



## HCM650 Insert Series

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## 1. INTRODUCTION

This specification contains the regulations for assembly of HCM650 contact inserts and the handling of these inserts.

## 2. SUPPORTING DOCUMENTS

### 2.1. Customer drawings

Please refer to the customer drawings of HCM650 insert series.

### 2.2. Product specification

The product specifications of the used articles are to be taken into account. The product specification describes the technical data as e.g. regulations, approvals, temperature range and rated voltage.

For further reference refer Product spec. 108-137074.

### 2.3. Application Specification

Connectors shall be assembled as below mentioned application specifications to ensure correct connector assembly.

### 2.4. Standards

- EN 61984: Connectors - Safety requirements and tests
- IEC 60664-1: Insulation coordination for equipment within low-voltage systems (Part 1)





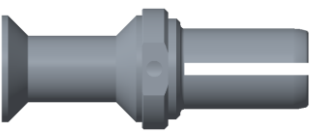
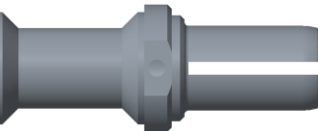
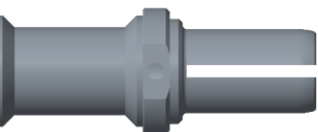
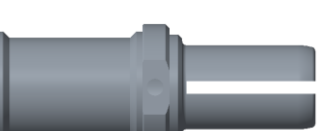
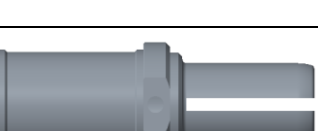
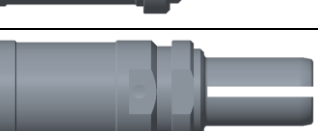
**Voltage rating dependent on installed creepage and clearance distance!**

## 3. DESCRIPTION

This application specification describes the male insert and the female insert of the “HCM650” series crimping contact type. The listed terms are used in the specification.

### 3.1. Inserts and contacts

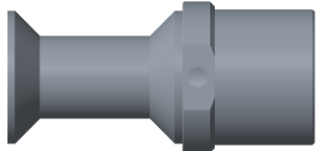
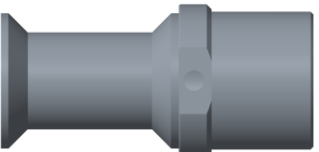
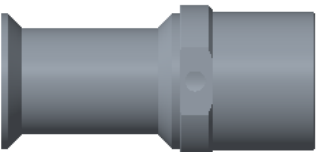
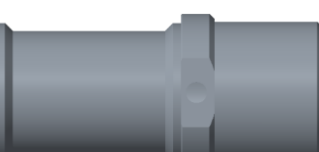
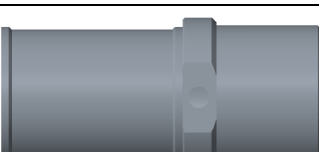
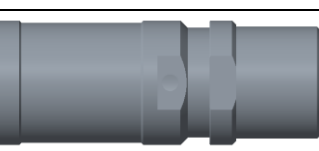

Available inserts and contacts are as below:

	Part No.	Type	Description	Picture
Inserts (Crimp)	T2196503101-000	HCM650-MC	HCM650 MALE INSERT, CRIMP	
	T2196503201-000	HCM650-FC	HCM650 FEMALE INSERT, CRIMP	
Contacts (Crimp)	T2196501070-001	HCM650-MC-70	HCM650 PIN CONTACT, CRIMP, 70mm <sup>2</sup> , COPPER WIHT SILVER PLATING	
	T2196501095-001	HCM650-MC-95	HCM650 PIN CONTACT, CRIMP, 95mm <sup>2</sup> , COPPER WIHT SILVER PLATING	
	T2196501120-001	HCM650-MC-120	HCM650 PIN CONTACT, CRIMP, 120mm <sup>2</sup> , COPPER WIHT SILVER PLATING	
	T2196501150-001	HCM650-MC-150	HCM650 PIN CONTACT, CRIMP, 150mm <sup>2</sup> , COPPER WIHT SILVER PLATING	
	T2196501185-001	HCM650-MC-185	HCM650 PIN CONTACT, CRIMP, 185mm <sup>2</sup> , COPPER WIHT SILVER PLATING	
	T2196501240-101	HCM650-MC-240	HCM650 PIN CONTACT, CRIMP, 240mm <sup>2</sup> , COPPER WIHT SILVER PLATING, WITH HEAT-SHRINKABLE INSULATION TUBING	

## Application Specification

**114-137074**

Feb 13<sup>th</sup>, 2025 Rev. A1

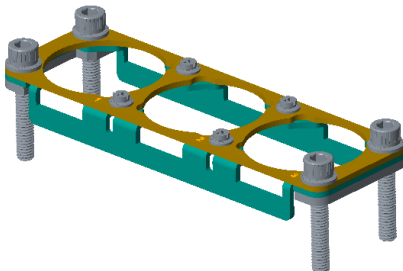
	T2196502070-001	HCM650-FC-70	HCM650 SOCKET CONTACT, CRIMP, 70mm <sup>2</sup> , COPPER WIHT SILVER PLATING	
	T2196502095-001	HCM650-FC-95	HCM650 SOCKET CONTACT, CRIMP, 95mm <sup>2</sup> , COPPER WIHT SILVER PLATING	
	T2196502120-001	HCM650-FC-120	HCM650 SOCKET CONTACT, CRIMP, 120mm <sup>2</sup> , COPPER WIHT SILVER PLATING	
	T2196502150-001	HCM650-FC-150	HCM650 SOCKET CONTACT, CRIMP, 150mm <sup>2</sup> , COPPER WIHT SILVER PLATING	
	T2196502185-001	HCM650-FC-185	HCM650 SOCKET CONTACT, CRIMP, 185mm <sup>2</sup> , COPPER WIHT SILVER PLATING	
	T2196502240-101	HCM650-FC-240	HCM650 SOCKET CONTACT, CRIMP, 240mm <sup>2</sup> , COPPER WIHT SILVER PLATING	 

Note: Crimp zones of above contact are acc. to DIN EN 46235, for stranded fine wires acc. to VDE 0295 class 5 / IEC 60228 class 5.

### 3.2. Accessories

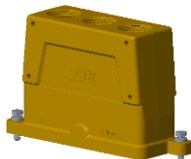
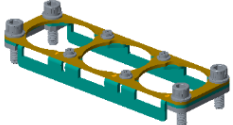
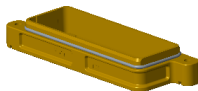
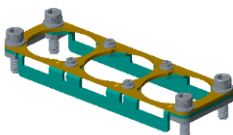
#### 3.2.1 Frame

There is 1 type of frame for HCM650 inserts available, description as below.

Pole	Part No.	Type	Description	Picture
3 poles	T0924311125-000	H24BPR-3P-650 -FRAME	H24BPR-3P-650 -RRAME	

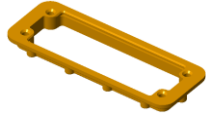
## 3.2.2 Hood and housing

There is 1 type of hood and housing for HCM650 inserts available. Description as below. The detail dimensions of entry hole refer to product catalogs or drawings.

Pole	PN	Type	Description	Picture	Frame
3 poles Hood	T1920240332-409	H24BPR-TGH-XL-3M32-EMC-C	H24BPR HEIGHTEN HOOD,DIAGONAL LOCKING, TOP ENTRY 3M32,POWDER COATED,BLACK		T0924311125-000 
3 poles Housing	T1930240000-409	H24BPR-AG-EMC-C	H24BPR HOUSING,DIAGONAL LOCKING,BULKHEAD MOUNTED, POWDER COATED,BLACK		T0924311125-000 

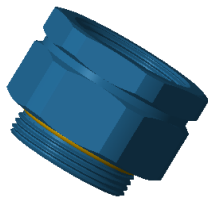
## 3.2.3 Mounting frame

There is 1 type of hood, housing and mounting frame for HCM650 inserts available. Description as below. The detail dimensions of entry hole refer to product catalogs or drawings.

PN	Type	Description	Picture	Size/Suitable For
T1990240001-001	H24BPR-FRAME	H24BPR-FRAME,DIAGONAL LOCKING		H24BPR Housing

## 3.2.4 Cable gland adapter

There is 1 type hexagonal adapter (with O-ring) available, which is installed between cable gland and 3 pole hood to reach the electrical data up to 350A 4000V 18kV 3. Description as below.

PN	Type	Description	Picture
T3033323250-000	INCR-32/32-M	METAL INCREASERS M32-M32	

For more detailed information regarding cable glands, please refer to related application specifications.

## 4. REQUIREMENTS

### 4.1. Wire selection and preparation

#### 4.1.1. Stripping length L

Use proper tooling to strip the wire.

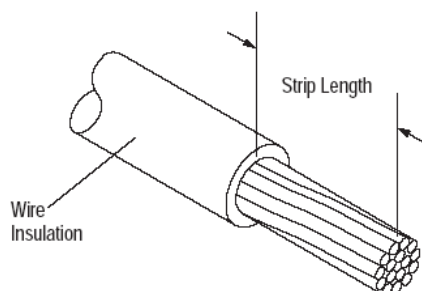


Figure: 2



When stripping the wire, care must be taken to avoid scraping, nicking, or cutting the conductor. Care must also be used when handling the wire during stripping to avoid cracking or breaking the conductor and insulation.

Depending upon the cross section of the wire or cable, the stripping length has to be selected from the table below. See Table 1.

Table: 1

Contacts	Wire cross section [mm <sup>2</sup> ]	Strip Length L [mm]
HCM650-MC-70	70 mm <sup>2</sup>	42
HCM650-FC-70	70 mm <sup>2</sup>	42
HCM650-MC-95	95 mm <sup>2</sup>	42
HCM650-FC-95	95 mm <sup>2</sup>	42
HCM650-MC-120	120 mm <sup>2</sup>	42
HCM650-FC-120	120 mm <sup>2</sup>	42
HCM650-MC-150	150 mm <sup>2</sup>	42
HCM650-FC-150	150 mm <sup>2</sup>	42
HCM650-MC-185	185 mm <sup>2</sup>	42
HCM650-FC-185	185 mm <sup>2</sup>	42
HCM650-MC-240	240 mm <sup>2</sup>	46
HCM650-FC-240	240 mm <sup>2</sup>	46

### 4.1.2. Insulation diameter

Any wire that is used for the Electrical purpose is covered with insulating polymer. This insulation on the wires depends upon the wire size and type of application where it is being used. The capability of insulation diameter for various wire sizes is as shown in table 2.

Table: 2

Contact Insert	With hood & housing	With hexagonal adapter (with O-ring)	Max. Wire cross section	Max. insulation Diameter in (mm)
HCM650-MC HCM650-FC	No	No	$\leq 240 \text{ mm}^2$	32
			$\leq 240 \text{ mm}^2$	32
	3 Pole	No	$\leq 240 \text{ mm}^2$	According to capability of selected M32 Cable gland
			$\leq 240 \text{ mm}^2$	
	3 Pole	T3033323250-000	$\leq 120 \text{ mm}^2$	Smaller value of: • Capability of hexagonal adapter(with O-ring) • Capability of selected M32 Cable gland
			$\leq 120 \text{ mm}^2$	



The insulation diameter over the wire specified in the table 2 is for the insulation concentric, with equal thickness layer over the conducting wire.

### 4.2. Assemble wires to inserts

Crimping tool

Crimping tool is available as below figure 3:

- Wire rage: 16-120mm<sup>2</sup>
- Name: Hydraulic crimper
- Order No.: T3100000015-000



- Wire rage: 10-300mm<sup>2</sup>
- Name: Hydraulic crimper
- Order No.: Contact sales representative



Figure: 3



Crimping tools other than above are also ok, if the said tools are designed for crimping contacts whose crimp zones are acc. to DIN EN 46235. And qualification test is necessary before using such tools.

## 4.2.1. Assemble stripped wires to contacts (Crimp)

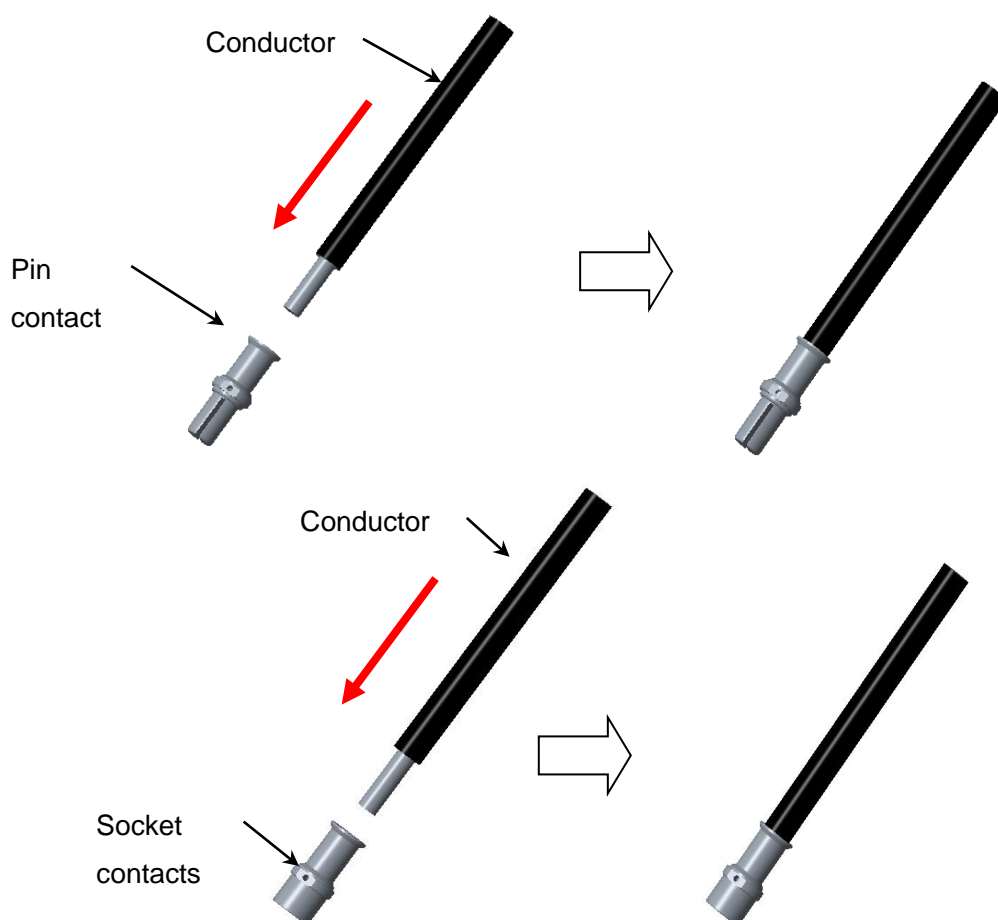
Insert the cable into the wire barrel of the contact. The wire strands must be visible in the reference hole of the contact. During the termination process make sure that the contact in the contact zone is not damaged or deformed.

When using manual crimp tools the following points must be followed:

- 1). Using the correct crimping dies for this type of contact. (Crimping dies are included in the crimping tool, for example: Using 70mm<sup>2</sup> crimping dies for 70mm<sup>2</sup> contact);
- 2). Installing the crimping dies into crimping tool.
- 3). Putting the contact and cable together into crimping dies.
- 4). Crimping the contact.

Crimping pulling resistance: (NF F 00-363)

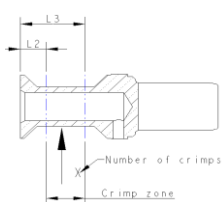
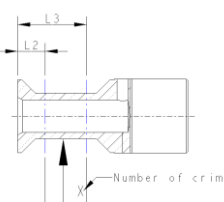
Cable cross section (mm <sup>2</sup> )	70	95	120	150	185	240
Minimal force (N)	3900	4600	5200	6500	8000	10400

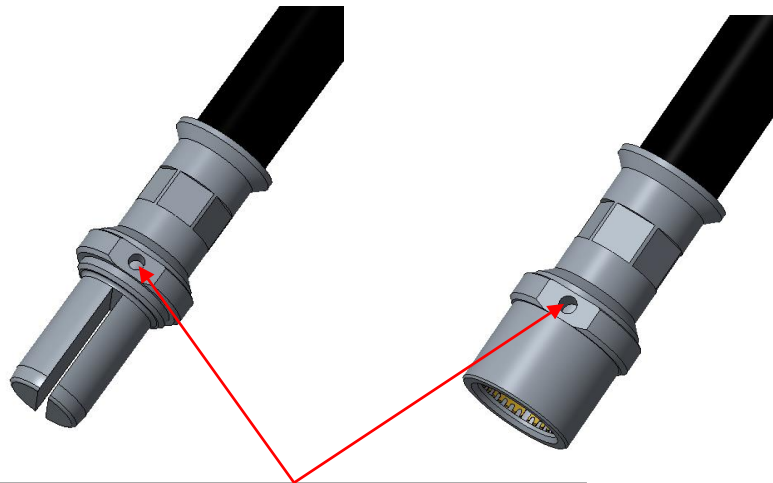


**Figure: 4**



### Crimping zone and number of crimps:

PART NUMBER	Cross section (mm <sup>2</sup> )	L2	L3	Number of crimps X	Crimp direction
T2196501070-001	70	10	25	1	
T2196501095-001	95	9	26	1	
T2196501120-001	120	8	27	1	
T2196501150-001	150	5	30	2	
T2196501185-001	185	3	28	2	
T2196501240-101	240	7	32	2	
T2196502070-001	70	10	25	1	
T2196502095-001	95	9	26	1	
T2196502120-001	120	8	27	1	
T2196502150-001	150	5	30	2	
T2196502185-001	185	3	28	2	
T2196502240-101	240	7	32	2	



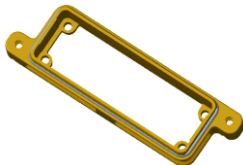
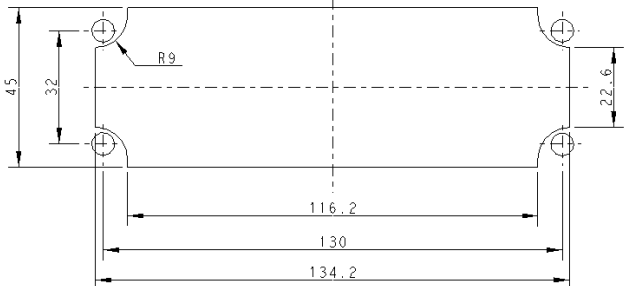
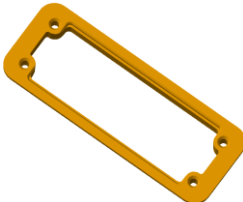
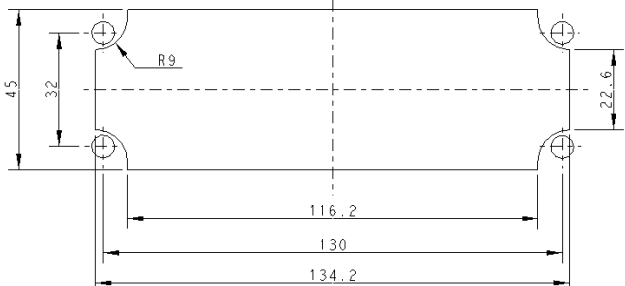
After crimp, the wire strands must be visible in the reference hole of the contact.



Contacts are designed for crimping for stranded wire acc. to IEC 60 228 class 5.

## 4.3. Panel Cut Out

Cut the panel before assemble housing, Dimensions are shown in the table below.

Type	Description	Picture	Dimensions
T1930240000-409 H24BPR-AG-EMC-C	H24BPR HOUSING,DIAGONAL LOCKING,BULKHEAD MOUNTED, POWDER COATED,BLACK		
T1990240001-001 H24BPR-FRAME	H24BPR-FRAME,DIAGONAL LOCKING		

## 5. ASSEMBLY

A proper assembly procedure is according to how the modular be used and which other parts assembled together with.

### 5.1. Inserts assembly

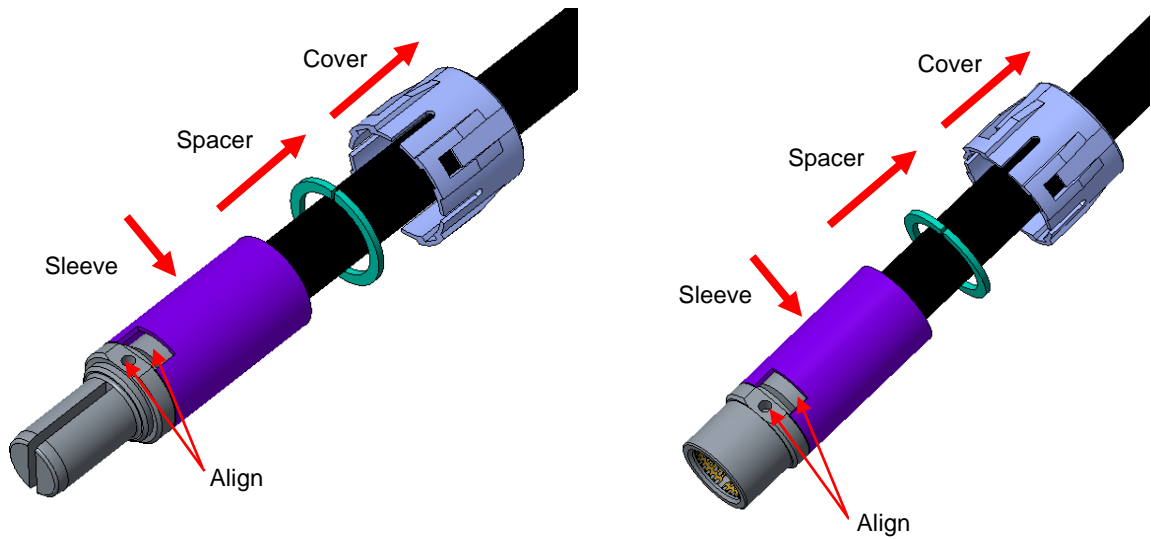
Step 1:

Prepare the crimped contacts: As above section 4.

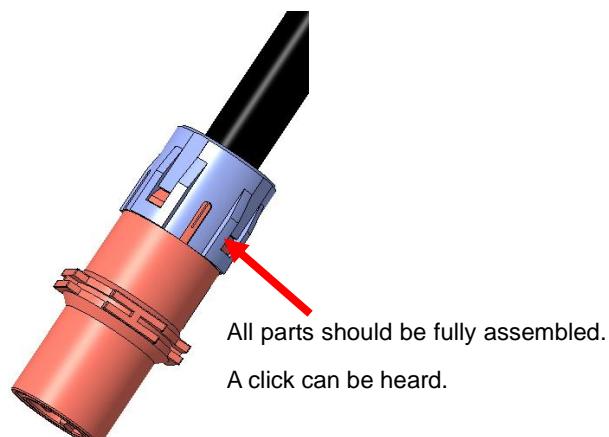
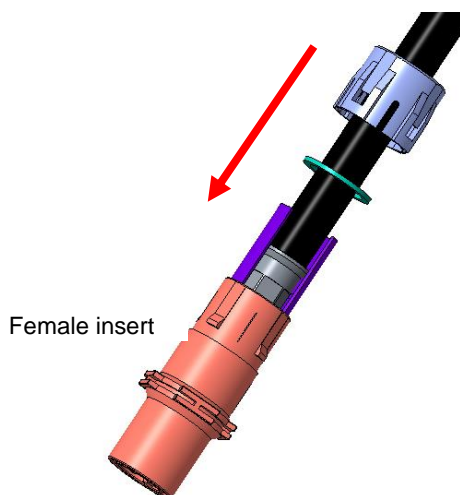
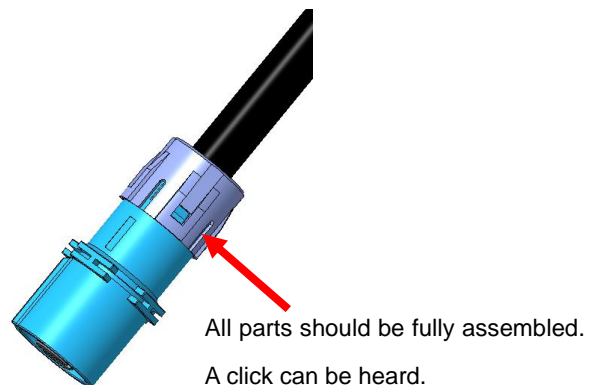
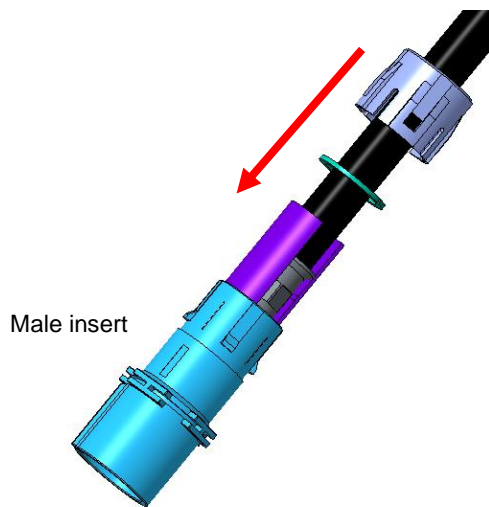


Step 2:

Assembly cover, spacer and sleeve together with crimped contact.



Step 3:  
Assembly insert.



## 5.2. 3 Poles application assembly

Hood side:

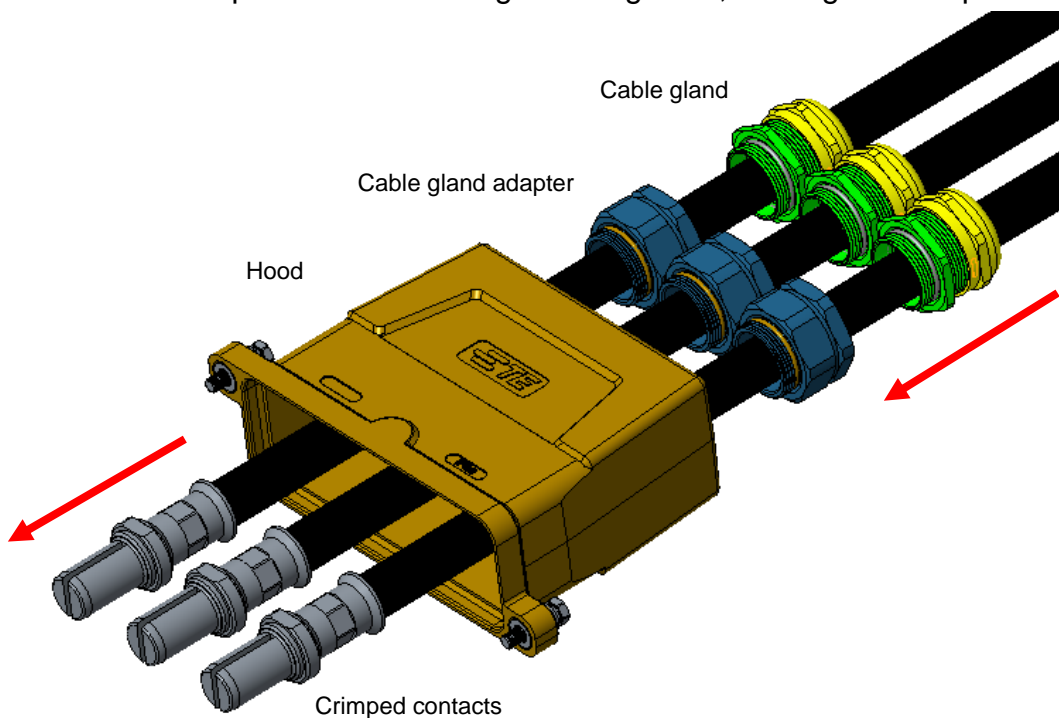
Step 1:

Prepare the crimped contacts: As above section 4.



Step 2

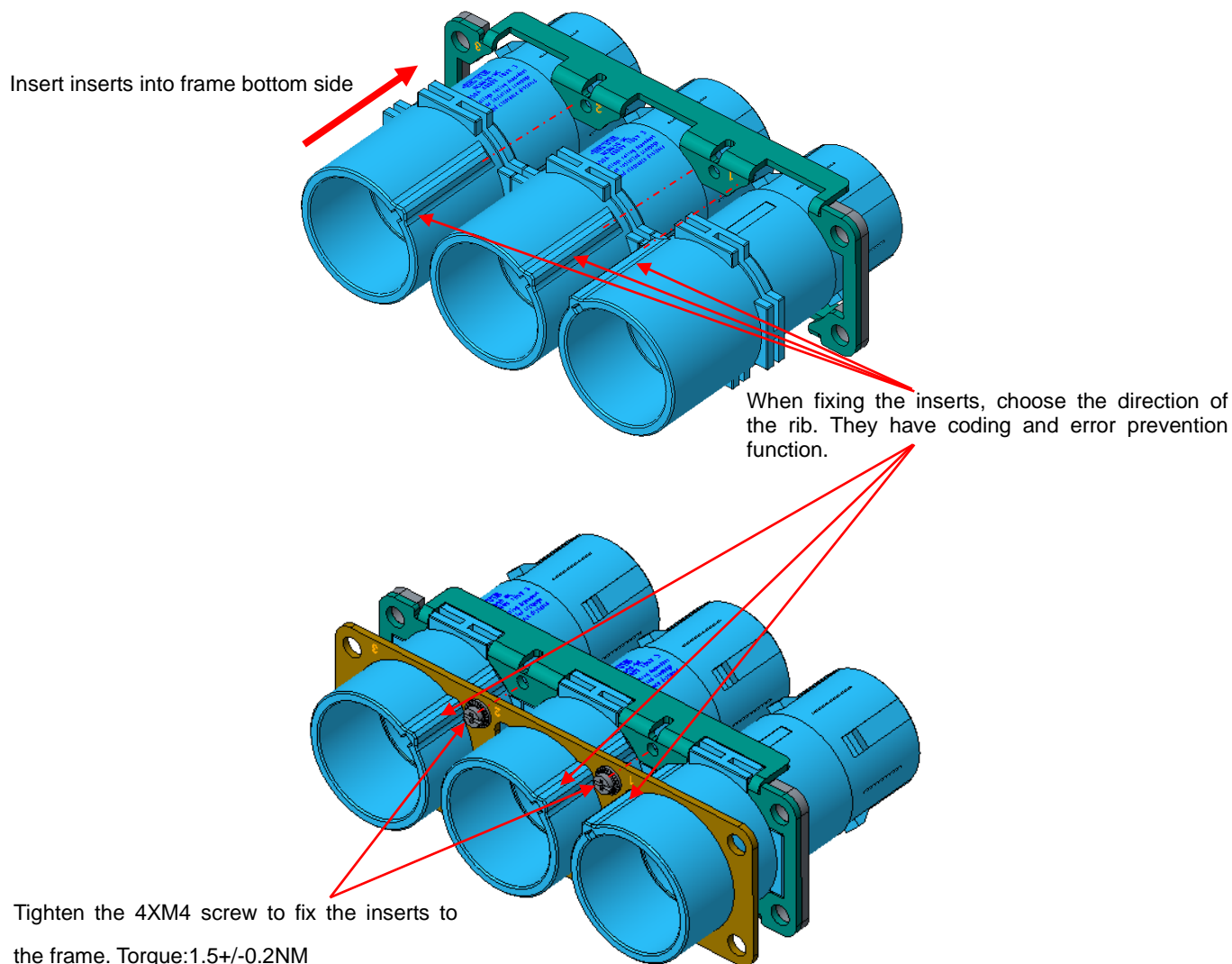
Insert the crimped contacts through cable glands, cable gland adapter and hood.



Above cable gland adapter is optional. Cable gland can be assembled to hood directly. The influence will be difference creepage and clearance distance herein.

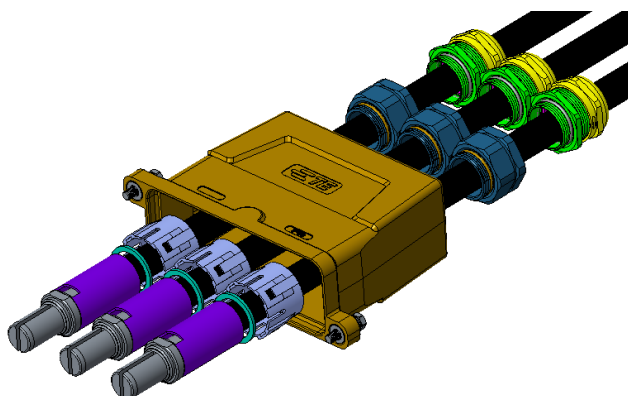
## Step 3

Insert inserts into frame bottom side. Fix the inserts to the 3 pole frame.



## Step 4:

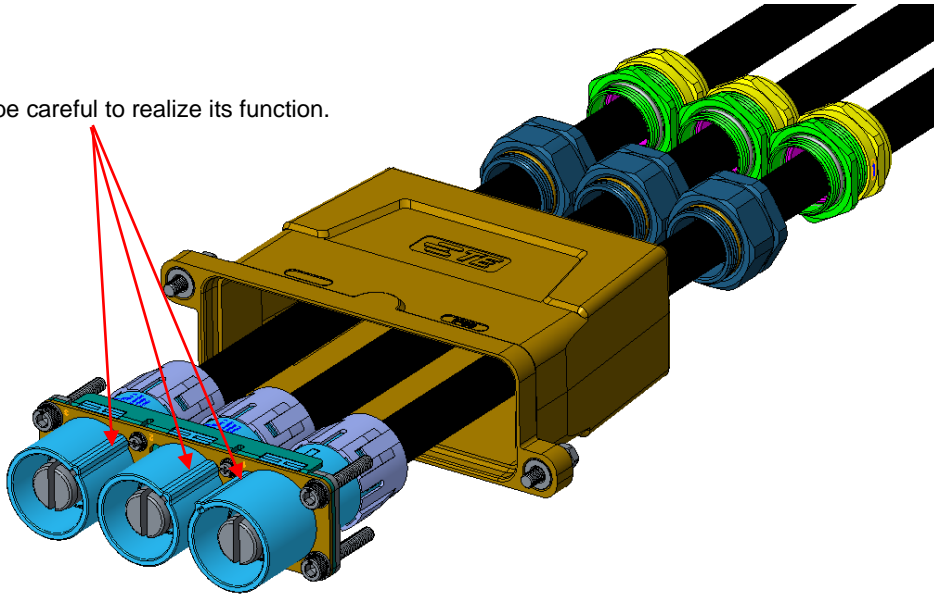
Assembly cover, spacer and sleeve to the crimped contact. Refer 5.1 step2.



**Step 5:**

Assembly crimped contacts to inserts. Refer to 5.1 step3.

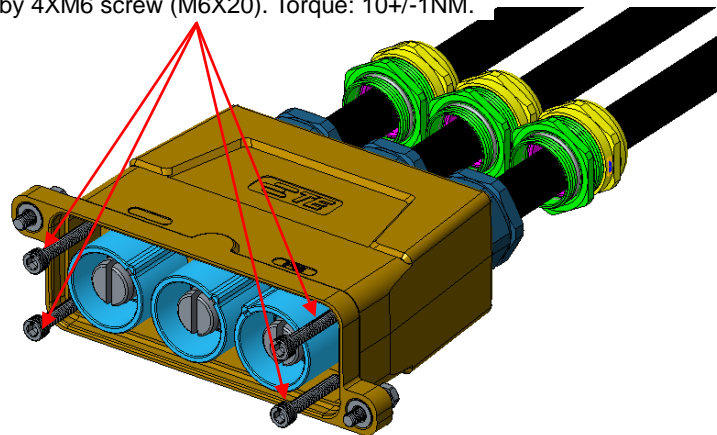
Keying should be careful to realize its function.



**Step 6:**

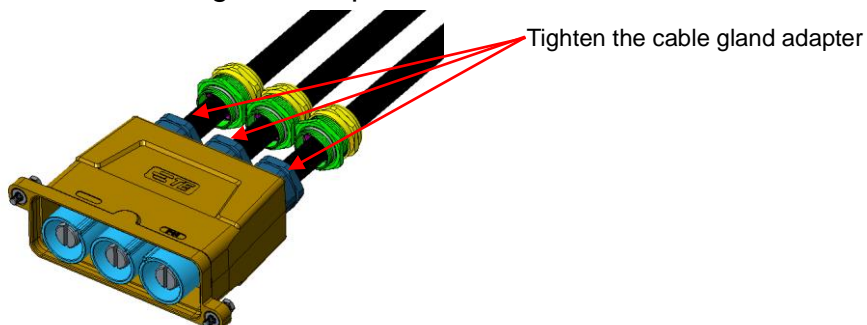
Fix frame to hood.

Fix the frame to hood by 4XM6 screw (M6X20). Torque: 10+/-1NM.



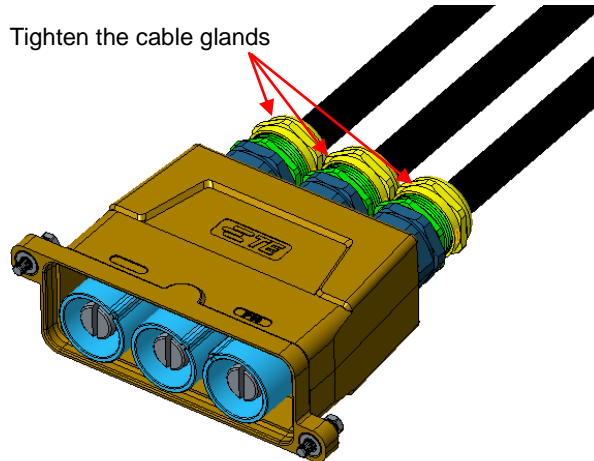
**Step 7:**

Tighten the cable gland adapters.



Step 8:

Tighten the cable glands



Female inserts are also ok to be assembled with hood. The process is same as above.

Housing side:

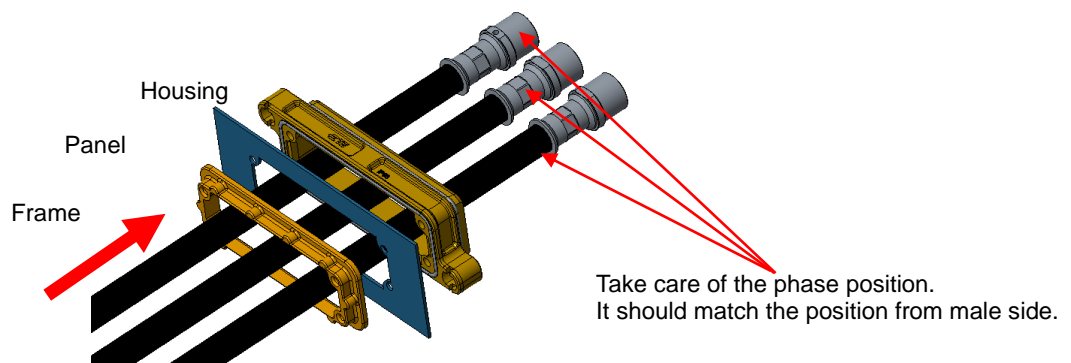
Step 1:

Prepare the crimped contacts: As above section 4.



Step 2:

Insert the crimped contacts through frame, panel and housing.



- Frame is optional, in case of customer directly use nuts only.
- Panel should be cut before assembling. Refer to section 4.3.

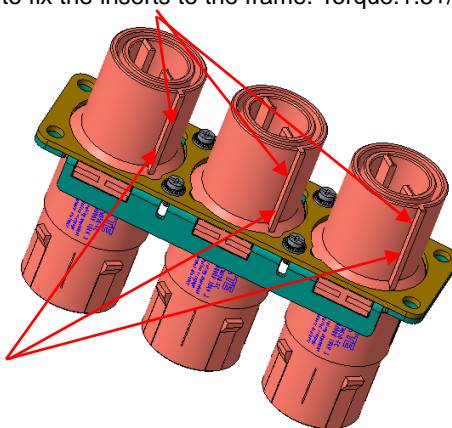


## Step 3:

Fix the female inserts to the frame. Same process as 5.2 step 3.

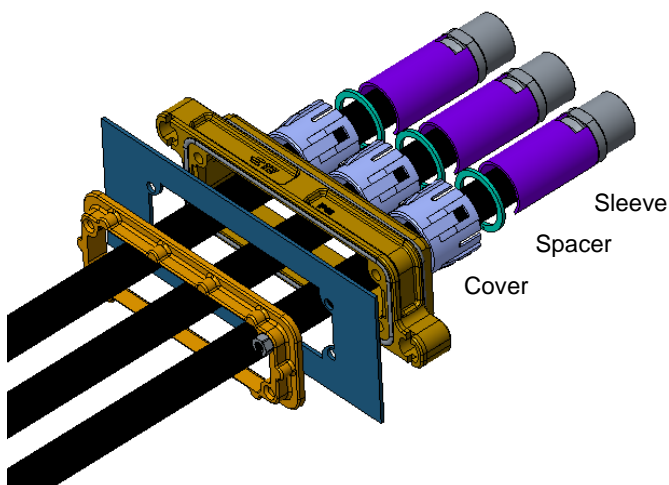
Tighten the 4XM4 screw to fix the inserts to the frame. Torque:1.5+/-0.2NM.

When fixing the female inserts, choose the direction of the ribs corresponding male inserts side (Refer to section 5 step2 & step5). They have coding and error prevention function.



## Step 4:

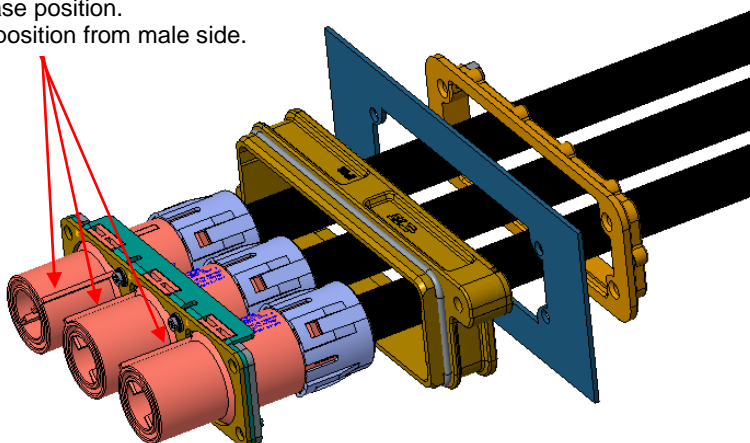
Assembly cover, spacer and sleeve to the crimped contact. Refer 5.1 step2.



## Step 5:

Assembly crimped contacts to inserts. Refer to 5.1 step3.

Take care of the phase position.  
It should match the position from male side.

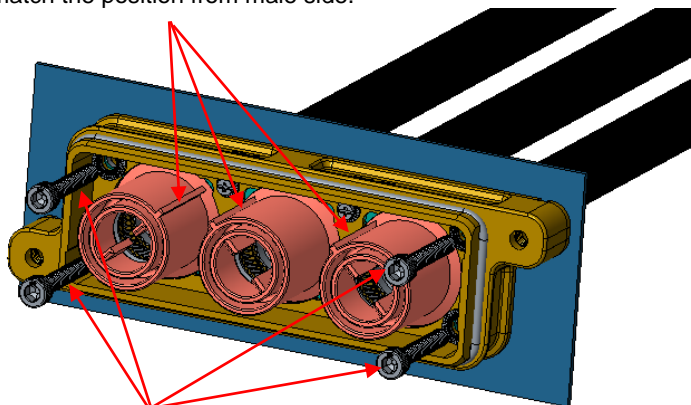




## Step 6:

### Fix frame to housing.

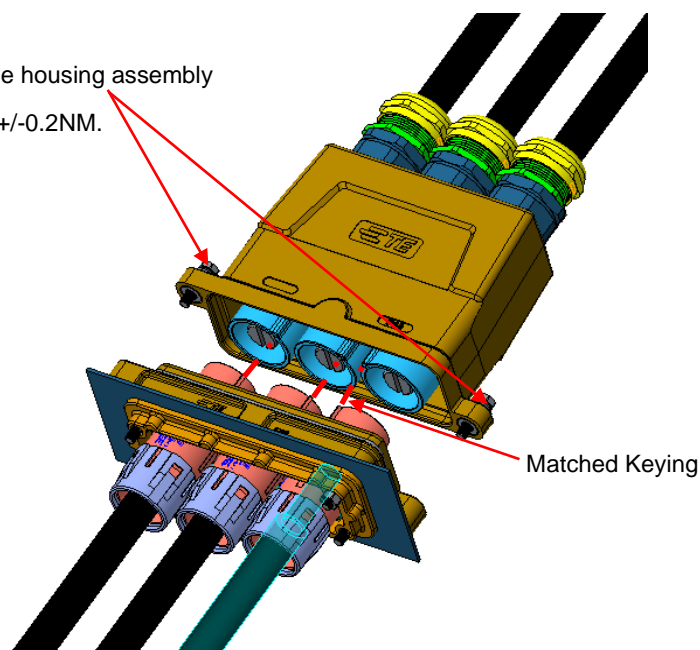
Take care of the phase position.  
It should match the position from male side.



Fix the frame to hood by 4XM6 screw (M6X35). Torque: 10+/-1NM.

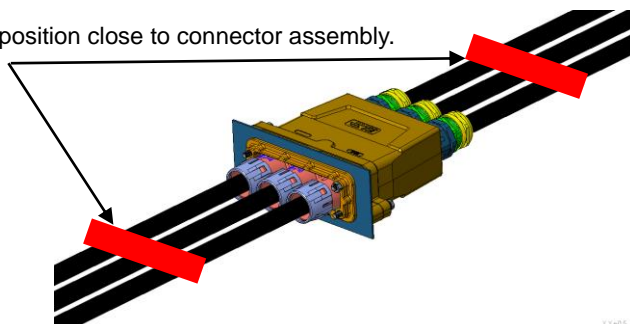
## Assembly hood and housing

Fix the hood assembly to the housing assembly  
by 2XM6 screws. Torque: 4+/-0.2NM.



## Fix cable

Cables should be fixed at position close to connector assembly.





## 6. STORAGE

### 6.1. Chemical exposure

Do not store the connectors near any chemical listed below as they may cause corrosion stress the connector contacts:

Alkalies, Ammonia, Citrates, Phosphates, Citrates, Sulfur, Amines, Carbonates, Nitrites, Sulfides, Nitrites, Tart rates.

### 6.2. Storage condition

The connectors should be stored in the air ventilation, no corrosive gas, no rain and no snow in the warehouse. Relative humidity: less than 85% RH (For connectors which include insert and contacts or contacts only, the preferred storage temperature is 10° C~27° C, Relative humidity: 25%~60%). The connectors should remain in the shipping containers until ready for use to prevent deformation to the contacts. The connectors should be used on a first in, first out basis to avoid storage contamination that could adversely affect electrical functions.

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