



## HA Insert Series

### Table of contents

1. INTRODUCTION .....	2
2. SUPPORTING DOCUMENTS .....	2
2.1. Customer drawings .....	2
2.2. Product specification .....	2
2.3. Application Specification .....	2
2.4. Standards .....	2
3. DESCRIPTION .....	3
4. REQUIREMENTS .....	4
4.1. Wire selection and preparation .....	4
4.1.1. Stripping length L .....	4
4.1.2. Insulation diameter .....	5
4.2. Assemble wires to inserts .....	5
4.2.1. Inserts of screw termination (HA-XXX-M/F) .....	5
4.2.2. Inserts of spring termination (HA-XXX-MS/FS) .....	7
4.2.3. Inserts of crimp termination (HA-XXX-MC/FC) .....	9
4.3. Cable length inside the housing .....	12
5. ASSEMBLY .....	13
5.1. Contact inserts .....	13
5.2. Grounding .....	14
5.3. Marking .....	15
5.4. Polarization function .....	15
6. STORAGE .....	16
6.1. Chemical exposure .....	16
6.2. Storage condition .....	16



## 1. INTRODUCTION

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

## 2. SUPPORTING DOCUMENTS

### 2.1. Customer drawings

Please refer to the customer drawings of HA 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. 108-137045.

### 2.3. Application Specification

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

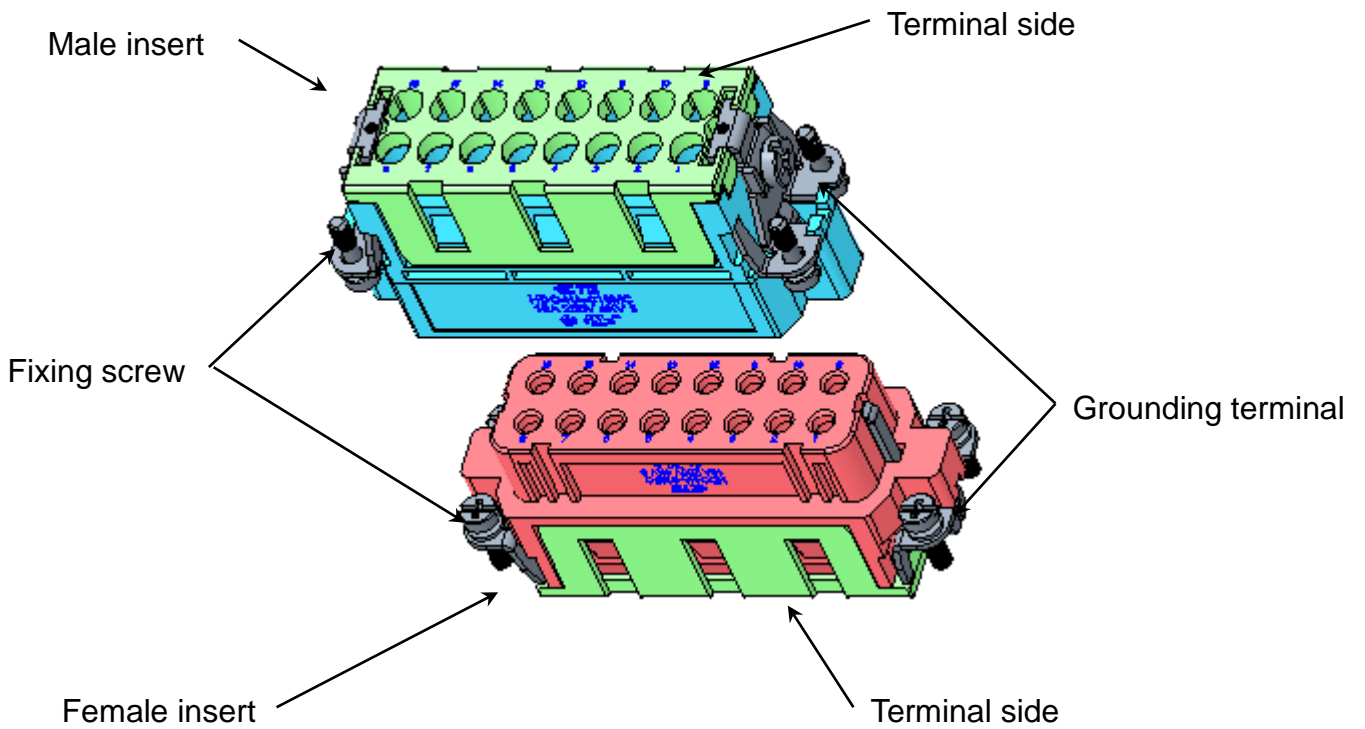
### 2.4. Standards

- EN 61984: Connectors - Safety requirements and tests
- IEC 60664-1: Insulation coordination for equipment within low-voltage systems (Part 1)
- IEC 60999-1: Electrical copper conductors- Safety requirements for the clamping units for conductors

## 3. DESCRIPTION

This application specification describes the male insert and the female insert of the “HA” series.

The listed terms are used in the specification as shown HA-016 as example in figure 1.



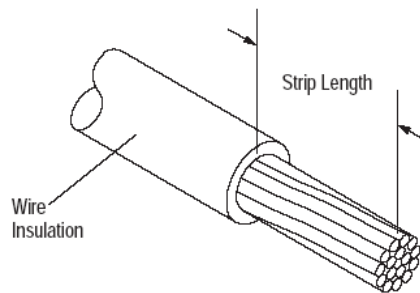
**Figure: 1**

## 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 prevent 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**

Contact Insert	Max. Wire cross section		Strip Length For Reference	Tightening torque For Reference
	[mm <sup>2</sup> ]	AWG	L [mm]	[Nm]
HA-003/004-M/F	≤2.5 mm <sup>2</sup>	14	5	0.25
HA-010/016-M/F	≤2.5 mm <sup>2</sup>	14	7.5	0.5
HA-XXX-MS/FS	≤2.5 mm <sup>2</sup>	14	9	-
HA-XXX-MC/FC	≤4.0 mm <sup>2</sup>	12	7.5	-

## 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 insulation diameter for various wire sizes is as shown in table 2 only for reference.

**Table: 2**

Contact Insert	Max. Wire cross section		Insulation Diameter in (mm)
	[mm <sup>2</sup> ]	AWG	
HA-003/004-M/F	≤2.5 mm <sup>2</sup>	14	4.0 MAX.
HA-010/016-M/F	≤2.5 mm <sup>2</sup>	14	4.8 MAX.
HA-XXX-MS/FS	≤2.5 mm <sup>2</sup>	14	4.1 MAX.
HA-XXX-MC/FC	≤4.0 mm <sup>2</sup>	12	4.7 MAX.



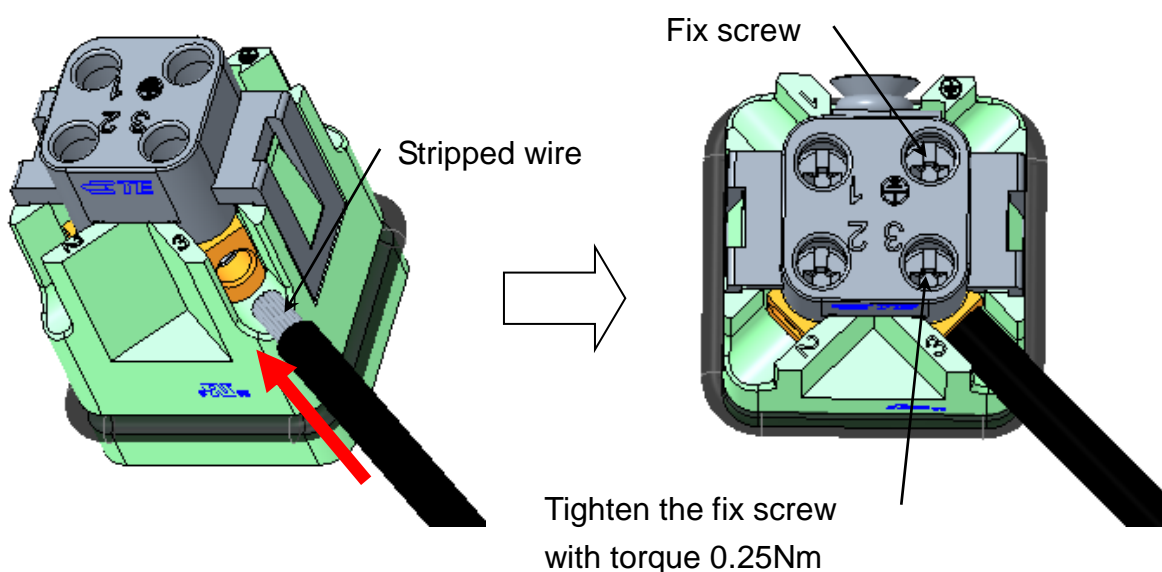
The Insulation diameter over the wire specified in the table 2 is for the insulation concentric, with equal thickness layer over the conducting wire.

## 4.2. Assemble wires to inserts

### 4.2.1. Inserts of screw termination (HA-XXX-M/F)

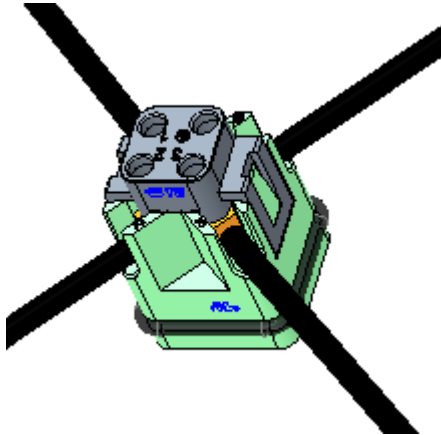
The listed terms are used in the specification as shown HA-003-M as example.

- Adjust the depth of the fix screws by a proper screw driver, so that insert the wires into the contacts completely.
- Use a proper screw driver to tighten the fix screw with torque 0.25Nm.

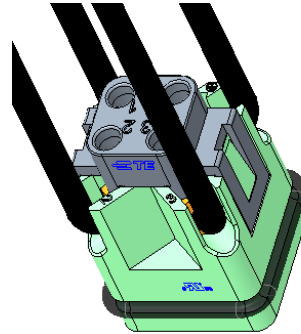
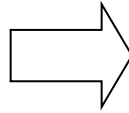


**Figure: 3**

- c. Repeat till wires are fully assembled. (Figure: 4)
- d. Bend the wires. (Figure: 5)



**Figure: 4**

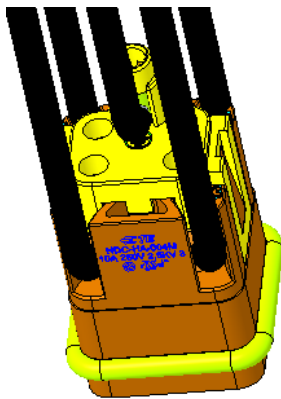


**Figure: 5**

HA-004/010/016-M (figure 6/7/8/) assemble can refer to HA-003-M.

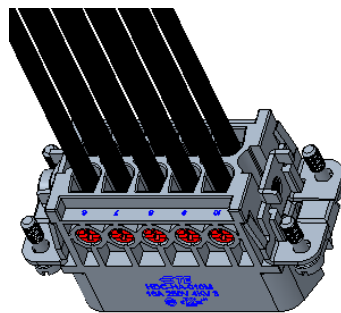
HA-XXX-F assemble can refer to related HA-XXX-M.

Notice: the Tightening torque for HA-010/016-M/F is 0.5Nm.



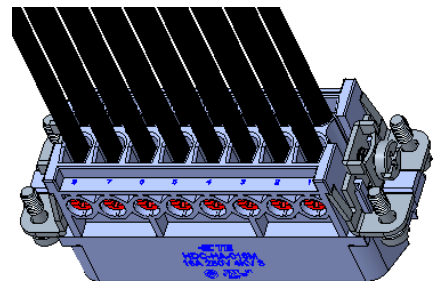
HA-004-M

**Figure: 6**



HA-010-M

**Figure: 7**



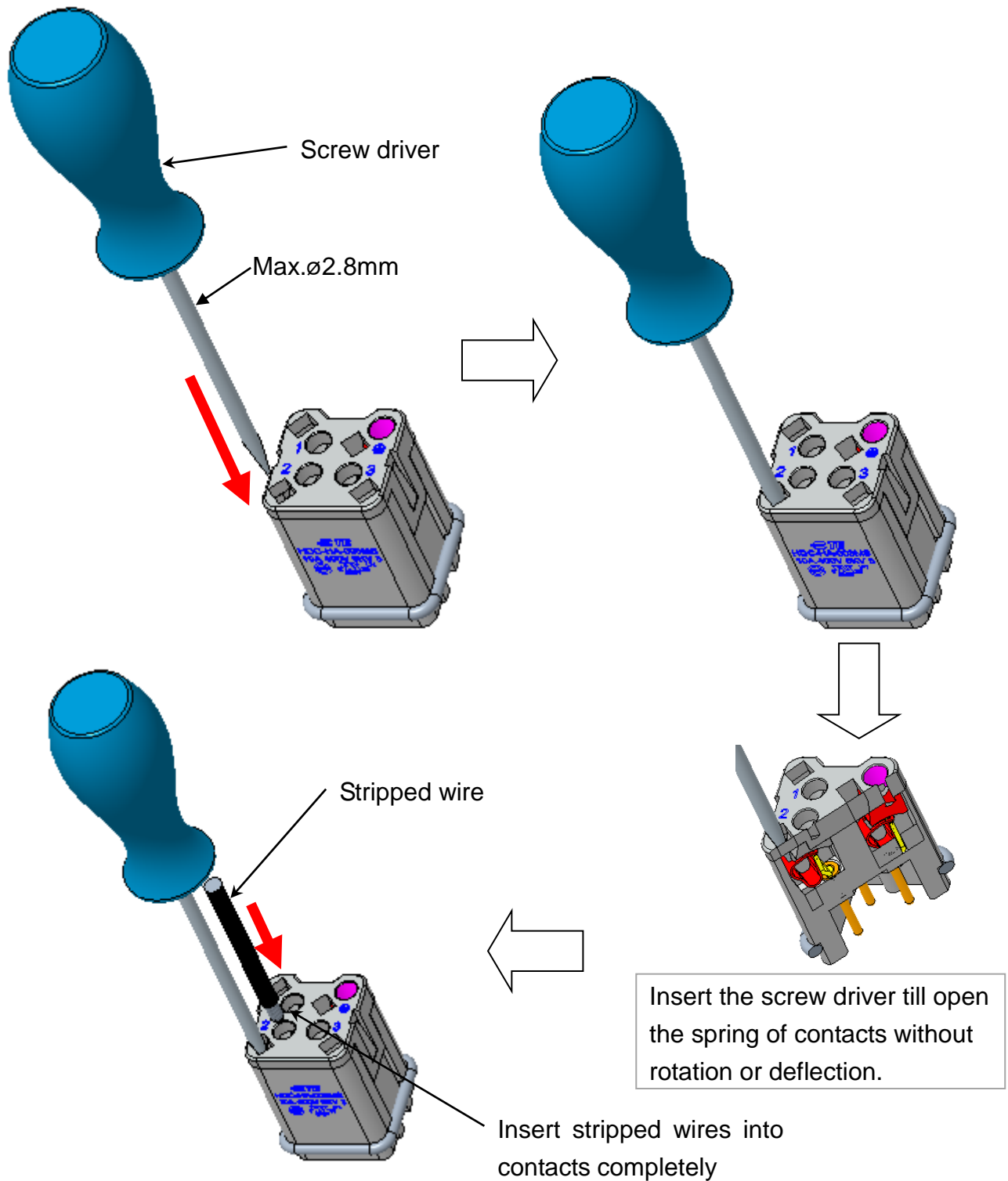
HA-016-M

**Figure: 8**

## 4.2.2. Inserts of spring termination (HA-XXX-MS/FS)

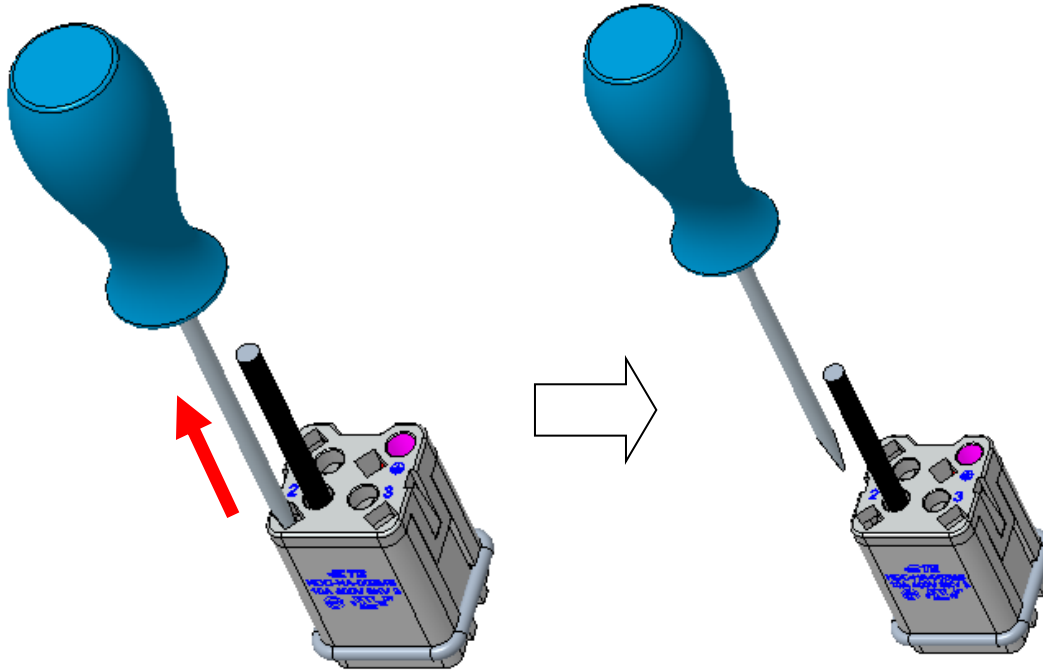
The listed terms are used in the specification as shown HA-003-MS as example.

- Insert a proper screw driver into the inserts, till open the spring of the contacts.
- Insert stripped wires into contacts completely.



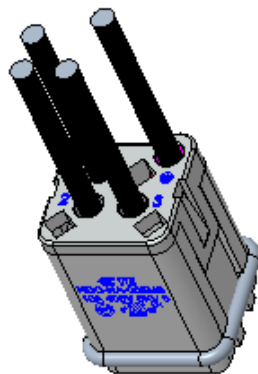
**Figure: 9**

c. Pull out the screw driver



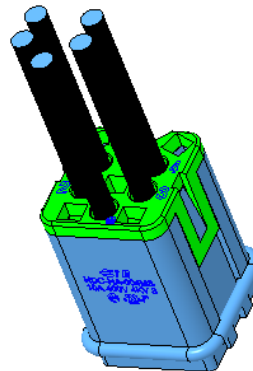
**Figure: 10**

d. Repeat till wires are fully assembled.



HA-003-MS

**Figure: 11**



HA-004-MS

**Figure: 12**

HA-004-MS (figure 12) assemble can refer to HA-003-MS.

HA-XXX-FS assemble can refer to related HA-XXX-MS.



## 4.2.3. Inserts of crimp termination (HA-XXX-MC/FC)

- a. Assemble stripped wires to contacts (Crimp)

- Crimping tool

Crimping tool is available as below figure 13:



- ◆ Wire range: 26AWG-12AWG
- ◆ Type: RPC-M23-T-B
- ◆ Order number: T3100000022-000

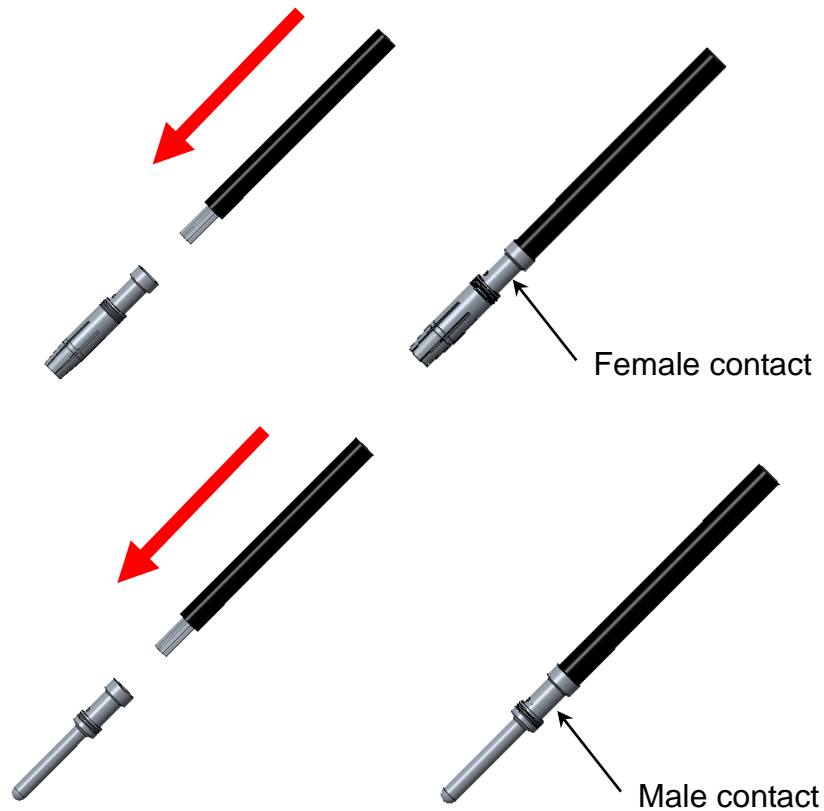
**Figure: 13**

- Crimp

Insert the cable - stripped according to table 1 - into the wire barrel of the contact. The wire strands must be visible in the reference hole of the contact. Afterwards, crimp the contact in the crimp area, using the correct tool for this type of 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). Equip manual crimp tool with the correct locator or positioning ferrule.
- 2). When using different manual crimping tools the pliers have to be adjusted by plug gauge to fit the crimp area.
- 3). Fully insert contacts into the locator.
- 4). Clamp the wire with help of crimp tool. Note that to press the crimp tool till the stopper is reached a positive crimp.

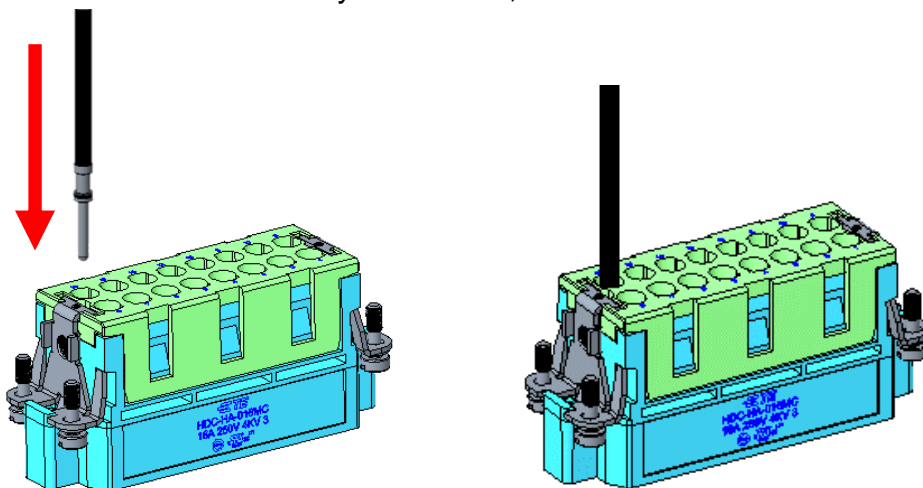


**Figure: 14**

**NOTE** For more detailed information, please refer to related contacts application specifications.

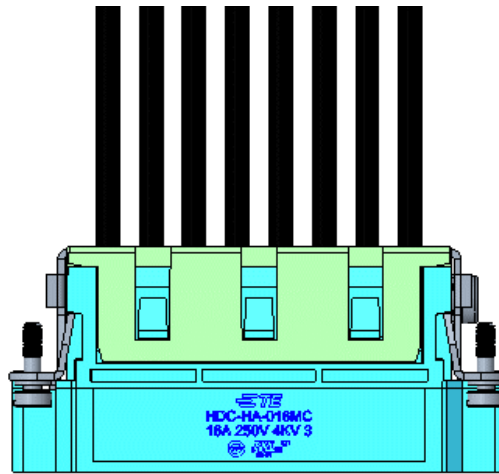
b. Insert crimped terminals into inserts

The crimped terminals are plugged into the insert by gently pushing it into the required position until the contact is locked by the inserts, a click should be heard normally.



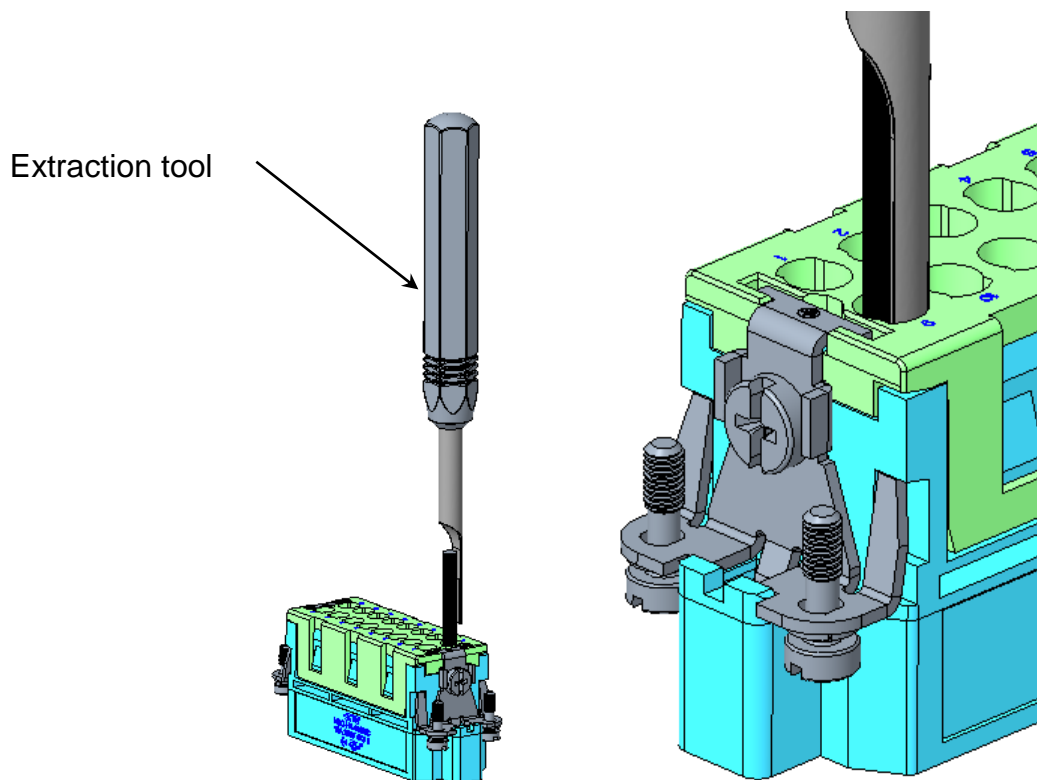
**Figure: 15**

- c. Repeat till wires are fully assembled.



**Figure: 16**

### Tooling for contacts removal



**Figure: 17**

- 1). Insert the extraction tool along the crimped contact into the special space on the cover
- 2). Insert the tool till it touch the contact end face.
- 3). Now, pull out crimped contact holding cable and also the tool together to unplug the contact.

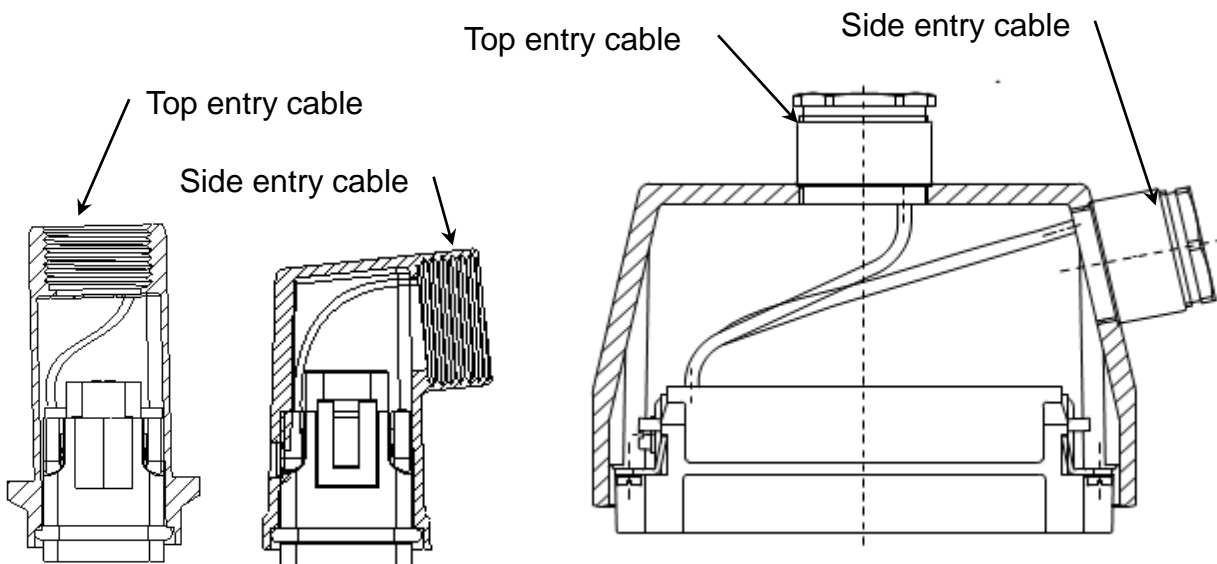
- ◆ Type: REMOV-HEE
- ◆ Order number: T3100000002-000



**Figure: 18**

### 4.3. Cable length inside the housing

For the optimal cable lay inside the housing it is necessary to make sure that the striped length is fit to used cable type; is fit to permitted bending radius of the cable and make sure that the contact insert is fit to the type of hood. For recommended cable lengths (cable entry: TOP, SIDE), please refer to the table 3. In accordance with the application it is proposed the cable length is selective to shorten (e.g., shorter cable near the cable gland longer cable at the turned off side).



**Figure: 19**

**Table: 3**

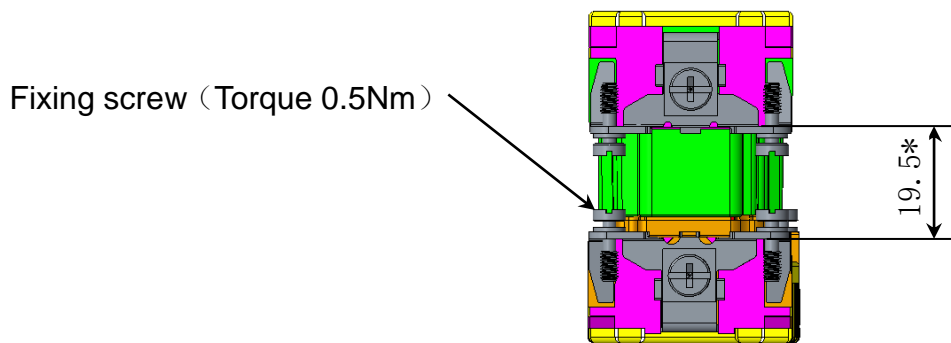
Insert size	Hood Size	Type of hood	Cable length (mm)		Note
			Top entry cable	Side entry cable	
HA-003 HA-004	H3A	H3A	33	38	For reference only
		3APR	33	-	For reference only
HA-010	H10A	H10A	38	60	For reference only
HA-016	H16A	H16A	38	68	For reference only
		H16A (High structure)	48	82	For reference only

## 5. ASSEMBLY

Assembling the contact inserts for both Male & Female connector has to be carried out with proper tools.

### 5.1. Contact inserts

The contact inserts are screwed into a corresponding hood or housing by fixing screws M3. The torque is 0.5Nm for reference. Note: \* The distance for safe contact of the contact inserts is max. 21mm. See figure 20.

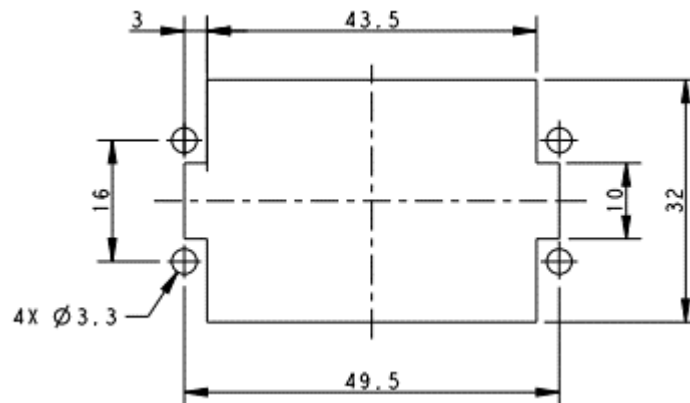


**Figure: 20**

#### ◆ Information for panel cut-out:

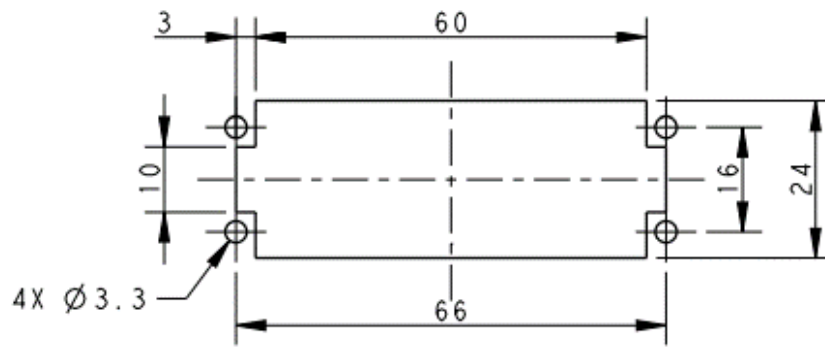
Information concerning the panel cut-out for assembly of the contact inserts without housings can be taken from the customer drawings. An example of Panel cut-out looks as shown in figure 21/figure 22.

Panel cut-out dimension for HA-010/HA-016



HA-010

**Figure: 21**

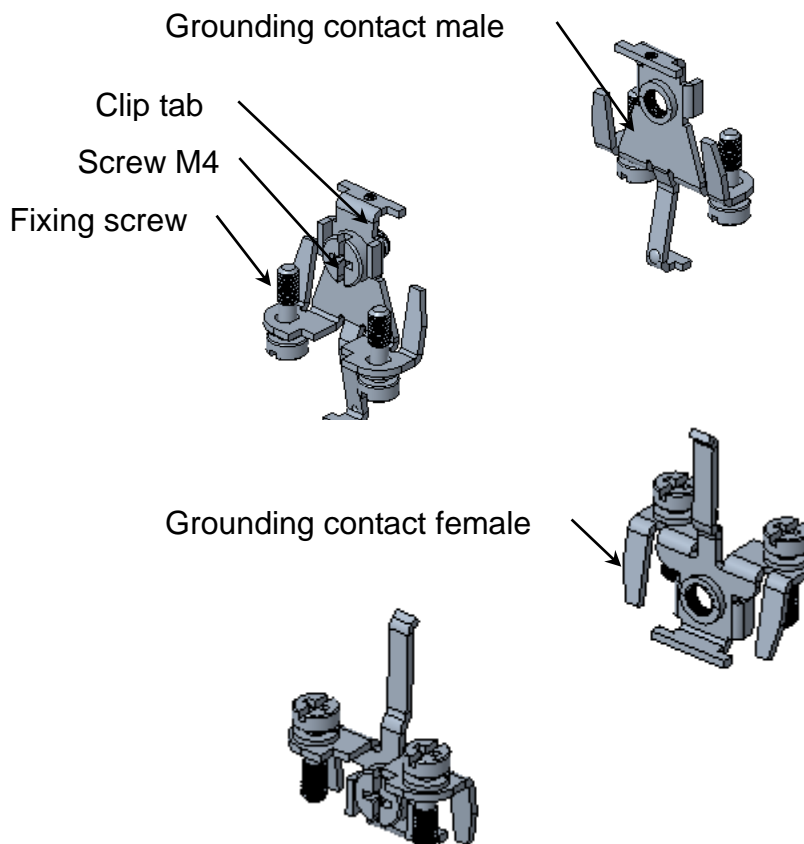


HA-016

**Figure: 22**

## 5.2. Grounding

Fixed to the contact inserts are grounding contacts, on which with the grounding screw (M4). The cable can be locked on the earth potential. The grounding contact in an assembly is the only part that will be having press contact with corresponding grounding contact on the other assembly near the interfacing portion of the housings.



**Figure: 23**

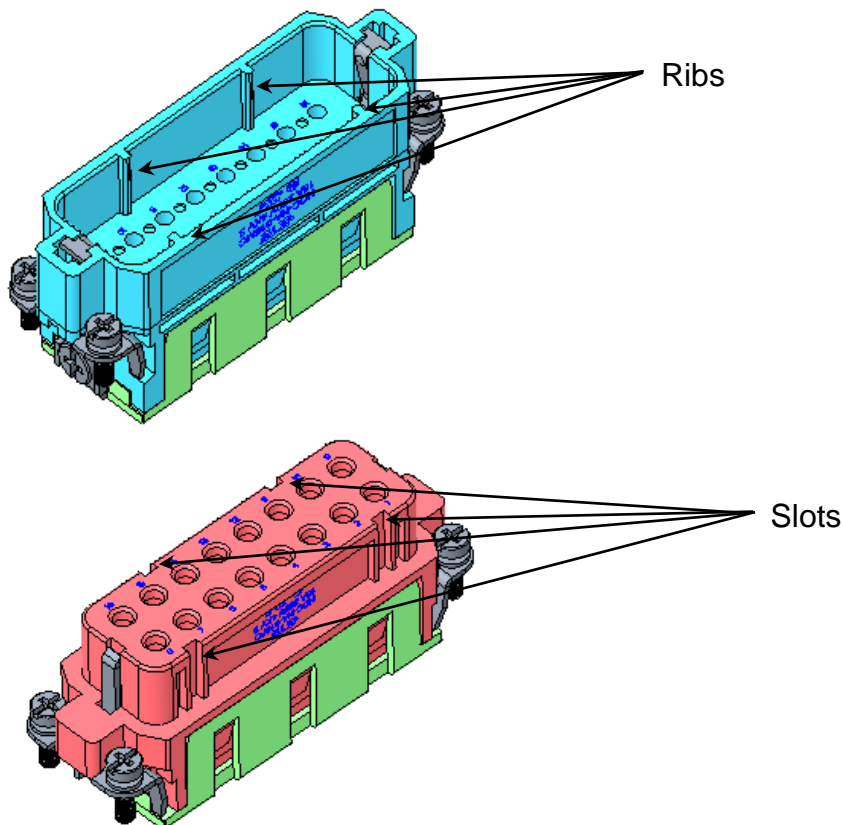
This clamping point is suitable for connection of a cable with a nominal cross section of up to 4 mm<sup>2</sup>. It is recommended to use cables with insulated barrels. The stripped end of the cable has to be put under the clip tab. Earthing is to be executed according to IEC 61984. Tighten torque 1.2Nm.

### 5.3. Marking

The connector type, rating and the number of position etc. refer to the corresponding HA insert customer drawings.

### 5.4. Polarization function

The process of assembling the male and female inserts without any mismatch and difficulty calls for polarization. This is done with the help of ribs or slots and which are present on both the male insert as well as the female insert. As shown in figure 24.



**Figure: 24**



## 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. 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.

-----END-----