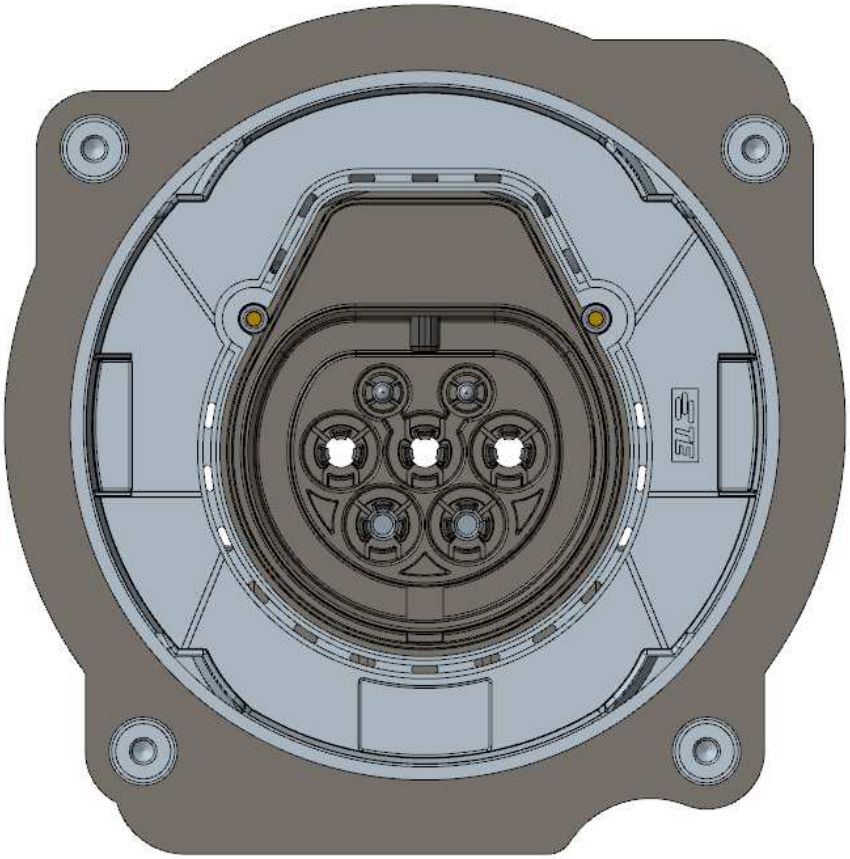
Class 1

VEHICLE CHARGE INLET TYPE 2 acc. IEC62196-2



| Indicates Change

Content

1. SCOPE

1.1. Content

This specification describes the handling and assembly of the vehicle charge inlets Type II acc. IEC 62196-2 for conductive charging of electric vehicles. This specification applies to manual assembly of the components from series production tooling, for the standard version.

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1.2. Processing Note

The processor is responsible for ensuring the quality of the manufacturing process and the proper function of the system. The warranty and liability is excluded if quality deficiency or damages occur by failing compliance to this specification or using not specified, 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 then the product specification has priority.

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2.1. TE Connectivity Documents

a) Drawings / Bill of material:

See Customer drawing for TYP 2 INLET

DBAG basic number: A 000 340 76 00 (AMG-Version: A 000 340 89 03)

TE number: 2387397-DBAG (AMG-Version: 2387461-AMG)

b) Specifications

108-94519	Product Spec. TE actuator for charge inlets
114-13000	Application Specification Micro MATE-N-LOK Connectors

3. WIRES

The following designations are used in this specification. The illustrations are exemplary and schematically.

3.1. 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.

3.2. Wire selection

The contact system is released for the application with wires specified in point 3.4
The released contact-wire-combinations and crimp parameters are given in table 1.
Other wires require the approval of the engineering department.
The wires are applied as single wire terminations. Double terminations are not intended.

3.3. Wire preparation

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

The insulation must be cut accurately and pulled off the conductor. Offcut of insulation may 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. Sticking out strands are not permitted.
The single strands of the conductor may not be twisted.

3.4. Cable Specifications of Prescribed Cables

AC-Cable: Cross-section 2 x 6,0mm²

Supplier:	Coroplast
Outer Diameter:	12,8 $^{-0,6}$ mm
Cable description:	*FHLR2GCB2G 2x6.0mm²* *acc. LV216-2 Tab. A5*
Coroplast Part No.:	9-2641 (2x6mm²)

AC-Cable: Cross-section 3 x 6,0mm²

Supplier:	Coroplast
Outer Diameter:	14,1 $^{-0,6}$ mm
Cable description:	*FHLR2GCB2G 3x6.0mm²* *acc. LV216-2 Tab. A5*
Coroplast Part No.:	9-2641 (3x6mm²)

AC-Cable: Cross-section 5 x 6,0mm²

Supplier:	Coroplast
Outer Diameter	16,3 $^{-0,6}$ mm
Cable description:	*FHLR2GCB2G 5x6.0mm²* *acc. LV216-2 Tab. A5*
Part No.:	9-2641 (5x6mm²)

PE-Cable: Cross-section 6,0mm²

Supplier*:*	Gebauer & Griller Kabelwerke GmbH
Outer Diameter	5,1 $^{-0,4}$ mm
Cable description*:*	*FLYKW 6.0mm² (189x0,2)*
Part No.:	*FLYKW 6.0(0,20)*

Note regarding PE-PVC insolation:
PG23 test is carried out according customer request and in conflict to specified requirements with PE cable which constricts during thermal aging in the sealing area (PVC insolation). To counteract this effect, the test samples were modified after the thermal aging in such a way, that the constricted area of the PE cable is moved out of the sealing area.

4. APPLICATION TOOLS

Required application tools are:

Minimum requirements for the press are 20t.

Wire Type	Wire Size [mm²]	Construction	Stripping Length [mm]	Crimp height CH_1 [mm]	Wire Std	Specification	Supplier	Contact P/N	Geometry	Applicator	Recommended crimping press
Pure copper	6	189 x 0.20mm	13.0 ±1	3,7 ±0,1	-	FLYKW 6,0(0,20)	Gebauer & Griller	2293270-3 2-2293270-3	W	2358638-1	HV-20 2348822-1 [1)]
		84 x 0.31mm			LV216-2	FHLR2GCB2G 2x6.0mm² 3x6.0mm² 5x6.0mm²	Coroplast	2293269-3 2-2293269-3		2234179-1	

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.

5. REQUIREMENTS ON THE CRIMPED CONTACT

5.1. Terms of pin contact

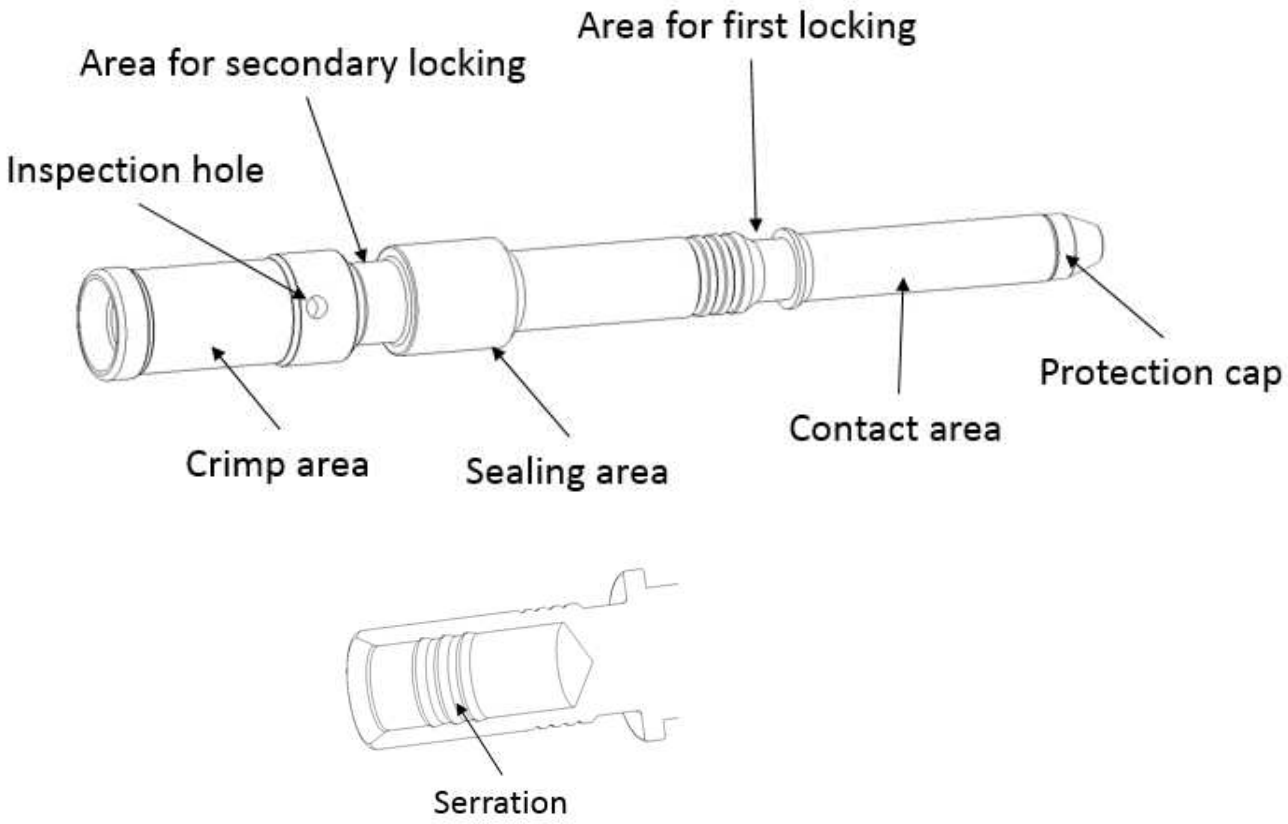


Figure 1

5.2. Conductor position

The single strands of the conductor are clamped in the wire barrel (drill hole at crimp area). Sticking out or on top crimped single strands are not permitted.
The wire end must be visible at the inspection hole before and after crimping. Insulation may not be inside of the crimping area.

5.3. Crimp data for the wire crimp

The crimp form, 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.

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 must be measured over both extensions in middle of crimp (figure 2, also see point 5.9).

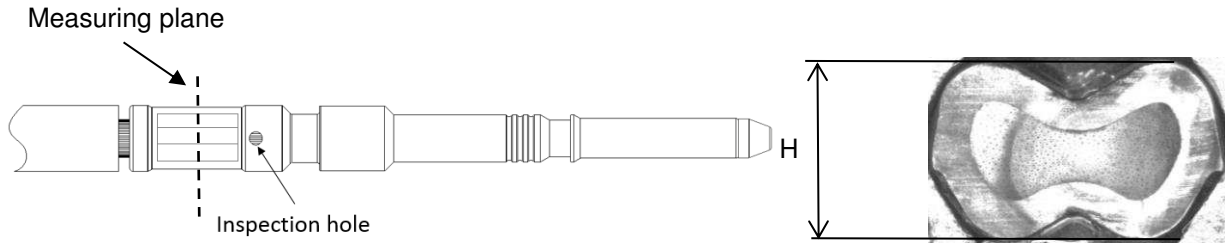


Figure 2

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.

5.4. Crimpposition

Contacts of wire diameter 6mm² have to be crimped with crimping tool position at middle of crimp area as shown.

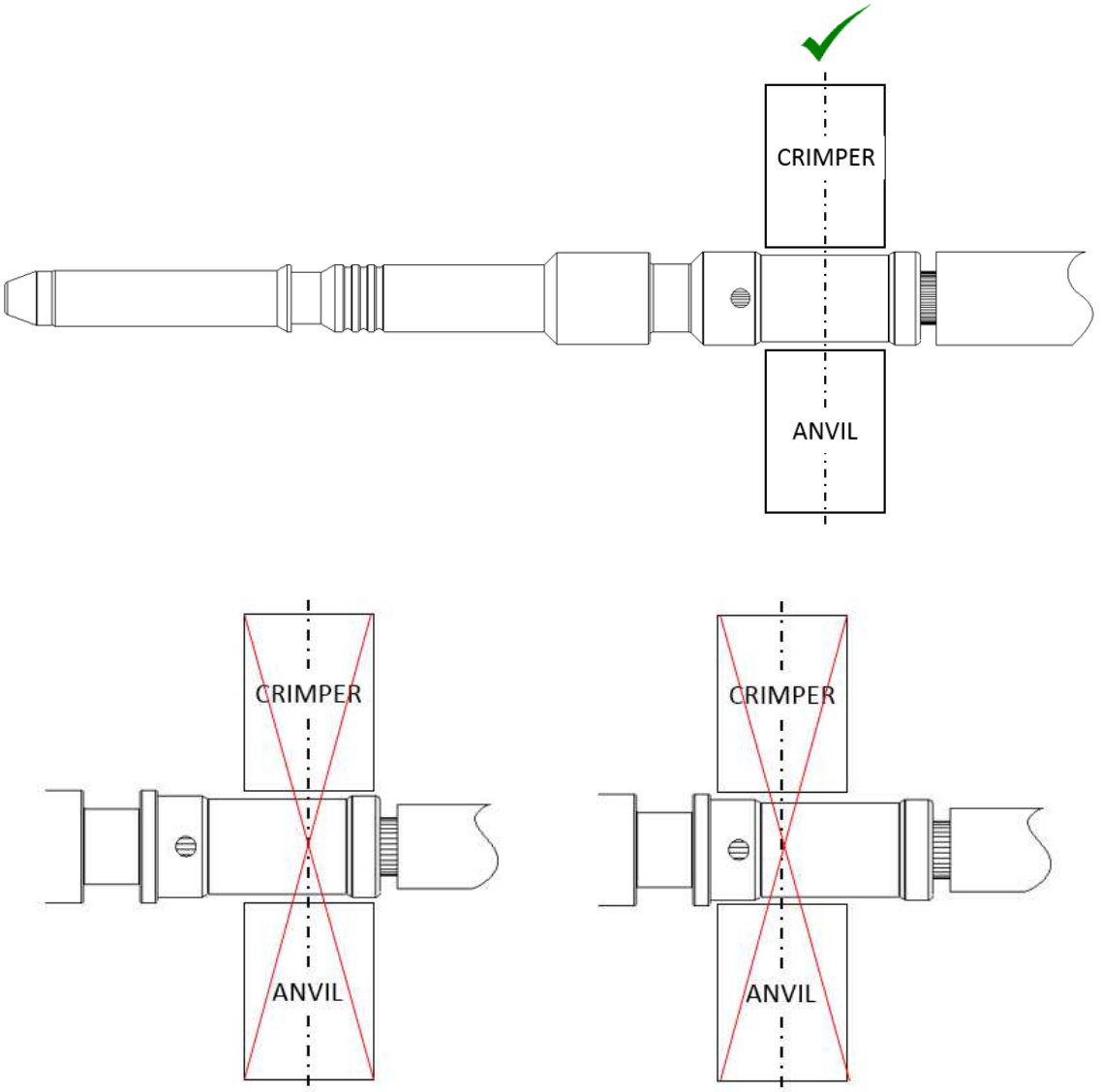


Figure 3

5.5. Cross sections

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

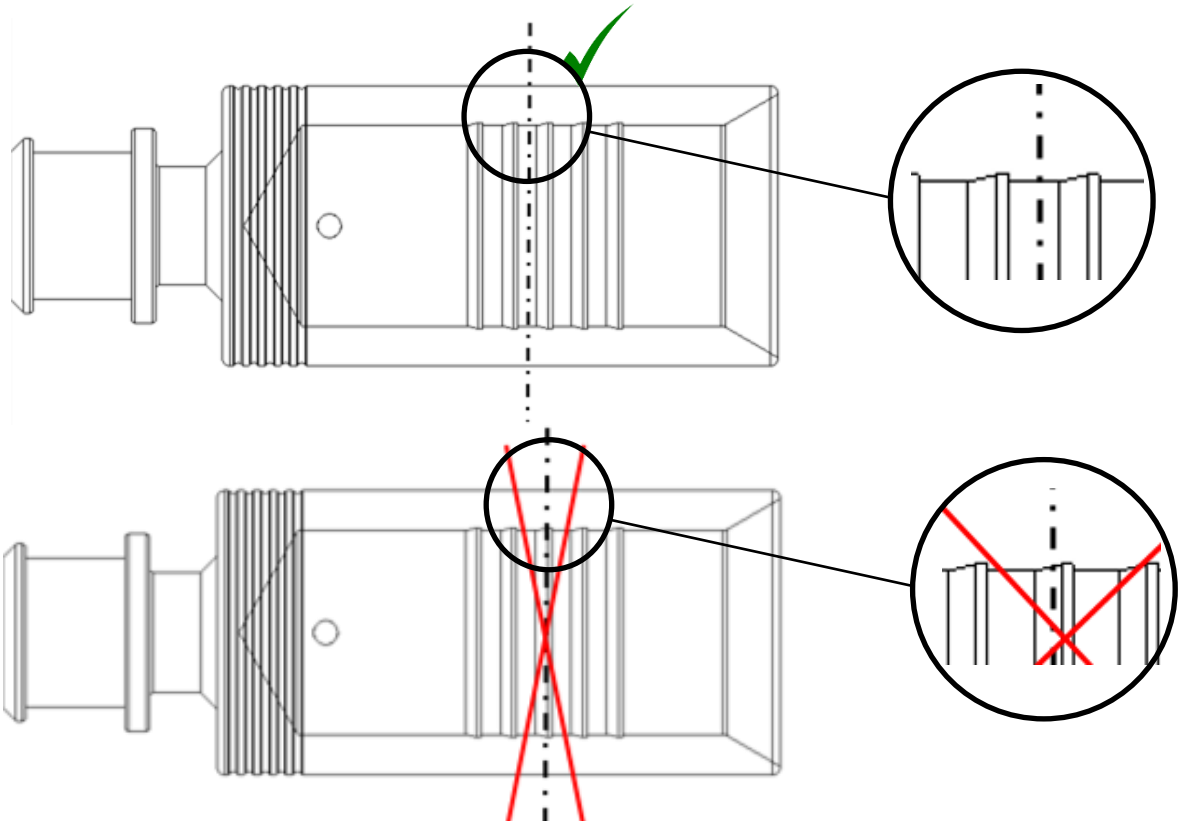


Figure 4

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

For 6 mm² meeting the specific shape and position tolerances shown at figure 5 must be ensured before the contact is inserted into the housing.

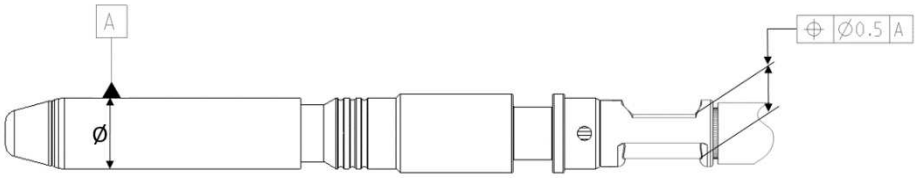


Figure 5

Measuring the shape and position deviation is not always necessary.
If the contact is obviously straight by eye a simplified shape and position functional test, at diameter 6mm², can be performed by inserting it into a suitable housing cavity (crimp may not scrape the walls of secondary lock).

If contacts are bent during the application process exceeding the specification limits they may not be bent back and must be rejected.

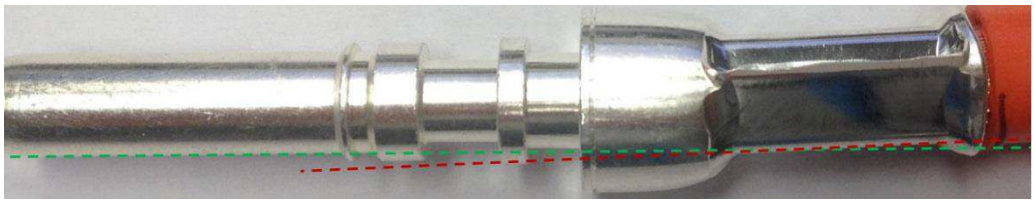


Figure 6

5.9. Measuring equipment and measuring position

As measuring equipment for measuring crimp height, a digital caliper with accuracy of measuring 0.01mm is required. Measuring of crimp height, has to be done always in middle of crimp area, across whole crimp.

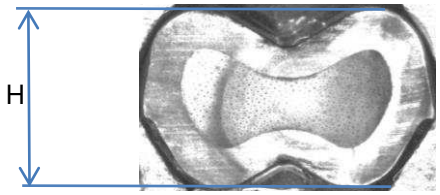


Figure 7

6. ASSEMBLY INSTRUCTIONS

In this chapter the way of assembly is described. All pictures in this chapter may differ from the specific product. The pictures illustrate the way of assembly and may not reflect all variants. The exact appearance of the components can be seen in the drawing documentation.

6.1. Assembly overview

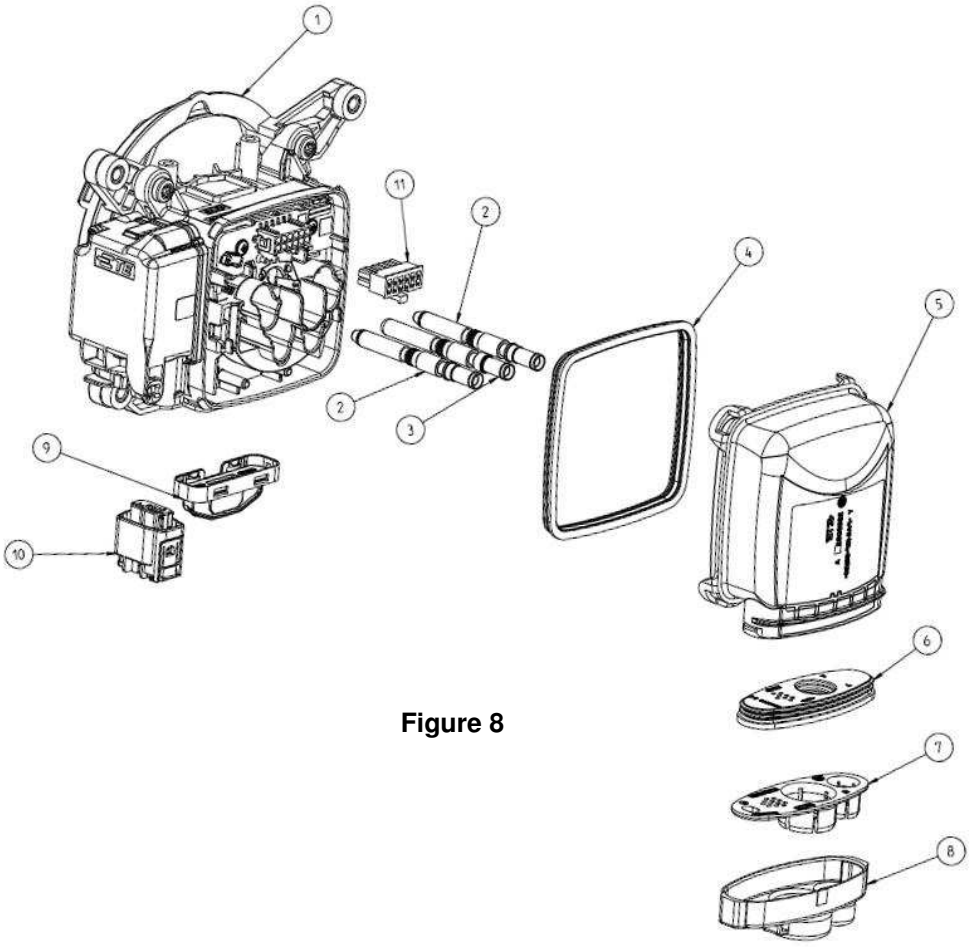


Figure 8

Pos.	Description / Bezeichnung
1	INLET HSG, TYP2, ASSY
2	PIN DIA 6.0, AC
3	PIN DIA 6.0, PE
4	PERIPHERAL SEAL
5	CABLE EXIT
6	FAMILY SEAL, AC
7	STRAIN RELIEF, AC
8	COVER, CABLE SEAL, AC
9	WATER DRAIN
10	4POS MQS ASSY acc. Spec. 108-94519 (additional part)
11	12P MICRO MNL ASSY acc. Spec. 114-13000 (additional part) [1]

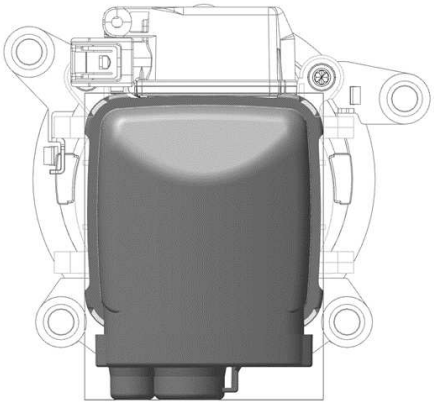
[1] TE Connectivity (TE) explicitly points out that this product as a single part is not an automotive product and therefore not subject to PPAP requirements. However, this product is technically capable, as it has been qualified according to automotive standards in the application described hereby in this document.
Socket contact on harness side must be selected acc. to Micro MNL application specification 114-13000. It must be ensured that the chosen contact was validated acc. to the automotive requirements of the Slow-Motion Bending Test.

Table 2

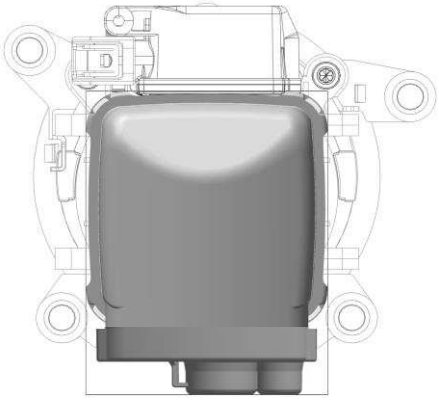
6.2. Assembly configuration cable exit

The inlet can be assembled with different cable exit directions. The required configuration can be chosen to customer request.

Configurations for cable exit 90° downwards:

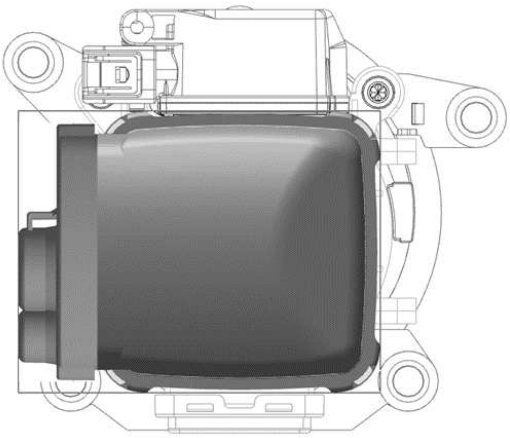


LV cable right

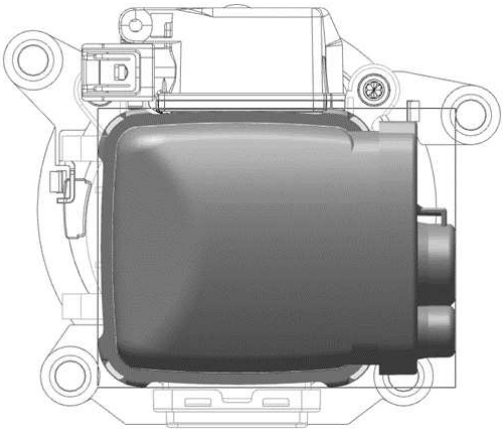


LV cable left

Configurations for cable exit 90° sideward:



To left side, LV-cables at top



To right side, LV-cables at top

Configurations for cable exit 180°:

Horizontal, LV left

Vertical, LV top

Horizontal, LV right

Figure 9

6.3. Parts to order

See 2.1.a

6.4. Security Advice

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

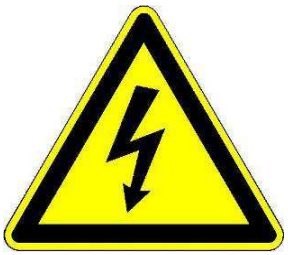


Figure 10

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 circuid 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. Cardboard packaging of the INLET HSG (Pos. 1) are only to be opened in ESD protected areas.

Figure 11

6.5. Assembly Steps

Step 1

The COVER CABLE SEAL AC [Pos. 8], STRAIN RELIEF AC [Pos. 7] and FAMILY SEAL AC [Pos. 6] 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 12).

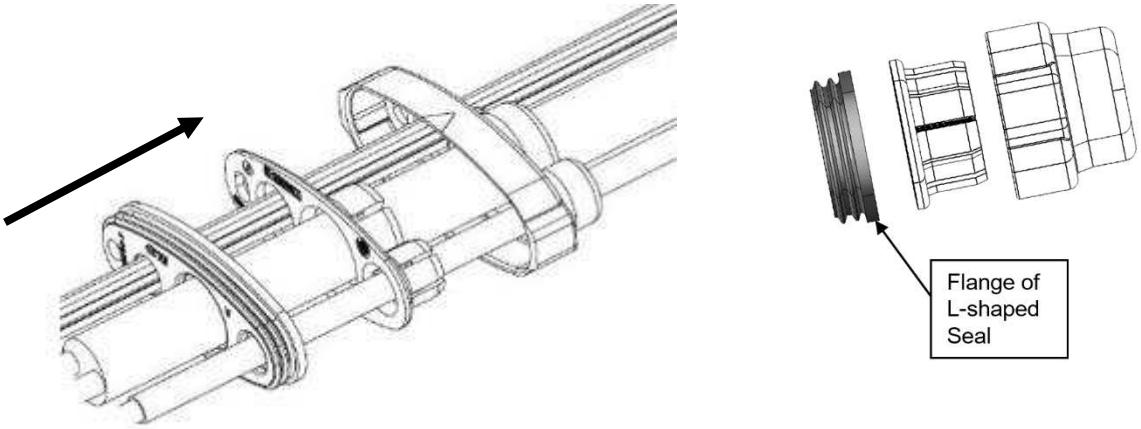


Figure 12

Step 2

Preparation of AC multicore cable.

THE SINGLE BRAIDS MAY NOT BE CUT OR DAMAGED DURING DISMANTLE PROCESS.

Remove outer isolation, shield and filler of AC-multicore-cable acc. figure 13.
The given length of the single wires shown in table 3, ensures that the outer isolation of the multicore cable seals off to the FAMILY SEAL AC [Pos. 6]. A marking on outer isolation in a distance “C” (or in an offset to “C”) to the cut off position is recommended to ensure the proper position of the outer isolation in the FAMILY SEAL AC [POS.6]**.**

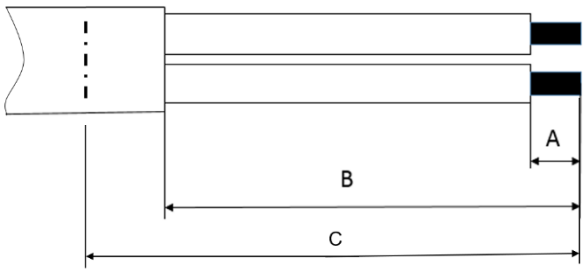


Figure 13

Wire Size	**Removal of insolation dim. "A"**	**Length of single wires “B”**	**Position outer end of COVER [POS.9] “C”**
6 mm²	13 +/- 1mm	65 +/-2 mm	96 +/-4 mm

Table 3

Alternative to prepar cable according step 2 figure 13, is it also possible to prepare cable similar figure 14. In this case it is necessary to protect complete overlapping shield braid with tape (e.g. Certoplast 9mm). A marking on outer isolation in a distance “E” (or in an offset to “E”) to the cut off position is recommended to ensure the proper position of the outer isolation in the FAMILY SEAL AC [POS.6]**.**

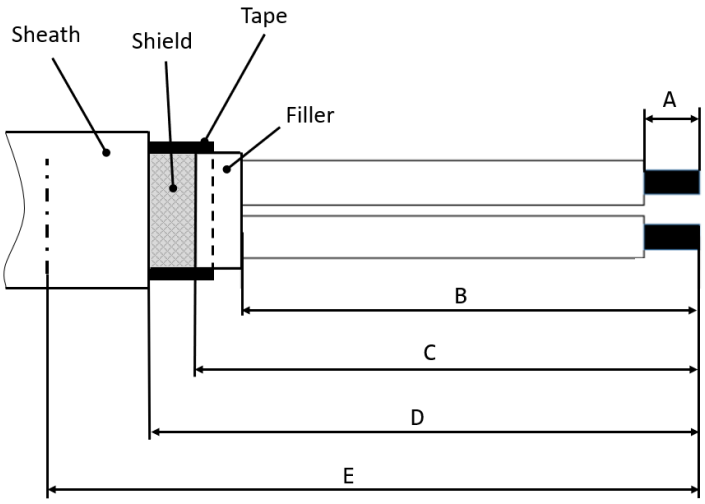


Figure 14

Variant of CABLE EXIT [POS. 6]	Wire Size	Removal of isolation "A"	Length to filler “B”	Length to shield braid “C”	Length to outer insulation “D”	Position outer end of COVER [POS.9] “E”
90°	6 mm²	13 +/-1 mm	65 +/-2 mm	73 +/-2 mm	78 +/-2 mm	106 +/-4 mm
180°	6 mm²	13 +/-1 mm	55 +/-2 mm	63 +/-2 mm	68 +/-2 mm	96 +/-4 mm

Table 4

Crimp the conductors to the PIN [Pos. 2] with the specified tools. Care shall be taken that all braids are caught in the crimp. Not inserted braids may jeopardize HV requirements! Wires shall be completely inserted to be visible through the inspection hole (Figure 15). Crimp height H shall be conform to dimension acc. table 1.

Any damage of the wire insolation must be avoided.

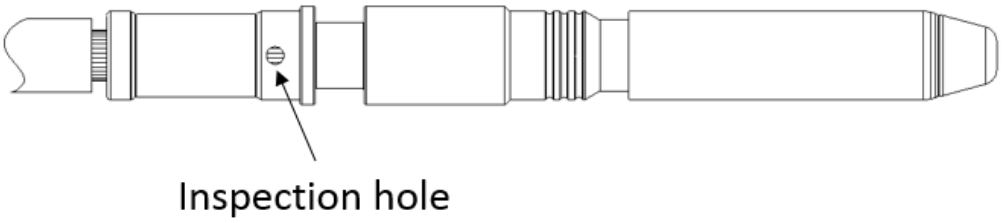


Figure 15

Step 3

Preparation of PE single wire.

Dismantle PE-single wire cable acc. Figure 16.

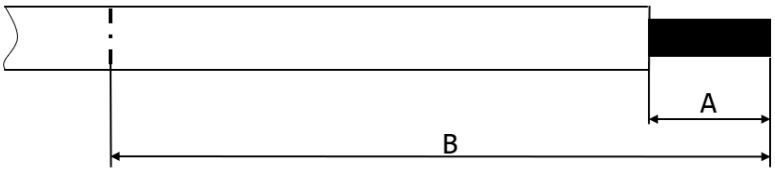


Figure 16

THE SINGLE BRAIDS MAY NOT BE CUT OR DAMAGED DURING DISMANTLE PROCESS**.**

Wire Size	Variant of CABLE EXIT [POS. 6]	Removal of insulation "A"	Position outer end of COVER [POS.9] "B"
6 mm²	90°	13.0 +/-1 mm	90 mm REF
	180°		90 mm REF

Table 5

Crimp conductor on PIN DIA 2,8 POWER PE [Pos. 3] with the specified tools. Care shall be taken that all braids are caught in the crimp. Not inserted braids may jeopardize HV requirements! Wires shall be completely inserted to be visible through the inspection hole (Figure 17). Crimp height H shall be conform to dimension

Any damage of the wire insolation must be avoided.

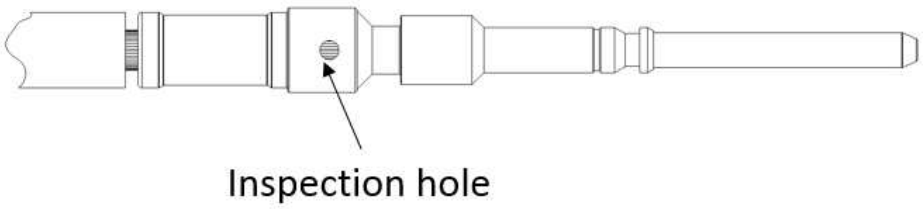


Figure 17

Step 4

Dismantle LV single wires (dim. A) acc. spec. 114-13000. Crimp Contacts acc. Spec. 114-13000 on LV signal wires.

THE SINGLE BRAIDS MAY NOT BE CUT OR DAMAGED DURING DISMANTLE PROCESS.

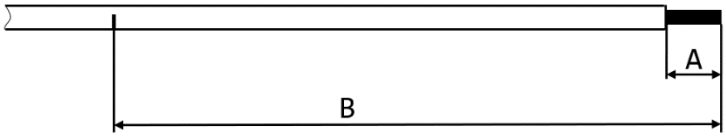


Figure 18

Wire Size	Variant of CABLE EXIT [POS. 6]	Removal of isolation "A"	Position outer end of COVER [POS.9] "B"
0,35mm²	90° down	Acc. 114-13000	96 mm REF
	90° right / left		80 mm REF
	180°		80 mm REF

Table 6

Push crimped MNL contacts into the Micro MNL connector housing acc. to application spec 114-13000. Pinning acc. to Figure 19 and Table 7.

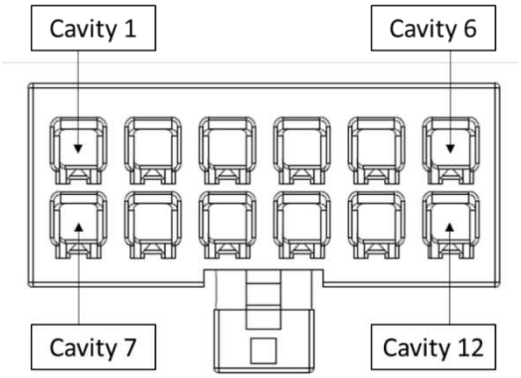


Figure 19

Cavity no.	Function
1	LED_DRV1 (Green)
2	LED_DRV2 (Red)
3	n/a
4	GND_LED
5	LED_DRV4 (White)
6	n/a
7	Proxi
8	Temp_GND
9	n/a
10	T_AC1
11	PE_S
12	CP

Table 7

Step 5

Assemble the Radial Seal [Pos. 4] to the Cable Exit Cover [Pos. 5]. Radial Seal should be properly seated into the Collar of the Cable Exit Cover. Ensure also correct orientation of seal acc. figure 20.

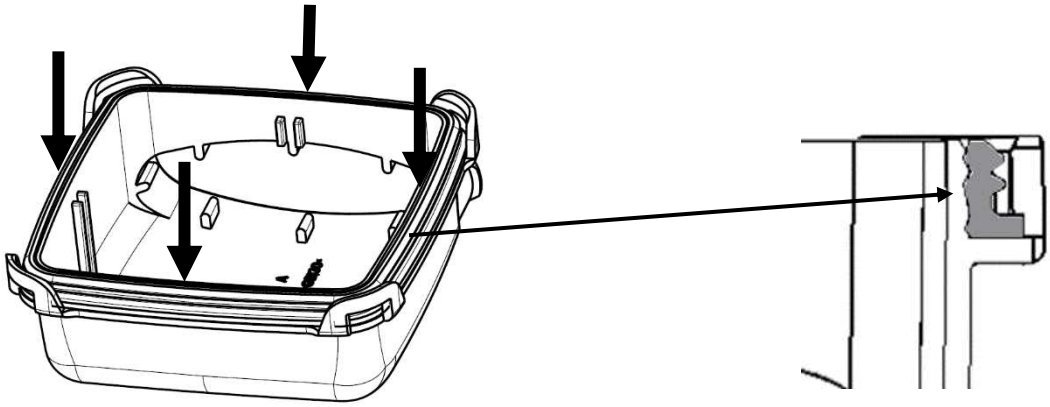


Figure 20

Step 6

Pass the cable subassembly through the AC slot in Cable Exit [Pos. 5] (figure 21).

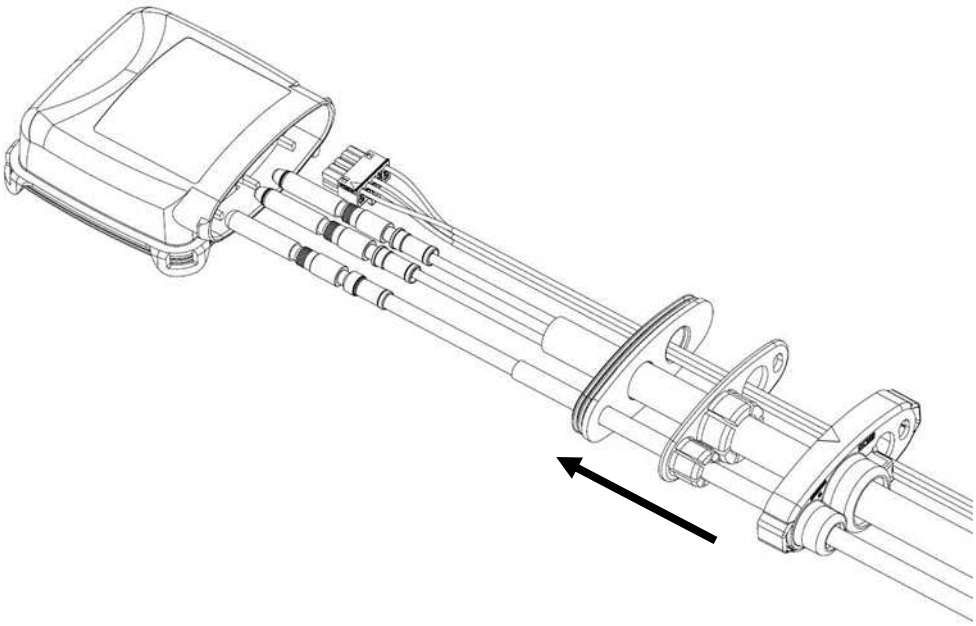


Figure 21

Step 7

Insert the Contacts from the rear side into the Inlet Housing (figure 22) according to the cavity description into their locking position.
ATTENTION: The correct contact positions must be ensured BEFORE pushing the contacts into locking 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)!

To ensure that the contacts are correctly inserted, pull and push with a low force on the cables (max. 10N) and check visually on the front side that the locking lances are properly engaged in the related pin groove. The locking lances must not stay outside of the grooves (figure 23). Ensure the Seals are properly positioned in their seats and are not damaged!

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.

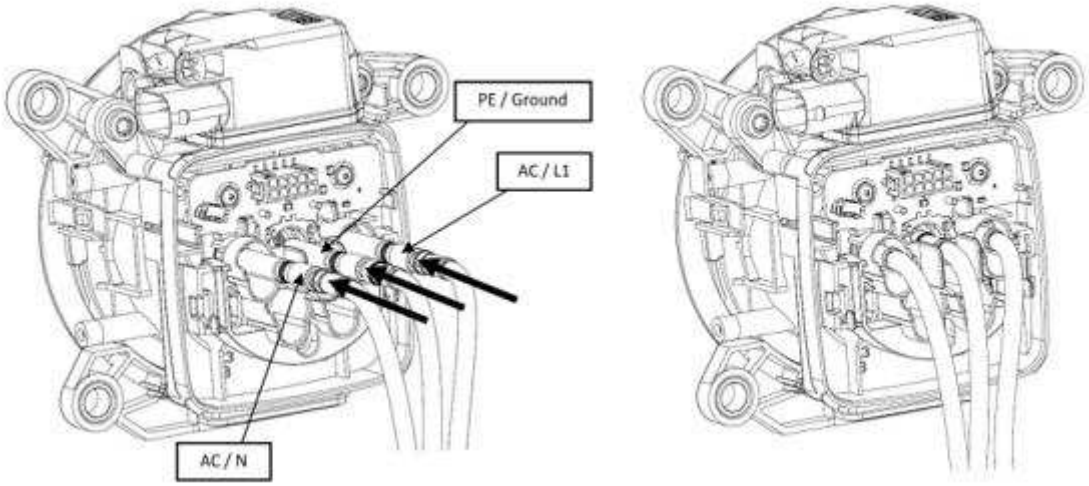


Figure 22

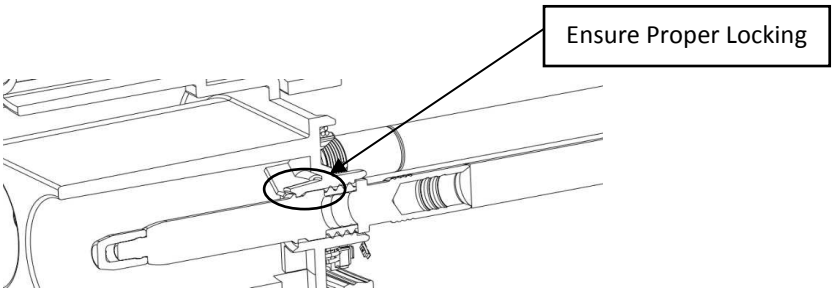


Figure 23

Step 8

After the contacts have been controlled for correct positioning and locking, the SECONDARY LOCK has to be pushed upwards (figure 24). Ensure that all hooks are properly engaged with the inlet housing, which must be controlled by the double audible click and by visible inspection (figure 25).

ATTENTION: The Pin position has to be ensured BEFORE locking the Secondary Lock!

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.

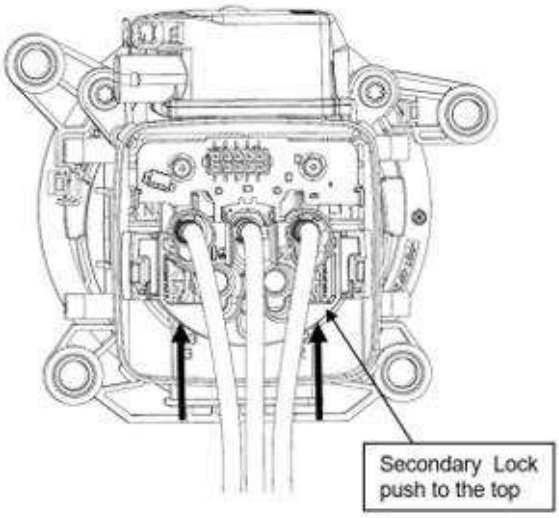


Figure 25

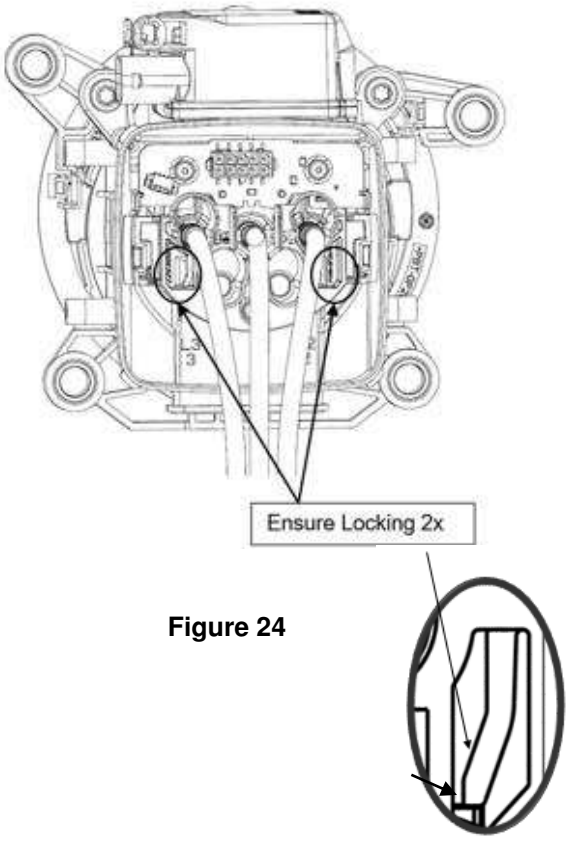


Figure 24

Step 9

Connect Micro Mate'N'Lock Connector to PCB-Header. Ensure the hook is properly engaged with the header, see figure 26.

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

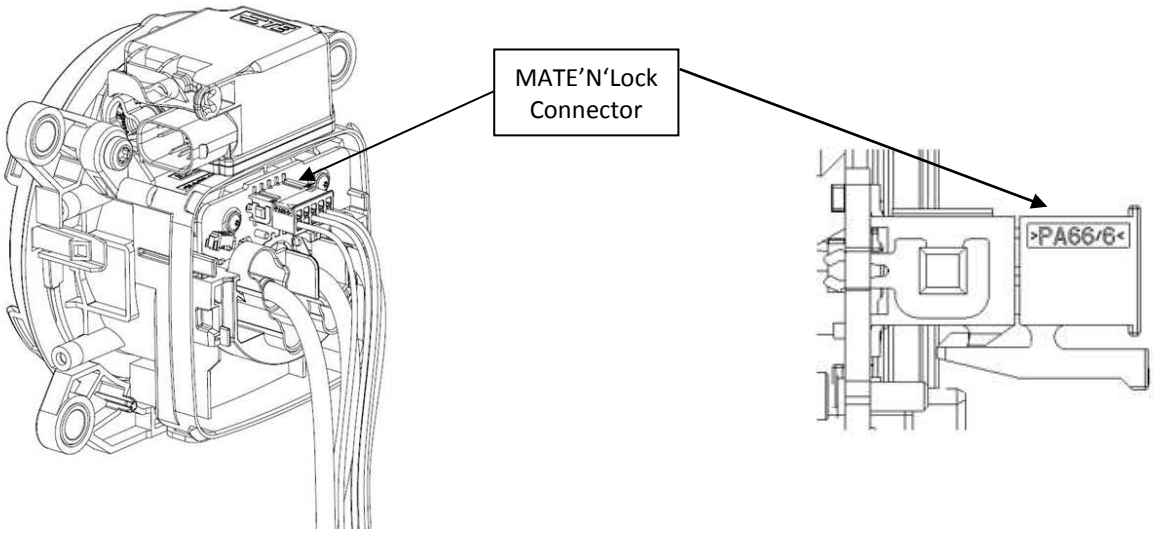


Figure 26

Step 10

Assemble the CABLE EXIT [Pos. 5] (with radial seal [Pos. 4]) to the Inlet Housing [Pos. 1] (Figure 27).
Press CABLE EXIT down at specified faces.
Ensure that all 4 hooks are properly engaged. Typical press-on-force = 250N; max. press-on-force = 500N

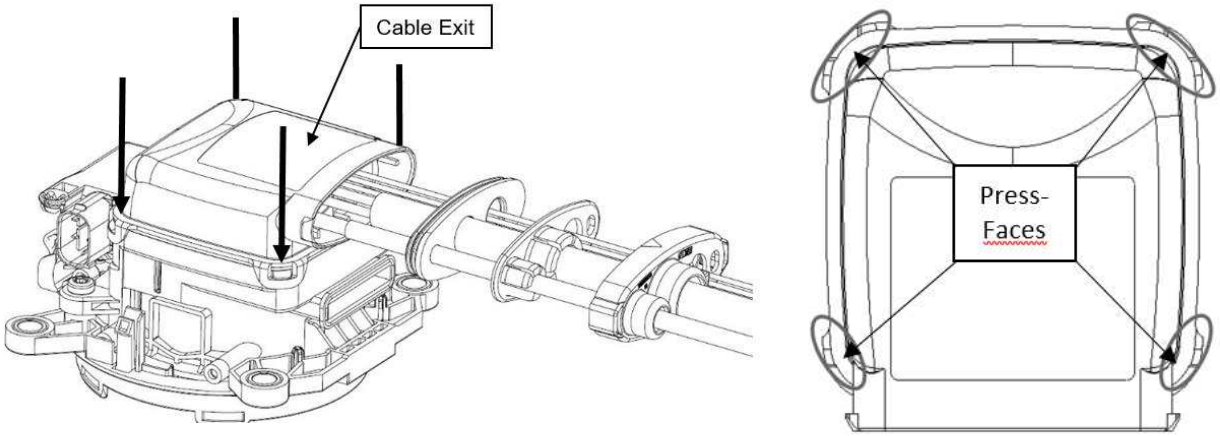


Figure 27

Step 11

Move the STRAIN RELIEF AC [POS. 7] together with FAMILY SEAL AC [POS. 6] into their position in the CABLE EXIT [POS. 5]. Ensure that all wires (AC-Multicore, PE-Single wire, LV-wires) are well positioned in the FAMILY SEAL, so that the seal lips are placed on the outer isolation of the cables

Ensure that the mark from Step 2 is on the same Level to the End of the CABLE EXIT [Pos. 5].

Push the COVER CABLE SEAL AC [POS. 8] over it and snap it on the CABLE EXIT [Pos. 5]. Ensure that both hooks are properly engaged. Typical press-on-force = 250N; max. press-on-force = 500N.

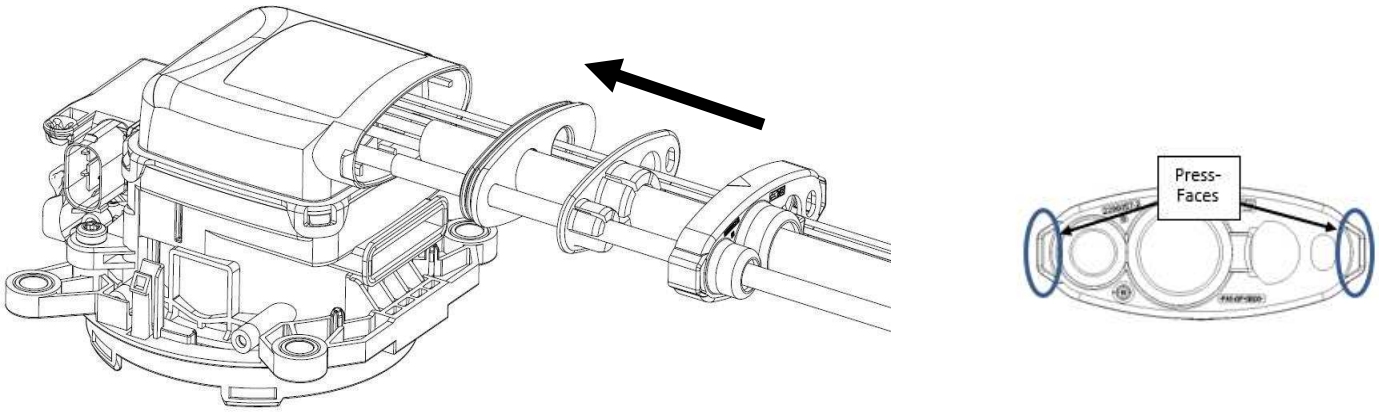


Figure 28

Place a cable tie (proposed dimensions 2,5mm wide, material to be heat stabilized and suitable for automotive use) around the single wire signal cables and the bridge at the Cover Cable Seal 2296057-1 and pull tight, see figure 29.

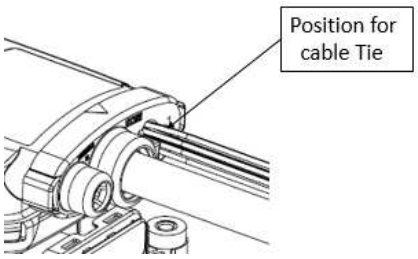


Figure 29

Step 12

Assemble Protection Cap [Pos. 9] at Inlet Housing [Pos. 1] as shown in the Figure 30
Typical press-on-force = 10N; max. press-on-force = 100N.

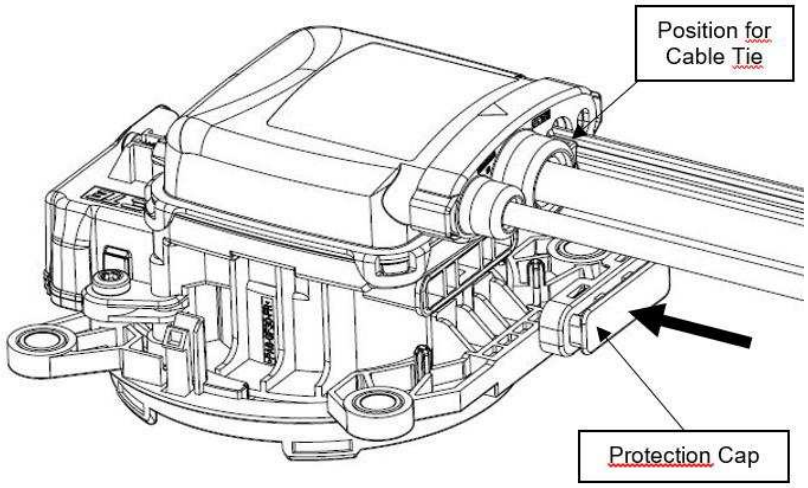


Figure 30

Step 13

Thread the service unlock ball wire through the hole in the actuator housing.

Snap the ball into the seating of the red unlocking strap as shown in the figure 31. Typical press-in-force = 10N; max. press-in-force = 50N.
Ensure that the ball is fixed well by pulling and pushing at the wire with a low force.

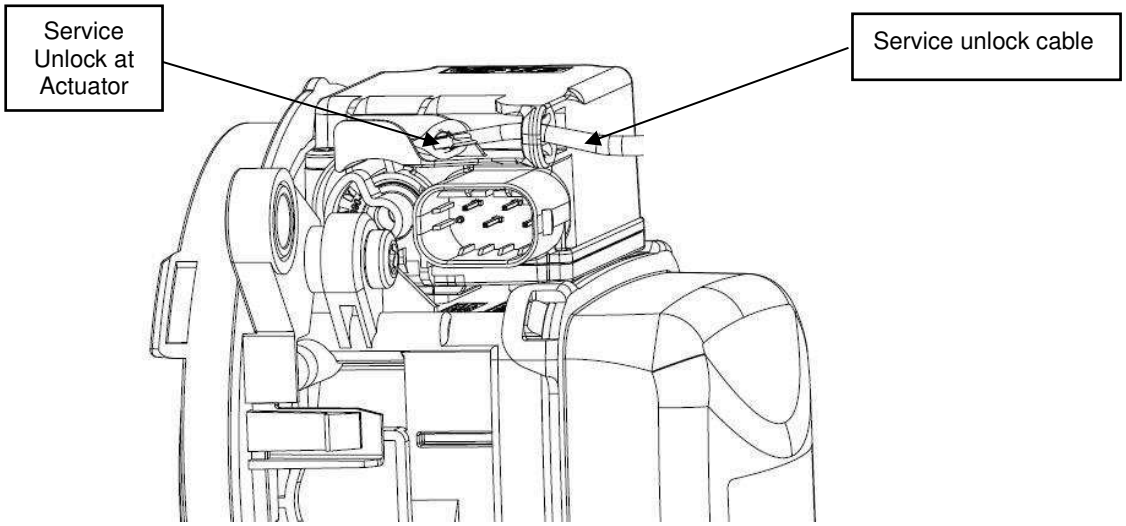


Figure 31

Step 14

Assemble the Connector for the Actuator connection acc. to application spec of MQS-Connector. (Applicator 2151038; Die Set 5-1579001-1).

Push connector on actuator housing. To ensure that the connector is correctly inserted, pull and push with a low force on the housing (max. 10N).

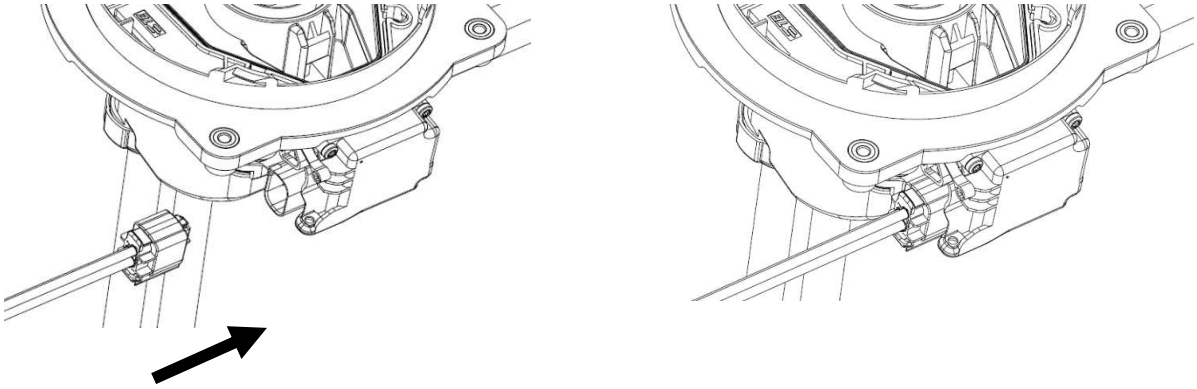


Figure 32

Step 15

Apply a label on specified face of CABLE EXIT. The label needs to include information acc. requirements of IEC62196-x. Also information acc. to customer requirements can be applied here.

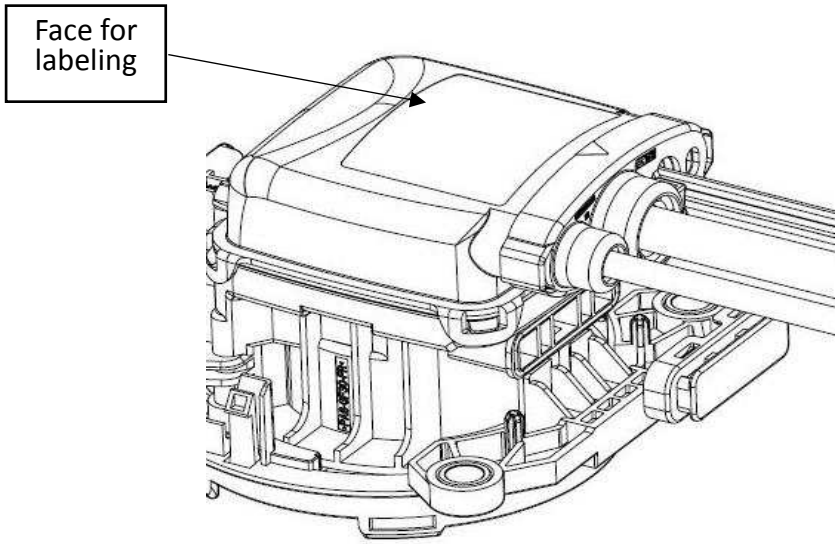


Figure 33

6.6. 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 the following tests must be performed:

- Isolation resistance:
  TEST VOLTAGE: 1000VDC
  Inspection Duration: 1s
  min. Riso: 200MOhm
  AC versus AC; AC versus multicore shield
- Dielectric withstand voltage:
  TEST VOLTAGE: 1500VAC
  Inspection duration: 1s
  max. leakage current: 10mA
  AC versus AC; AC versus multicore shield
- Correct Pinning
- Check seals for correct seating / Check of leakage
- Gauge check of geometrical interface acc. IE62196-2
- Functionality of connector locking device (mechanical check of pin movement in locking and unlocking position)

6.7. Technical Cleanliness Charge Inlet Assembled

According to risk assessments performed by TE Connectivity the following CCC for metallic particles at the complete assembled charge inlet (valid until cable outlet) are defined:

N (H30/I4/J2/K0)

LTR	REVISION RECORD	DWN	APP	DATE
A	FIRST RELEASE	M. SCHMIDT	F. WITTROCK	4DEC2018
A1	-SPECIFICATION REVISED -TABLE 1, ALL 6MM² CONTACTS NEW CH 3.7	R. SCHWAN	F. WITTROCK	28MAY2019
B	-2.1.A LIST OF COMPONENTS CHANGED TO CUSTOMER DRAWING -3.4 NOTE REGARDING PVC INSULATION ADDED -TABLE1, RECOMMENDED HV20 ADDED -TABLE 2, BOM CHANGED TO COMPONENT DESCRIPTION -6.3 PARTS TO ORDER REFERED TO CUSTOMER DRAWING -6.5 STEP2, RECOMMENDATIONS OF MARKING ADDED -FIGURE13, DIM“C” ADDED -TABLE3, DIM “C” TOLERANCE ADDED -FIG.14/TAB5 ALTERNATIVE TAPE PROTECTION ADDED -FIGURE18, DIM“B” ADDED -TABLE6, DIM“B” 80REF AND 60REF WERE 90 -6.6 TESTVOLTAGE 1000V WAS 500V	R. SCHWAN	F. WITTROCK	16DEC2019
B1	-TABLE 1, CONTACT 2-2293269-3 AND 2-2293270-3 ADDED -FIGURE11, NOTE “CARDBOARD PACKAGING OF THE INLET HSG (POS. 1) ARE ONLY TO BE OPENED IN ESD PROTECTED AREAS.” ADDED -6.6 ISOLATION RESISTANCE, "AC VERSUS AC; AC VERSUS MULTICORE SHIELD" ADDED -6.6 DIELECTRIC WITHSTAND VOLTAGE, TEST VOLTAGE: 1500VAC WAS 2000VAC; "AC VERSUS AC; AC VERSUS MULTICORE SHIELD" ADDED	R. SCHWAN	F. WITTROCK	18JUN2020
B2	-2.1 B): 114-13000 IN LIST ADDED -TABLE2: POS.2 SPEC AND SMBT REQUIREMENT ADDED, POS.11 SPEC. ADDED -STEP4: IMAGE PRESENTATION OF PINNING MNL UPDATED	R. SCHWAN	F. WITTROCK	21OCT2020
B3	-2.1) KIT NUMBER UPDATED -4) APPLICATOR PN UPDATED -6.1) FIGURE 8 UPDATED -6.1) FOOTNOTE UPDATED	M. MAENCHE	M. SCHMIDT	29APRIL2022
B4	-4) APPLICATOR NOTE ADDED	M. MAENCHE	M. SCHMIDT	31AUG2022
B5	-6.5) UPDATED WIRE LENGTH -6.7) TECHNICAL CLEANLINESS ADDED	M. MAENCHE	M. SCHMIDT	06DEC2022

DRW M.ISKRA 28JUN2018	TE CONNECTIVITY GERMANY GMBH AMPÈRESTRAßE 12-14 D-64625 BENSHEIM GERMANY		
CHK F. WITTROCK 4DEZ2018			
APP F. WITTROCK 4DEZ2018	NO 114-94440	REV B5	LOC AI
TITLE	Application Specification Vehicle Charge Inlet Type 2 AC acc. IEC62196-2		