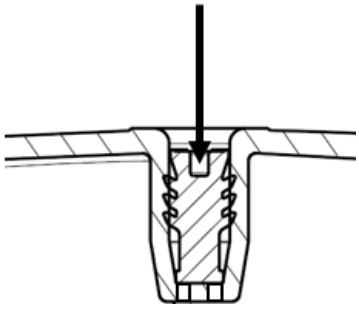


Figure 42

Step 18

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

Marking acc. IEC62196-3:

Manufacturer's name or trademark	XXXXX
Type reference or identification number	Art.: XXXXXXX
Rated currents, maximum voltages, and frequency	Max. 32A, 480V~50-60Hz / Max.200A, 1.000V
Number of Phases	3L / 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.

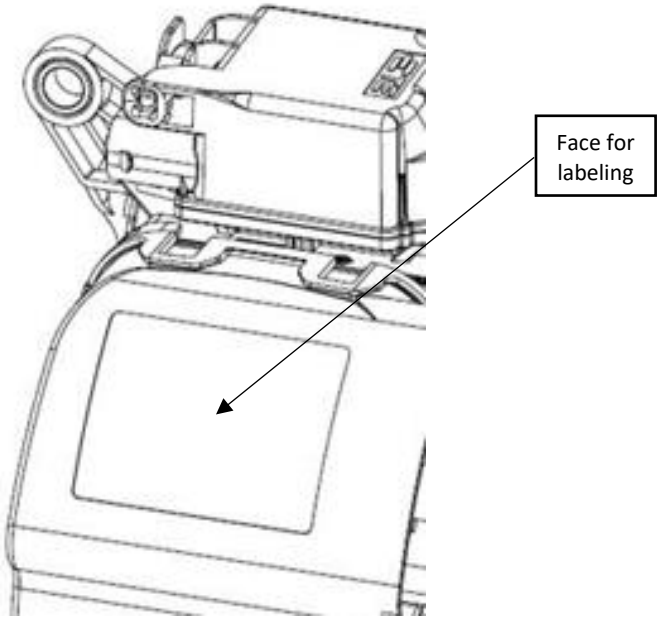


Figure 43

7.6. 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: 1000VDC
  Inspection Duration: 1s
  min. Riso: 200MOhm
  pin-to-pin, excluding CP-to-Proxi and CP/Proxi-to-Ground

a) L1 (+L2+L3 if present) versus N
b) if present, L2 + L3 versus L1
c) if present L2 versus L3
d) L1+N (+L2+L3 if present) versus Ground, CP, PP (These contacts shall be shortened during testing to avoid any failure current on the PCBA)
e) L1+N (+L2 +L3 if present) 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 (+L2+L3 if present) versus N
b) if present, L2 + L3 versus L1
c) if present L2 versus L3
d) L1+N (+L2+L3 if present) versus Ground, CP, PP (These contacts shall be shortened during testing to avoid any failure current on the PCBA)
e) L1+N (+L2 +L3 if present) versus AC multicore shield

- Correct Pinning of all Contacts

- 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.

APPENDIX 1: LIGHT INDICATORS FUNCTIONAL TEST

Light indicators Functional Check

1.Scope

This part describes Light indicators Functional Check (4 modes, see next page)

light indicators integrated in the front bracket of the AC Charge inlet (Figure 1).

Light source is made by LED powered via 12 ways connector located on the back side

(Figure 2).

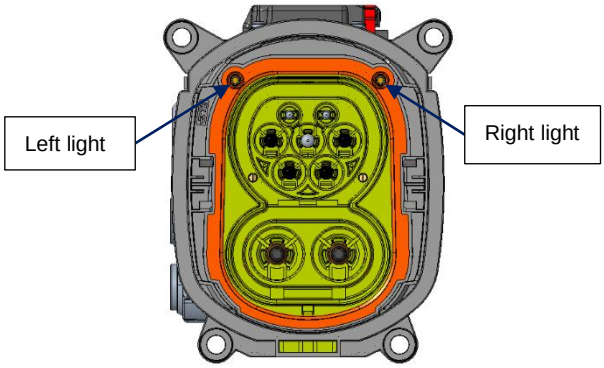


Figure 1: CAD data front view of the Bracket
With light shown with arrow.

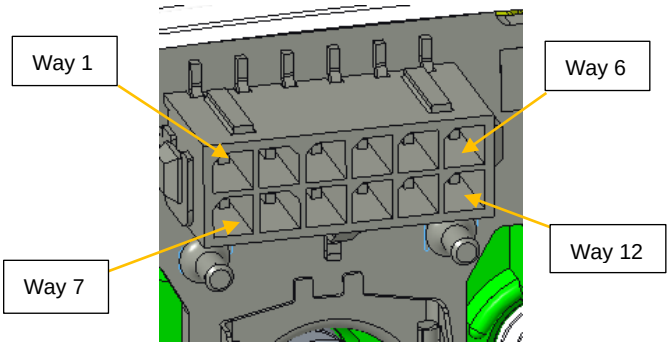


Figure 2: CAD data back side of the Bracket
With 12-way connector plugged

2.Light outputs modes

There are 4 modes to be checked

- indicator powered supply for red color: red light should be visible.
- indicator powered supply for blue color: blue light should be visible.
- indicator powered supply for green color: green light should be visible.
- indicator powered supply for white color: white light should be visible.

Left and Right Light are working together in the same mode.

Functional recheck: for each mode a visual check (color light on) must be done.

3.Power Source Definition

A triple output Current Power Supply is needed to provide regulated current. This Power Source must have the capability to drive independently all 4 LED power lines (see Annex 1) from the high side. This must be high side driver as LEDs are common cathode wired.

Power supply characteristics for each red, green, white, and blue channel.

The power supply shall provide a constant 30mA current.

4.Annex 1 – Light indicators: Power source connection

Each sample under test and must be connected to the power supply through the 12 ways connector With respect to the pinout as specified in the table1: only ways 1 to 5 should be connected to power Source of the light indicator functional test

Signal Name	Description	12 ways connector pin
GREEN_DRV	Green LED current driving channel	1
RED_DRV	Red LED current driving channel	2
BLUE_DRV	Blue LED current driving channel	3
WHITE_DRV	White LED current driving channel	5
GND	Main Ground	4

Table1: 12 ways connector pinout

5.Annex 2 – Light indicators: Power source setup

The LEDs shall be powered with a constant-current source with respect to table 2, max. Voltage 12V

ACTIVATION TABLE					
LINE	LED INTENSITY PER LINE	COLOR			
		RED	GREEN	BLUE	WHITE
R	30mA	ON	OFF	OFF	OFF
G	30mA	OFF	ON	OFF	OFF
B	30mA	OFF	OFF	ON	OFF
W	30mA	OFF	OFF	OFF	ON

Table2: Activation table

LTR	REVISION RECORD	DWN	APP	DATE
A	INTIAL RELEASE	PRADEEP KUMAR	FRANK WITTROCK	20FEB2023
A1	PARTS TO ORDER IS UPDATED IN PAGE 13	PRADEEP KUMAR	FRANK WITTROCK	21APR2023

DRAWN PRADEEP KUMAR K 20/02/2023	TE CONNECTIVITY GERMANY GMBH AMPÈRESTRAßE 12-14 D-64625 BENSHEIM GERMANY		
CHK KAREPPA K 20/02/2023			
APP FRANK WITTROCK 20/02/2023	NO 114-94819	REV A	LOC AI
TITLE	Application specification EV Charge Inlet Combo2 (90°AC-DC)		