HARTING

Pushing Performance

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Train 18 inter-car jumper systems installation and maintenance manual

Pushing Performance

Contents

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2. INTRODUCTION

Individual Solutions

Due to the modularity of modern rail vehicles, production increasingly takes place in the form of assemblies and this at different locations. In addition, the finished vehicles must nowadays be equipped for worldwide use. In order to meet the growing requirements associated with this, customized solutions for vehicle technology are indispensable.
It is often not enough to offer only standardized products. Rather, there is a demand for problem solutions, i.e. for components or systems that fulfil individual tasks quickly and reliably. Standard components, modifications but also completely new developments are used in these systems. The range of HARTING's customer-specific solutions extends from simplified handling through demand-oriented commissioning to the customized development of complex products and systems, e.g. the retrofitting of international train control systems such as ETCS, Eurobalise, Euroloop, DMI and GSM-R or computer-assisted train control such as CBTC. In addition to product development, HARTING also performs comprehensive engineering tasks. In order to develop the best solution for the customer, a team of engineers, qualified technical draughtsman and a high-performance, in-house, independent and accredited laboratory are used. Material procurement is independent and exclusively subject to customer requirements. This offers customers a flexibility that cannot be taken for granted. Above all, the requirement for reliability with the highest quality stands.

Your partner for jumper solutions

A variety of different data, signal and power lines run through railway vehicles. The wagon couplings between rail vehicles are a vital component of this "central nervous system". Many components – such as the internal MVB rail bus, the low-voltage power supply, the power transmission for the battery or air conditioning, and the video signal transmission – must be properly connected. The connectivity solution must be pluggable because service technicians need to disconnect the cables during maintenance. HARTING has designed and implemented a wagon-to-wagon cable assembly in cooperation with several of our railway customers. We are a single-source provider – starting with CAD-based design all the way to quality-certified delivery. The complete pre-assembled and tested wagon-to-wagon cable solution includes the following:

- ***Connectors***
- ***Cable glands***
- ***System cable***
- ***Protective cable conduits***
- ***Mechanical hanger and strain relief, in part with special lever systems***
- ***Stainless-steel connector plate with strain relief mechanism***
- ***Complete assembly***
- ***Electrical inspection + documentation***
- ***Suitable packaging for transport***

Jumper systems on the interior and exterior of a train are subject to different requirements. The requirements regarding protection against water and dust are lower for indoor installation than for outdoor applications. Thus, systems with protection class IP20 are used for wagon crossovers mounted indoors, and systems up to protection class IP68 are used outdoors. Generally, the wagon crossover cables are installed between the end walls of wagon bodies or as roof or underfloor systems in rail vehicles. There you will find jumper cable constructions for power, data bus, coaxial cables or even fiber optic connections. The system cables must withstand ¬high loads in the area between the vehicles. For the system cables to transmit the various voltages, signals, and data safely, reliably, and permanently, all vehicle- and track-specific requirements must be met. A multitude of other factors, such as the electrical, mechanical, and climatic conditions, must be considered during project planning.

Our service & your advantages

- ***Conceptual design & responsibility of jumper solutions based on our decades of experience in the railway market.***
- ***Selection of the right components according to the latest railway standards, e.g., connection technology, cables, mechanical fastenings.***
- ***Qualified consulting from our worldwide network of experts.***
- ***Complete jumper solutions adapted to your individual requirements.***
- ***Individual simulations and tests by our own accredited laboratory.***
- ***Cost reduction & time saving due to the final approval of inter-car jumper solutions in our independent test laboratory.***

3. GENERAL INFORMATION

Read and follow the instructions in this maintenance manual. Regular inspections and maintenance must be carried out to ensure operational safety! Working safely and successfully requires that several basic rules and procedures are followed. Please note the following points:

- ***Always follow all safety notices and instructions carefully!***
- ***Observe all applicable national regulations concerning health protection and accident prevention in the workplace.***
- ***Observe the general and local environmental regulations.***
- ***Observe the corresponding national regulations and other applicable safety regulations concerning the usage and assembly of connectors and plug-in equipment.***

3.1 PROPER AND INTENDED USE

HARTING's inter-car jumper cables are low-voltage facility components for use in systems in railway vehicles. They may only be used for the intended applications in the permissible and coordinated ambient conditions.

All work required for the installation, commissioning, maintenance, transport, and ongoing operations must be carried out by qualified personnel with the appropriate specialist expertise.

It is the responsibility of the user / operator to comply with all local, state, and federal laws, rules, and regulations regarding inter-car jumper systems for each application.

HARTING's inter-car jumper cables are intended only for detachable connections between components, devices and systems. They are designed for transmitting electrical signals and electrical energy.

In accordance with DIN EN IEC 61984, connectors or sockets must be configured with female contacts on the live-voltage side.

Connectors are components which, according to DIN EN 60309-1, may not be plugged in while under electrical voltage when being used properly.

3.2 QUALIFICATION OF THE USER

Any work relating to the installation, commissioning and maintenance may only be carried out by appropriately qualified staff. In the EU, only qualified technicians, in accordance with DIN EN 50110-1/-2 (VDE 0105 part 100) and IEC 60 364 or HD 384, may carry out such work. The relevant national accident prevention regulations must also be observed.

4. SAFETY INSTRUCTIONS

4.1 SPECIAL SAFETY MEASURES AND SAFETY PRECAUTIONS WHEN HANDLING ELECTRICAL DEVICES

Electric shock from live components!

Inter-car jumper cables contain live (energized) components. There is a risk of electric shock! Before starting work on electrical systems, always observe the following safety rules:

- ***De-energies the facility, the system and any auxiliary systems.***
- ***Ensure that there is an effective safeguard in place so that electrical devices or components that have been switched off cannot be switched on again.***
- ***Label and clearly mark your work area.***
- ***Determine that there is no voltage applied.***
- ***Strictly adhere to the applicable earthing and short-circuit regulations.***
- ***Cover any neighboring, live components.***
- ***Have a qualified electrician determine that there is no voltage.***

Electric shock caused by contamination, dirt, moisture, ice and snow!

Coupling a contaminated or dirty inter-car jumper plug to the inter-car jumper socket can lead to a life-threatening electric shock.

- ***Before inserting an inter-car jumper plug into the inter-car jumper socket or the dummy socket, check that the interiors of the components are free of dirt, dirt, moisture, snow, and ice.***
- ***Remove any dirt, moisture, snow or ice from the interior of the inter-wagon jumper plug, the inter-wagon jumper socket or the dummy socket so that no residue remains.***
- ***RISK OF INJURY! Never connect a contaminated or dirty inter-car jumper plug to the inter-car jumper socket or dummy socket.***

4.1.2 Risk of fire and explosion from flammable materials

Fire and explosion hazards!

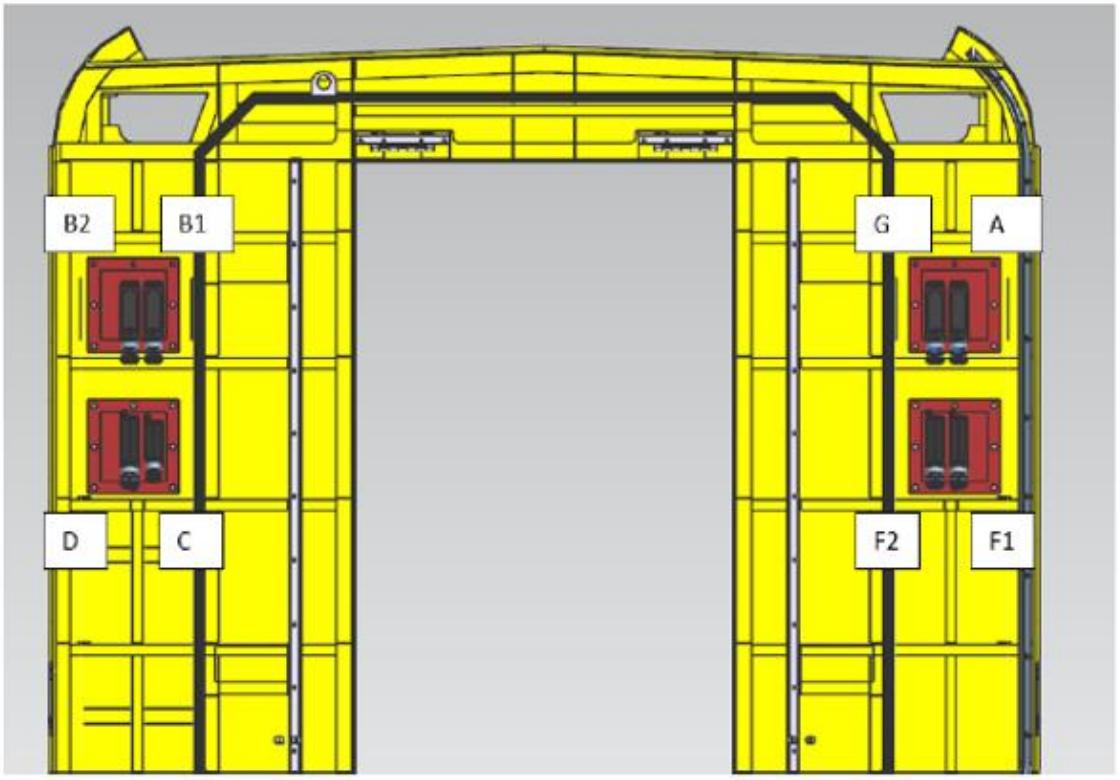
Disconnecting and plugging in the inter-car jumper cables while they are live (energized) can cause an electric arc. There is a risk of fire and explosion if explosive or highly flammable substances or any other ignition sources are in the vicinity!

Never plug or disconnect the inter-car jumper cable while it is live (energized)!

5. INTER-CAR JUMPER SYSTEMS MAINTENANCE AND ASSEMBLY DETAILS

5.1 JUMPER AND SOCKET ASSEMBLY COACH POSITION.

Before removing the jumper cable from socket assembly check the mounting of the coach location and position. Refer the below image (Pic-5.1) for (TC NAE) jumper and socket position.



Pic-5.1

5.2 JUMPER CABLE MAINTENANCE AND ASSEMBLY DETAILS

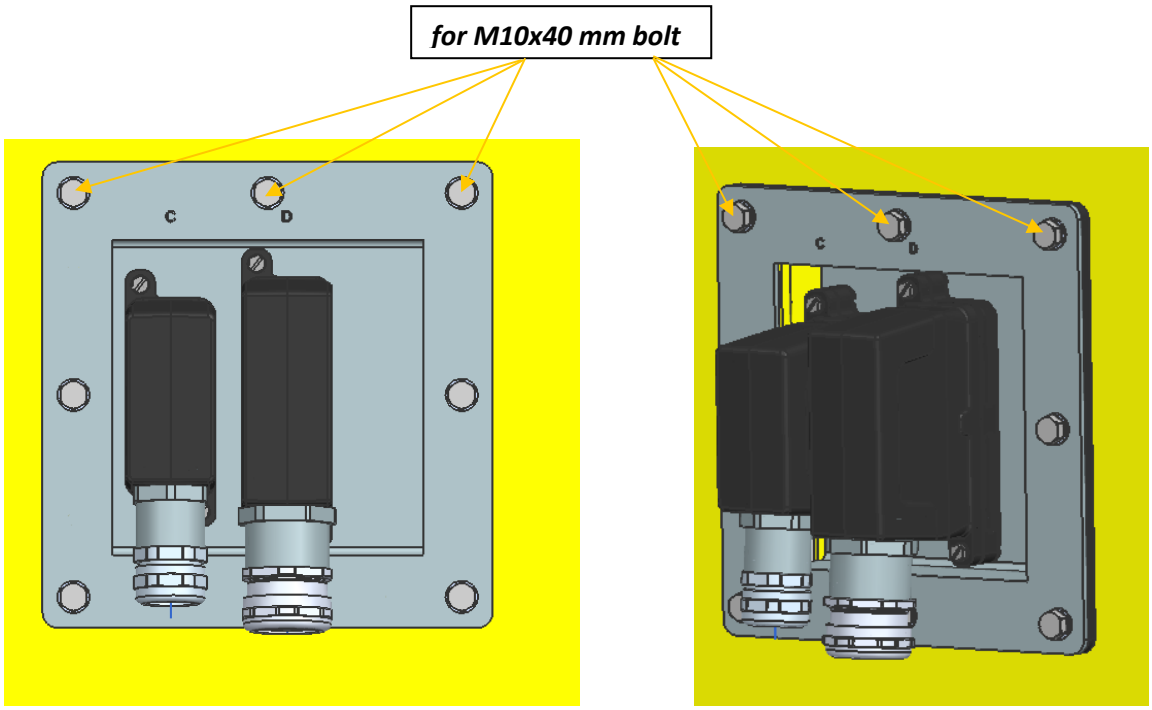
Improper use of the inter-car jumper cables (such as a hard impact on the floor) can severely damage them (cracks, deformation, etc.) and lead to personal injury. HARTING's inter-car jumper cables may only be used for the purpose specified in the maintenance instructions. Refer to the "Proper and intended use" chapter.

- ***Make sure that the inter-car jumper cables are handled properly.***
- ***Do not throw the inter-car jumper cables on the floor.***
- ***Check the inter-car jumper cables regularly for damage.***
- ***Replace any damaged components of the inter-car jumper cables immediately.***
- ***Risk of material damage! There is a risk of material damage from the tensile, compressive, bending and torsion forces placed on the cable/hose screw connection.***

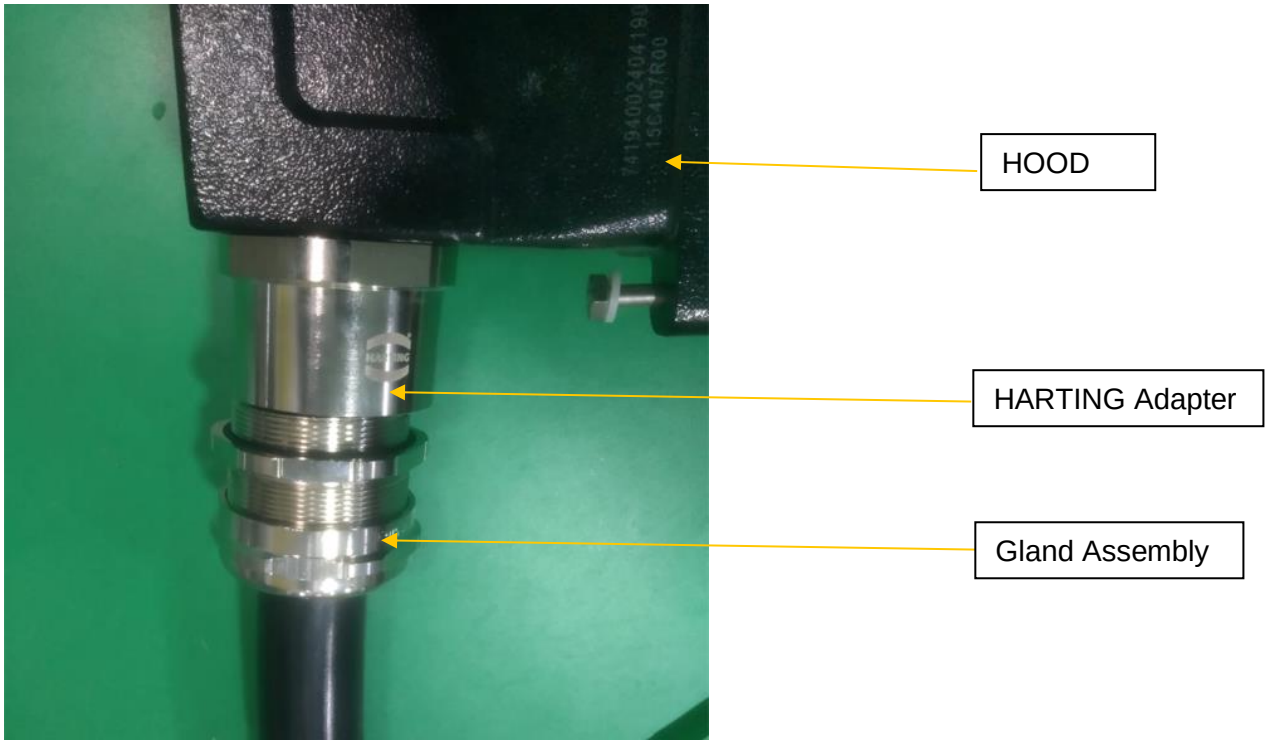
5.3 <u>SOCKET PLATE ASSEMBLY TORQUE DETAILS</u>

The recommended torque for M10x40 mm bolt, washer, and spring washer along with EPDM gasket is 35 Nm.

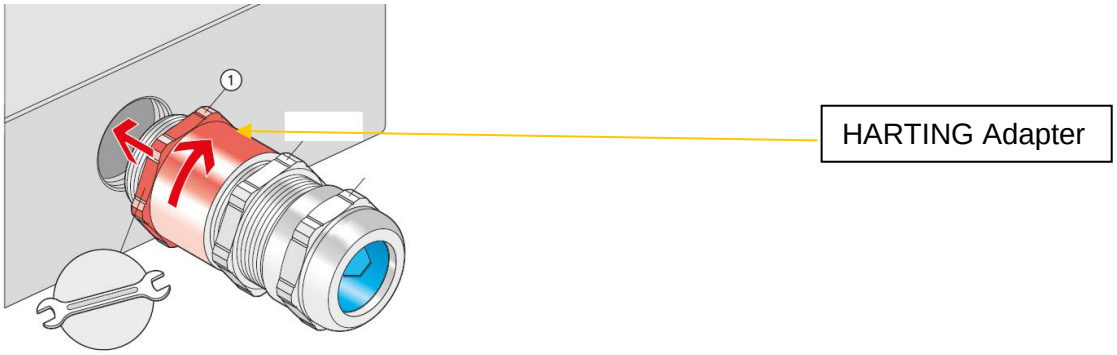
We are using 8 Bolts / per bolt 35 Nm is applied = 280 Nm or 28 Kg is applied across End wall plate.



5.4 JUMPER CABLE ASSEMBLY DETAILS



Pic-5.3



Pic-5.3.1

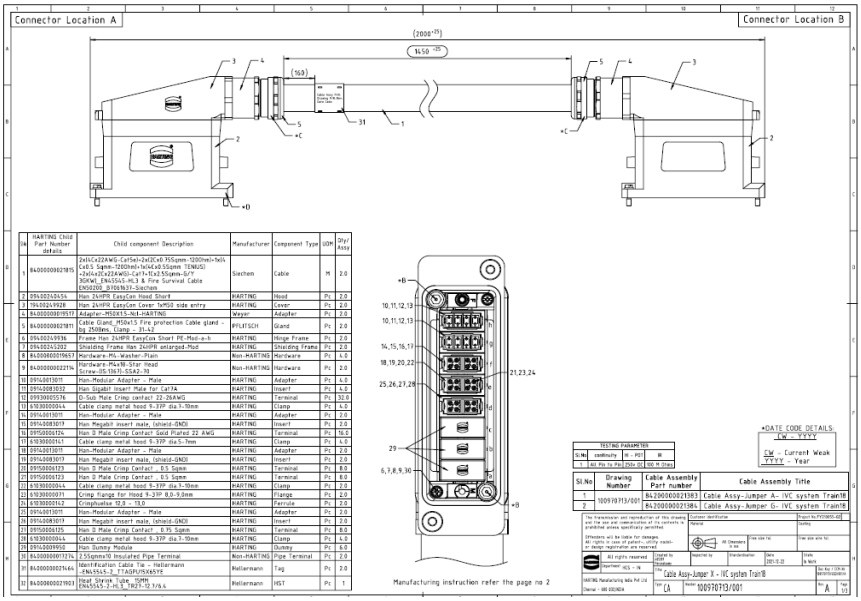
5.4.1 HOOD WITH ADAPTER ASSEMBLY

Before Gland assembly with Hood part, Refer the above picture 5.3 and 5.3.1 for adapter position.

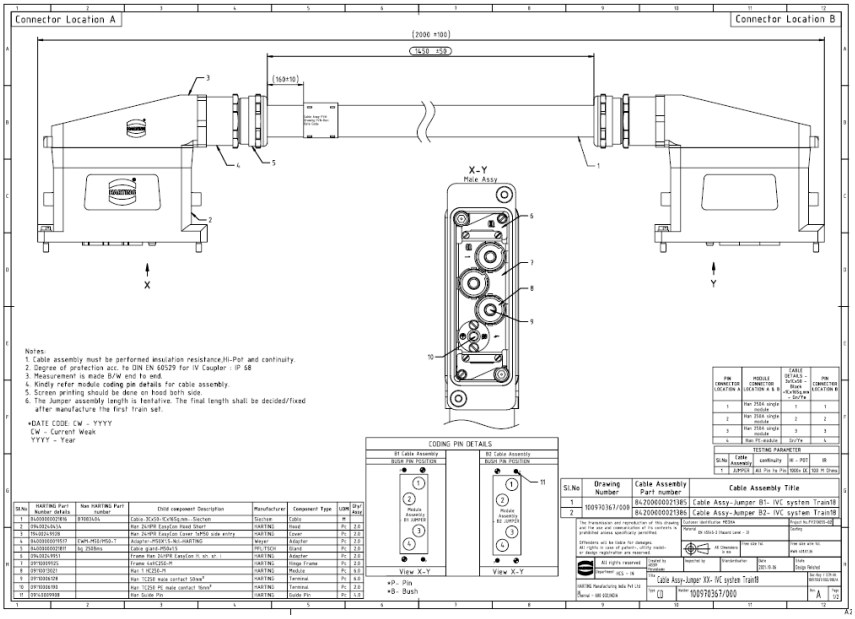
5.4.2 A, G, B1, B2 CABLE AND MODULE ASSEMBLY DETAILS

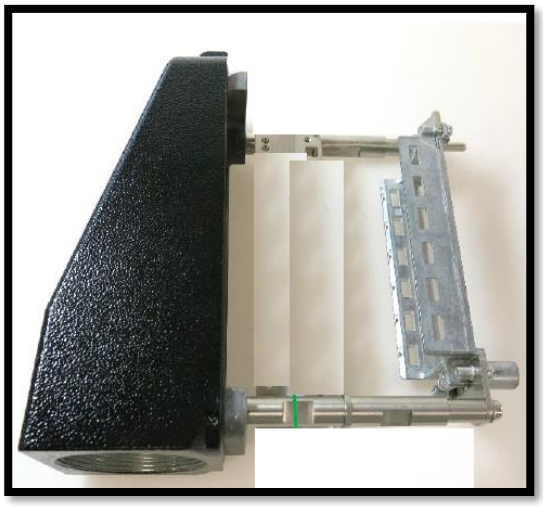
A G cable assembly before removing the Hood from closing cover refers the cable assembly 84200000021383 and 21384 drawing for module position details. After removing the Hood Refer the picture 5.3.2 and 5.3.3 for cable assembly and Hood with closing cover details.

JUMPER A, G, CABLE ASSEMBLY DRAWING

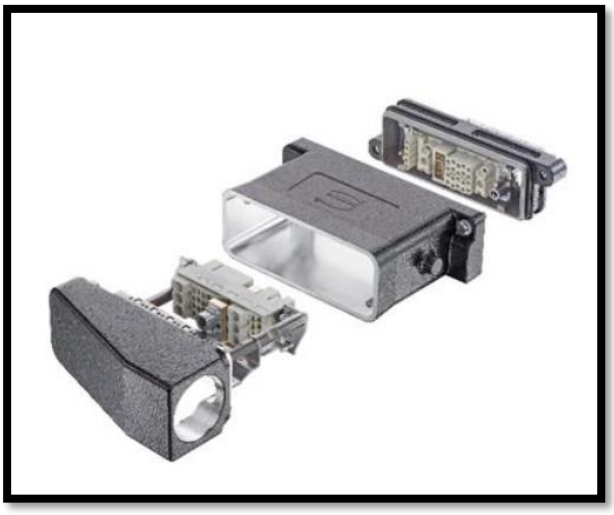


JUMPER B1, B2, CABLE ASSEMBLY DRAWING





Pic- 5.3.2



Pic- 5.3.3

Refer the picture 5.3.2 for closing cover with hinged frame assembly view and refer picture 5.3.3 for module assembly with closing cover and hood assembly position details, after hinged frame assembly refer the cable assembly drawing for hood assembly points are *A, *B and before both end hood assembly check the gland-to-gland assembly should be 1450 (+25 and -0) mm.

5.4.3 A, G, MODULE AND HINGED FRAME ASSEMBLY DETAILS

A G MODULE ASSEMBLY

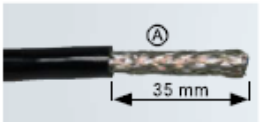
Han GIGABIT MODULE ASSEMBLY

There are two ways to connect the shielding of the cable to the connector:

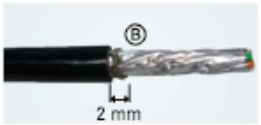
- Using the crimp flange
- Using the cable clamp

The following describes the required steps for both types of assembly.

Assembly with crimp flange

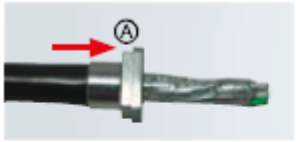


1. Strip the cable over 35 mm, release the screening braid Ⓐ and expose the screen foil Ⓑ.

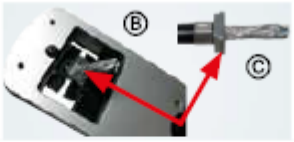


2. Push the crimp barrel Ⓒ over the outer jacket of the cable. Fold the screen backwards and cut it off, leaving approx. 2 mm of the screening braid.

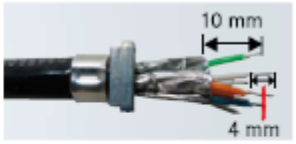
3. Push the crimping flange Ⓓ over the cable and screen foil and press it between the screening braid and foil. Slide the crimping flange so that the cable insulation lies on the flange.*



4. Now slide the barrel back over the cable. The barrel should be positioned as near as possible to the flange* for the best crimping process.



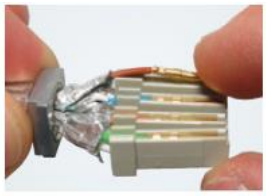
5. Crimp the barrel with the crimp tool Ⓑ **61 03 600 0020**. Hold the tool closed until it opens by itself. Remove the crimped cable Ⓒ.



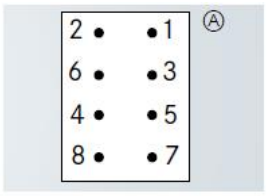
6. Shorten the screen foil to 10 mm. Strip all individual wires to 4 mm.

* Insert the support of the flange as far as possible under the cable shield.
Notice: The assembly tool 61 03 600 6017 makes it easier to insert the flange.

7. Guide the stripped wires into the contact and crimp them in accordance with the tool's instructions (red arrow). Recommended tool: **09 99 000 0501**



8. Place the contacts sideways into the Han® Gigabit insert. The contact chambers 1, 3, 5 and 7 are on one level, the chambers 2, 4, 6 and 8 are on the other.



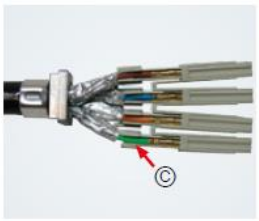
Ⓐ Contact assignment acc. to EIA / TIA 568A (view from termination side):

2 = green	1 = white / green
6 = orange	3 = white / orange
4 = blue	5 = white / blue
8 = brown	7 = white / brown

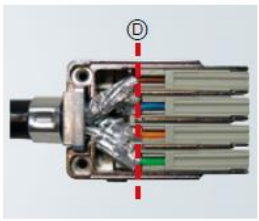
Ⓐ Contact assignment acc. to EIA / TIA 568B (view from termination side):

2 = orange	1 = white / orange
6 = green	3 = white / green
4 = blue	5 = white / blue
8 = brown	7 = white / brown

Ⓑ Contact chamber marking: Female insert (F), Male side (M) assigned similarly.

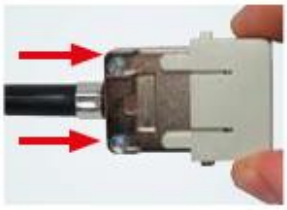


9. Insert the crimped contacts until they lock securely with an audible click. To achieve optimal transmission characteristics, the screen foil must reach to the insert. Push the insert upper part onto the insert Ⓒ.



10. Lay the assembled insert into the chamber of the housing bottom part.
To achieve optimal transmission characteristics, the screen foil must reach to the metal ribs of the housing bottom part – red line Ⓓ.

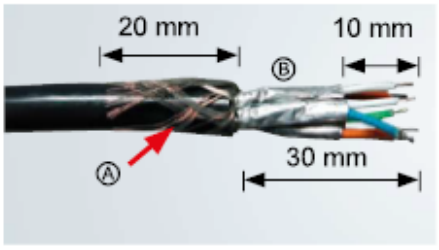
11. Screw the housing cover onto the housing bottom part (0.5 Nm).



12. Insert the assembled insert into the Han® module adapter (in the direction of the arrow).

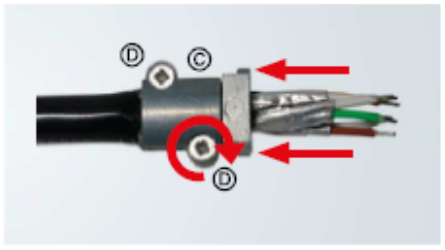
13. The module is now assembled.

Assembly with cable clamp



1. Strip the jacket of the cable and lay the screening braid Ⓐ according to the requirements (20 mm).

2. Strip all individual wires to 4 mm. Shorten the shield foil Ⓑ of the wires to 10 mm.



3. Push the cable clamp Ⓒ over the wires until the foil is completely enclosed by the cable clamp.

4. Close the cover of the cable clamp and tighten up the M3 screws Ⓓ (recommended: PH 1 screwdriver, 0.5 Nm).

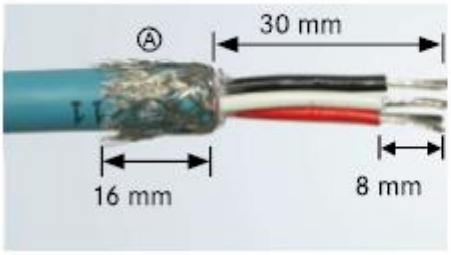
The wires can now be further processed (refer to **Assembly with crimp flange**, step 7).

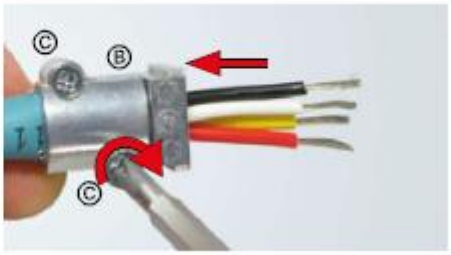
Han MEGABIT MODULE ASSEMBLY

There are two ways to connect the shielding of the cable to the connector:
- Using the cable clamp
- Using the crimp flange

The following instructions describe the steps required for both types of assembly. They are limited to the assembly of the male contacts. The female contacts are assembled in the same way.

Assembly with cable clamp



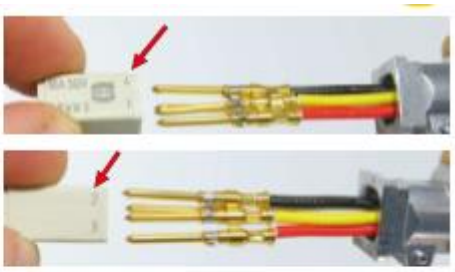


1. Strip the jacket of the cable and lay the screening braid Ⓐ according to the requirements. Strip all the individual wires to 8 mm (6 mm with Han D® 2.5 mm² contacts).

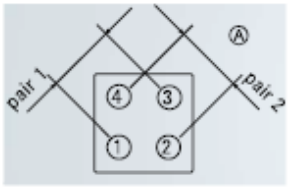
2. Push the cable clamp Ⓒ over the wires until the foil is completely enclosed by the cable clamp.

3. Close the cover of the cable clamp and tighten up the M3 screws Ⓓ. (Recommended: PH 1 screwdriver, 0.5 Nm).

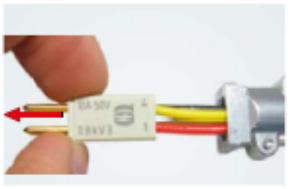
4. Guide the stripped wires into the contact and crimp them in accordance with the respective crimp tool's instructions (red arrow). (Recommended tools: 09 99 000 0110, 09 99 000 0001, 09 999 000 0021)



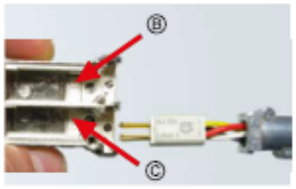
5. Before inserting the contacts, check the contact chamber marking. The contact chambers 1 and 4 are on one side (with the HARTING logo), chambers 2 and 3 on the other side.



6. Insert the contacts into the Han® Megabit module (assignment acc. to the sketch Ⓐ). Push in the crimped contacts until they lock securely with an audible click.

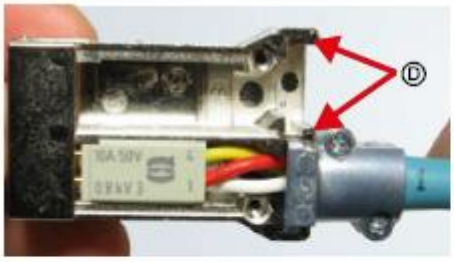


7. Then check the crimp contact for firm seating by pulling in the direction of the arrow.

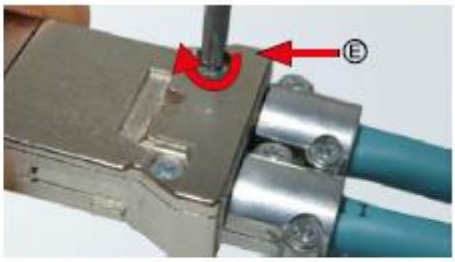


8. Place the assembled insert into the respective chamber of the housing bottom part. So that the allocation is clear, the letters B and A are formed in the housing chambers (Ⓑ, Ⓒ).

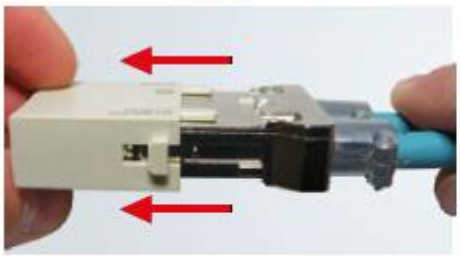
- **The insert is placed so that the HARTING logo is visible from above. The insert fits exactly into the insertion area provided.**



9. Place the clamping piece for the shield connection exactly in the guides of the housing bottom part Ⓓ.



10. Assemble and mount the second insert in accordance with the instructions for the first insert and insert it into the empty contact chamber. Screw on the housing cover Ⓔ. (Recommended: PH 1 screwdriver, 0.5 Nm).

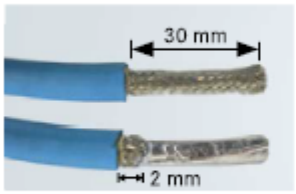


11. Insert the assembled housing into the Han® Module adapter (in the direction of the arrows).

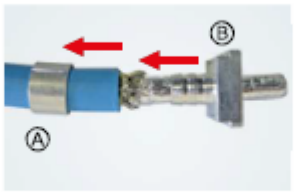
12. The module is now assembled.

Pushing Performance

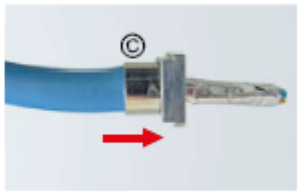
Assembly with crimp flange



1. Strip the cable to 30 mm, release the shielding and expose the shield foil.
2. Fold the screen to the rear, and cut off. Leave approximately 2 mm of the screening braid.



3. Push the crimp barrel Ⓐ over the outer jacket of the cable. Push the flange Ⓑ over the cable and the screen foil. Press it between the screening braid and the insulation (if necessary, turn it slightly).
Insert the support of the flange as far as possible under the cable shield.*



Slide the crimping flange so that it lies on the cable insulation.

4. Push the crimp barrel Ⓒ back over the cable. The barrel should be positioned as near as possible to the flange for the best crimping process.

5. Crimp the barrel and flange (e.g. using crimp tool **61 03 600 0020**). Keep pressing the crimp tool until the die opens itself again Ⓓ.
Remove the crimped cable Ⓔ.

6. Remove the shield foil and insert the crimp flange Ⓕ in the housing opening Ⓖ.

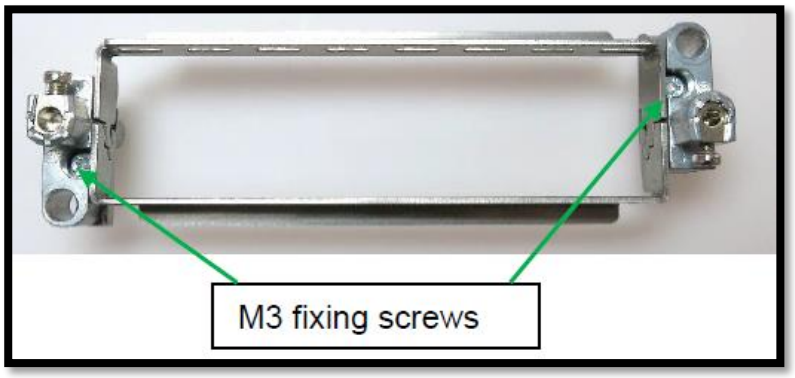
7. The wires are now ready for further processing – as described in the instructions for assembly with the cable clamp, steps 4 to 11.

A G HINGED FRAME ASSEMBLY

24 HPR EasyCon Frames with PE for Han-Modular® Modules assembly Features

- For up to 8 single modules in size 24B Size Hood and Base Panel assembly

- For pre-assembling the adapters can be fixed by a M3 screw to the hinged frame (Pic- 5.3.4)



Pic- 5.3.4

After removing the M3 screw, Remove the Additional zinc die-cast adapters with PE contacts for Assembling the connector modules.

Pic- 5.3.5

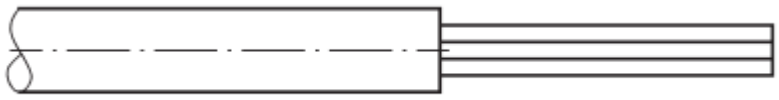
5.4.4 B1, B2, (250 A) MODULE ASSEMBLY DETAILS

250 A MODULE ASSEMBLY TECHNICAL SPECIFICATION

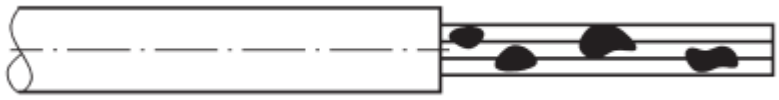
i) Cable Stripping Length details.

	Cross-section	Crimping jaw acc. to DIN 46235	ø	Stripping length
Crimping jaws in accordance with DIN 46235	10 mm^2	6	4.3 mm	22 mm
	16 mm^2	8	5.5 mm	22 mm
	25 mm^2	10	7.0 mm	22 mm
	35 mm^2	12	8.45 mm	22 mm
	50 mm^2	14	10.25 mm	22 mm
	70 mm^2	16	11.75 mm	22 mm

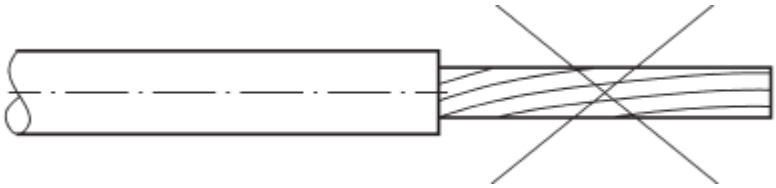
Table 5.1



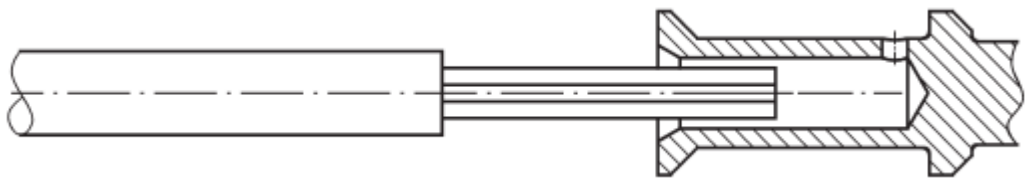
Cut the cable head square and strip the insulation as per the Table 5.1



The copper strands must be clean from dirt and oxid film.

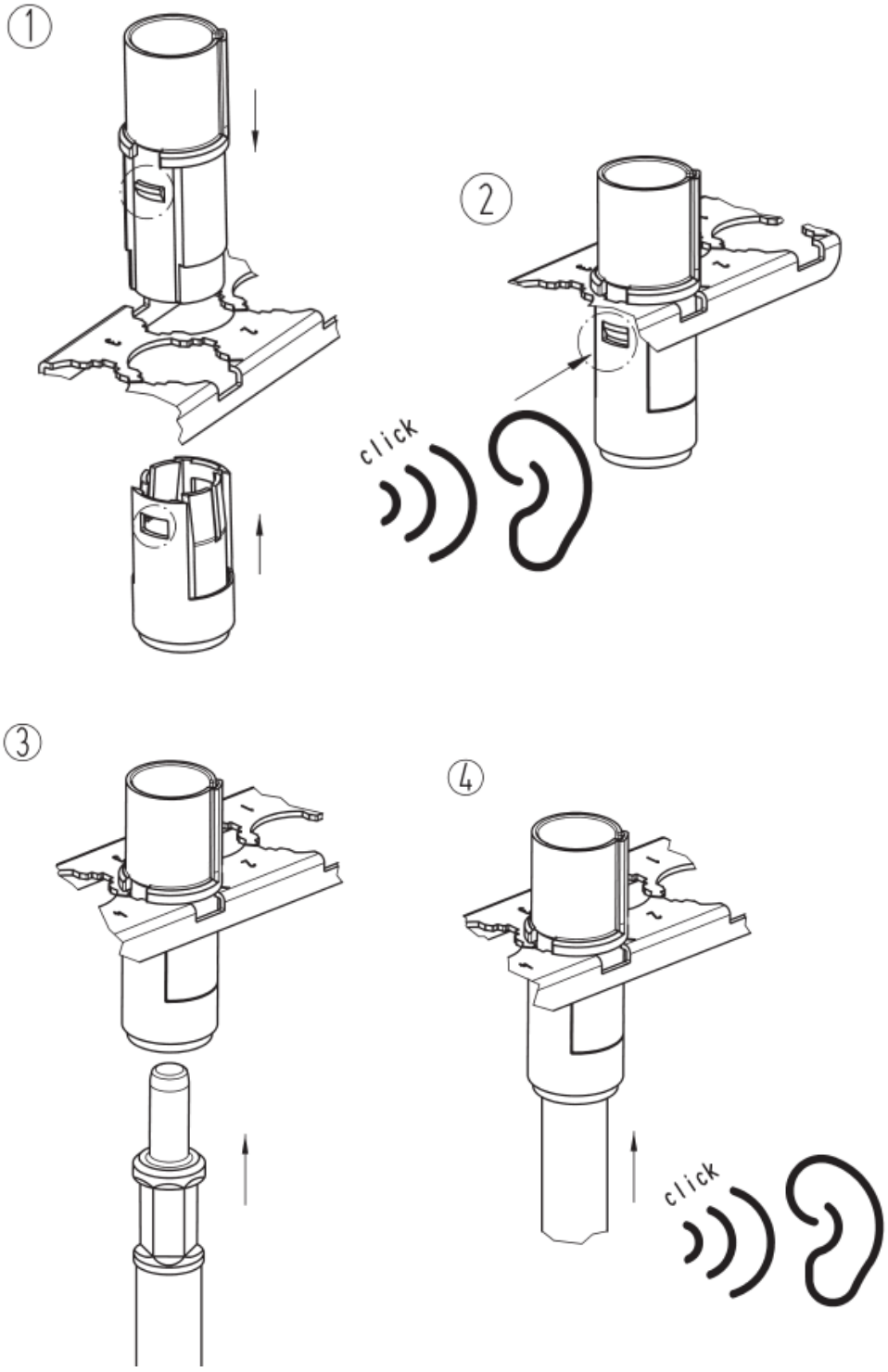


Copper strands must not be drilled.

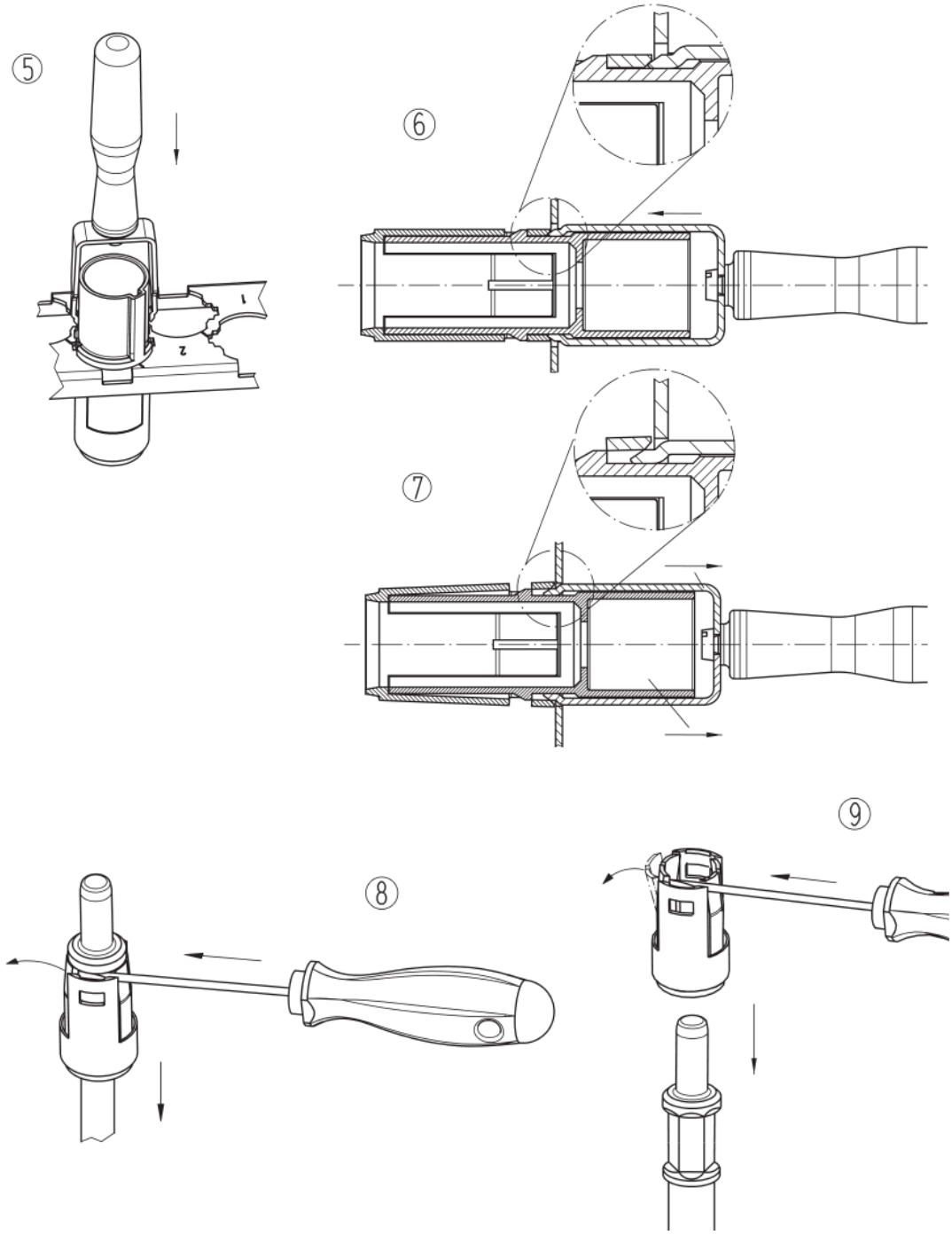


Insert the cable strand completely into the crimp ferrule. Insertion checks via inspection hole.

ii) 250 A Module with 250A frame and cable - *Assembly.



iii) 250 A Module with 250A frame and cable - Removal.



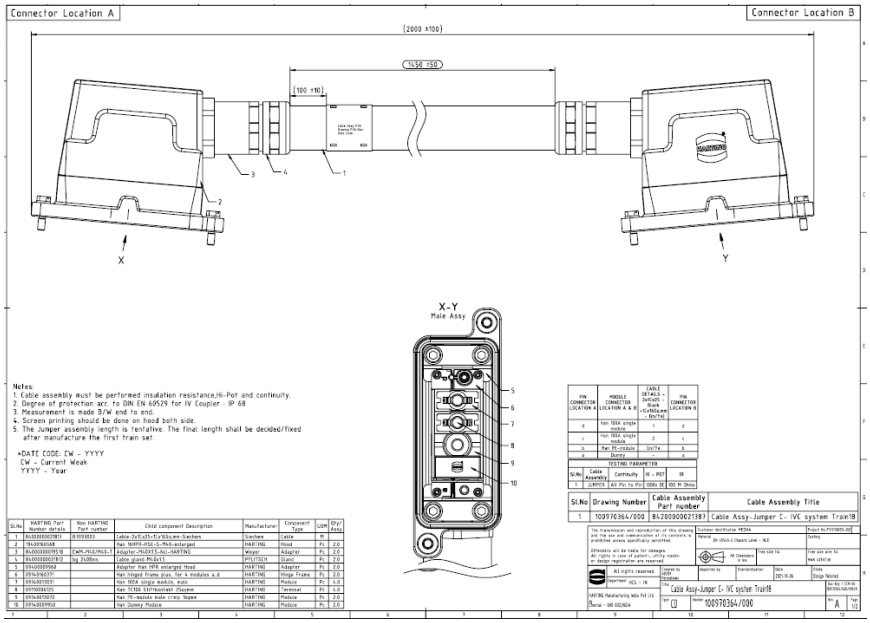
- ***Above details are Applicable for both male and female 250A connector assembly***
- ***Must use the removing tool 09 99 000 0332 for module removing process.***
- ***Coding pin and hinged frame module position refer the cable assembly 84200000021385 and 21386 drawing details.***

5.4.5 C, D, F1, F2 CABLE AND MODULE ASSEMBLY DETAILS

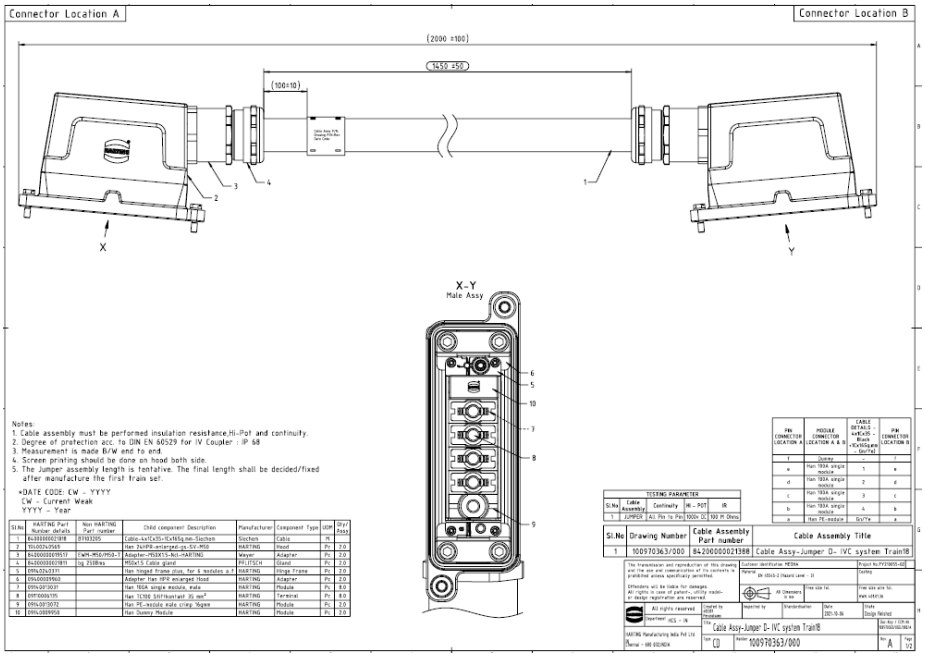
1. C, D MODULE ASSEMBLY DETAILS

After Hood adapter (Pic-5.3) assembly refer the cable assembly drawing 84200000021387 and 21388 for module and hinged frame assembly positions.

Jumper C cable assembly drawing.

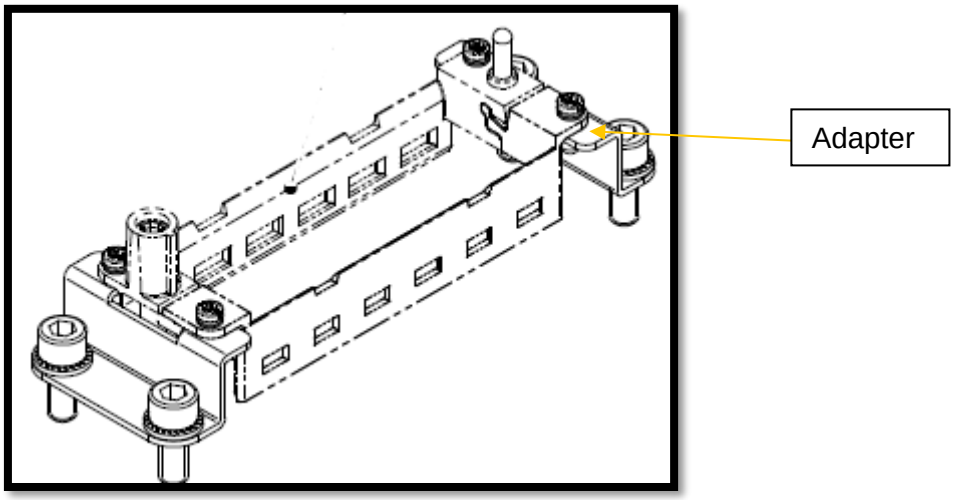


Jumper D Cable assembly drawing



2. C and D - Hinged Frame and module assembly details

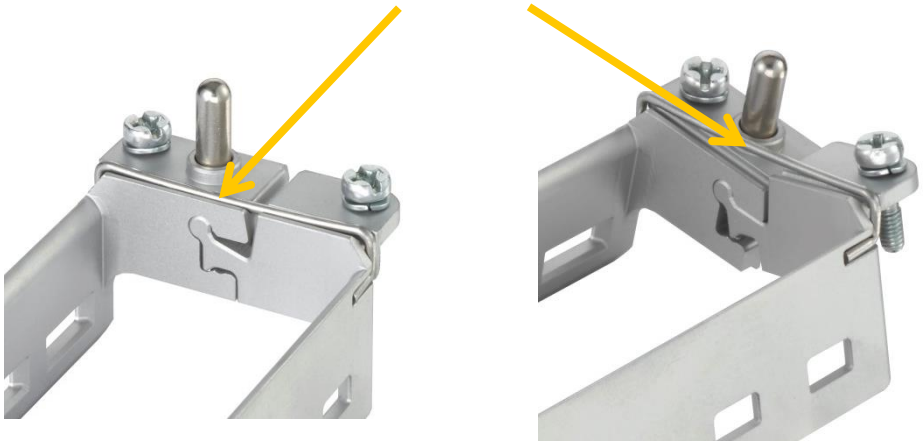
i) Hinged Frame assembly with Han HPR Hood adapter (09400009960) and Housing Adapter (09400009961) for male and female connector assembly.



Pic-5.3.5

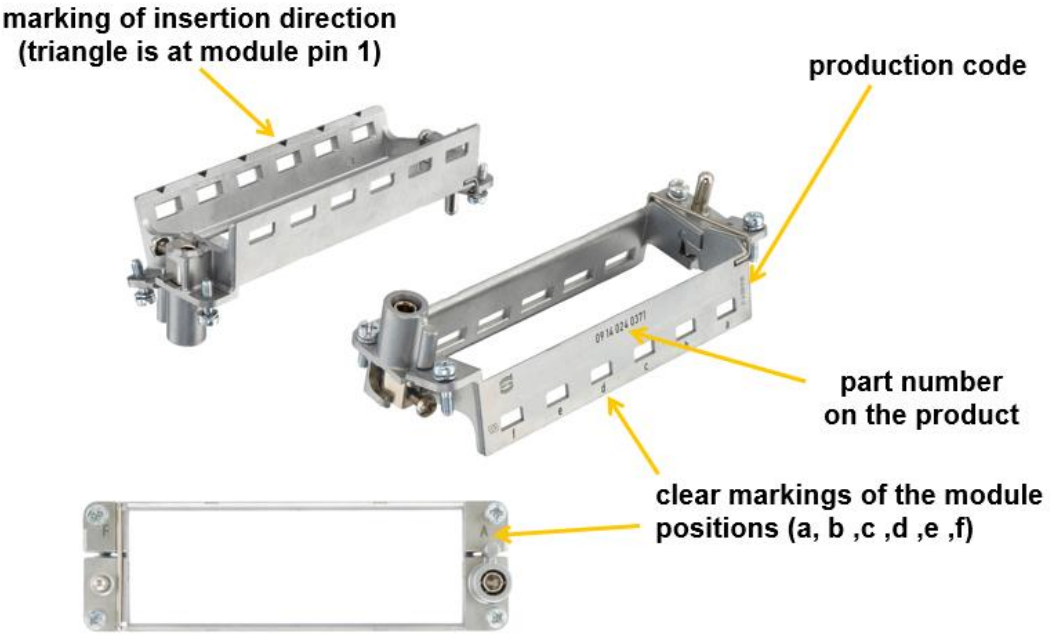
ii) Hinged Assembly

spring force in open and close position



- ***stainless steel spring with double retaining function***
- ***supported by an audible "click"***
- ***quick and easy assembly of the modules***

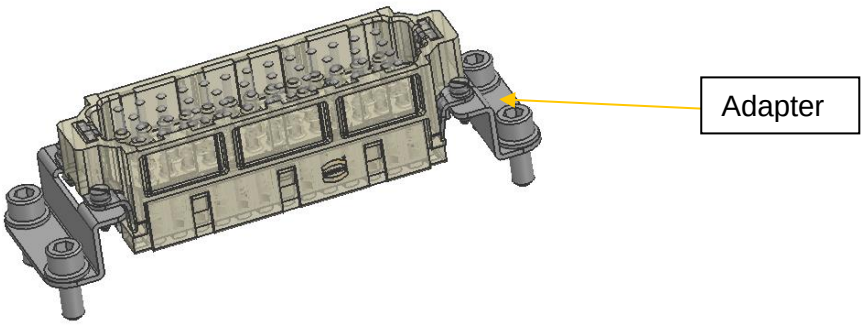
iii) Hinged Frame – Marking Details.

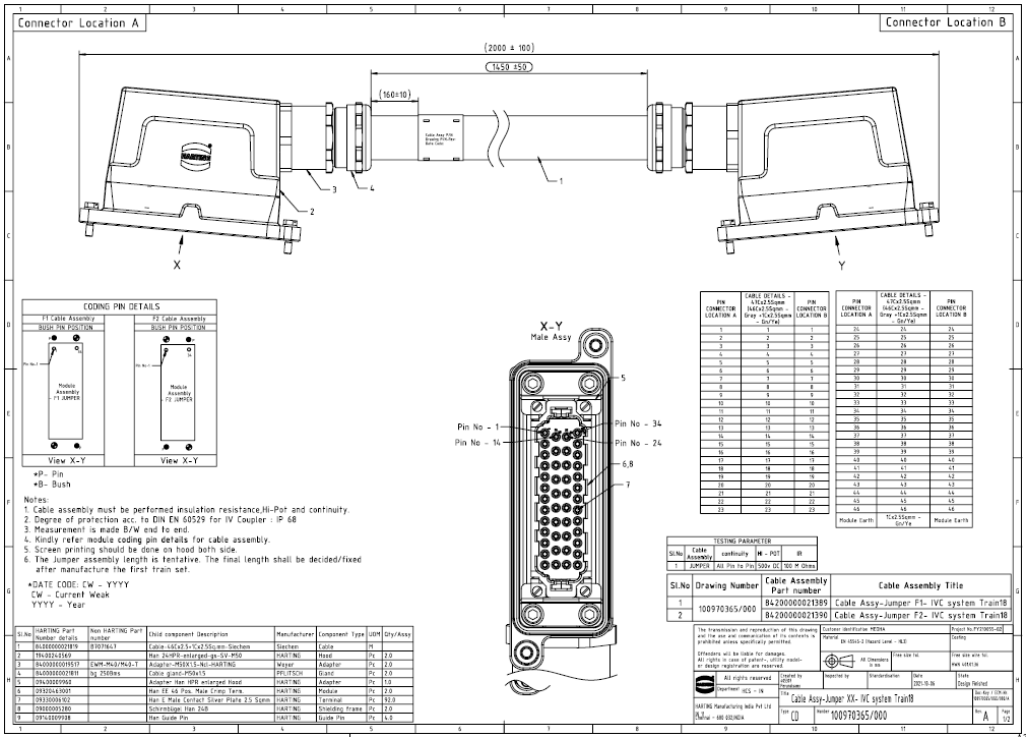


5.4.6 F1, F2 MODULE ASSEMBLY DETAILS:

After Hood adapter (Pic-5.3) assembly refer the cable assembly drawing 84200000021389 and 21390 for module and hinged frame assembly positions.

i) 46 Pin Module assembly with Han HPR Hood adapter (09400009960) and Housing Adapter (09400009961) for male and female connector assembly.





ii) ***46 Pin connector with crimp wire connection are classified as "solder free electrical connections". The specifications for this connection method are define in DIN EN 60352-2. Electrical connection using hand crimp tool or crimp machines which fulfill the specified mechanical, electrical and climatic requirements.***

iii) ***The test of a good crimp connection is the wire pull out force. This force is specification is DIN EN 60352-2 for standard wire with cross selection up to 10 Sqmm. This specified pull to force for the crimp contact are maintained when HARTING crimping tools are used in a proper fashion. The wire pull-out forces are listed in the following table 5.2. VDE 0220 is valid for crimp connections of conductors with wire cross section above 10 sqmm.***

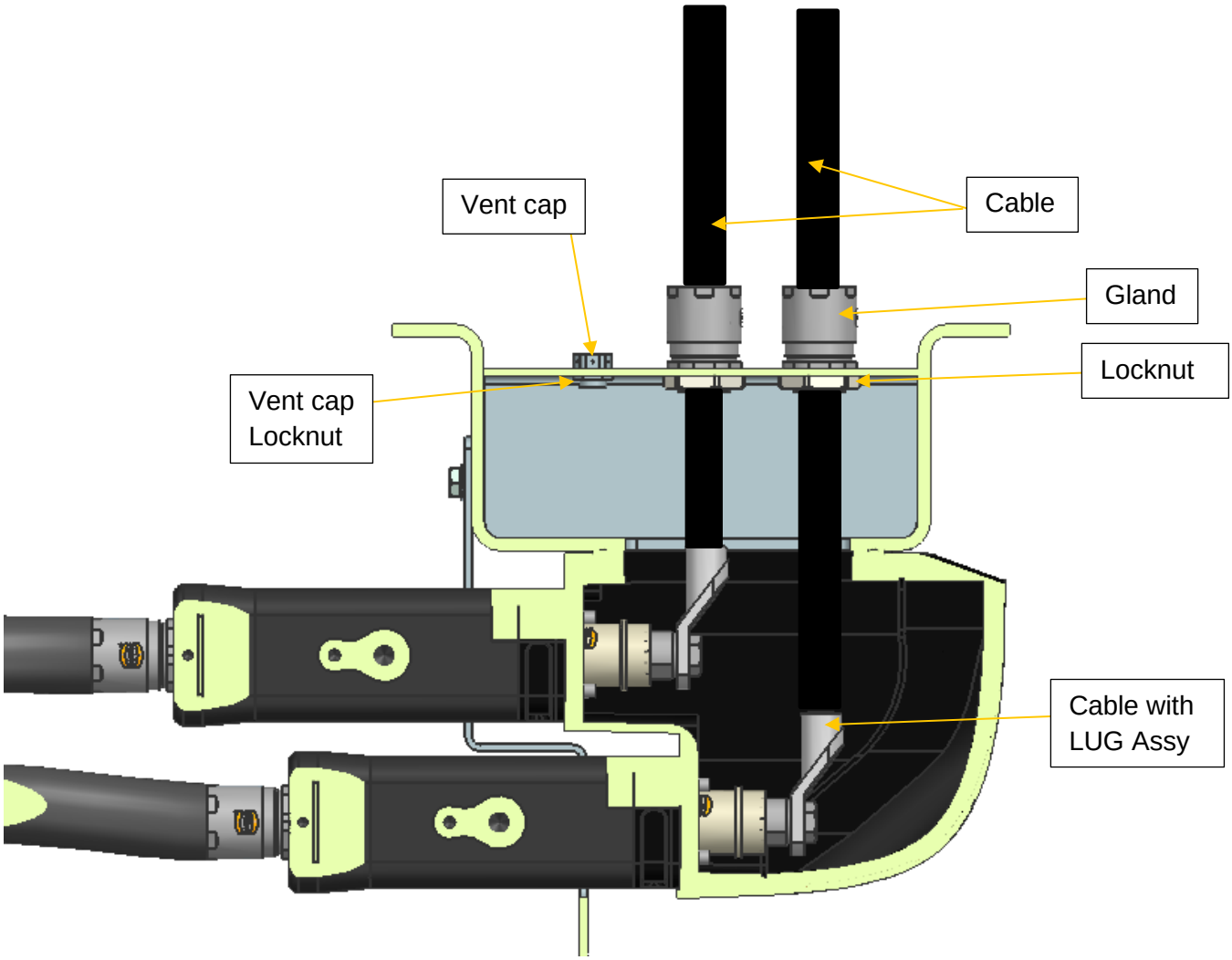
Pull-out forces for crimp connections in accordance with DIN IEC 60 352-2, A2

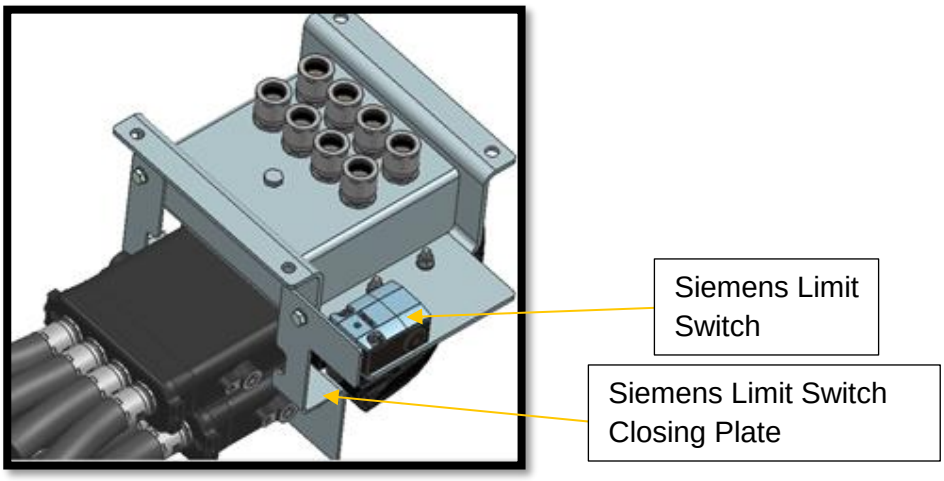
Cross-section / wire gauge mm²	AWG	Pull-out force N	HARTING contacts
0.14	26	18	Han D®, Han E®, D-Sub, DIN 41612
0.22	24	28	Han D®, Han E®, D-Sub, DIN 41612
0.25		32	Han D®, Han E®, D-Sub, DIN 41612
0.32	22	40	Han D®, Han E®, D-Sub, DIN 41612
0.50	20	60	Han D®, Han E®, D-Sub, DIN 41612
0.75		85	Han D®, Han E®, D-Sub, DIN 41612
0.82	18	90	Han D®, Han E®, DIN 41612
1.00		108	Han D®, Han E®, DIN 41612
1.30	16	135	Han D®, Han E®, DIN 41612, Han® C
1.50		150	Han D®, Han E®, DIN 41612, Han® C
2.10	14	200	Han D®, Han E®, Han® C
2.50		230	Han D®, Han E®, Han® C
3.30	12	275	Han E®, Han® C
4.00		310	Han E®, Han® C
6.00	10	360	Han® C
10.00	8	380	Han® C

Table 5.2

6. UNDERFLOOR POWER COUPLER BOX AND SOCKET ASSEMBLY

6.1 UNDERFLOOR POWER SOCKET BOX ASSEMBLY





6.2 HAN® 24 HPR VARIOSHELL ASSEMBLY - UNDERFLOOR POWER COUPLER

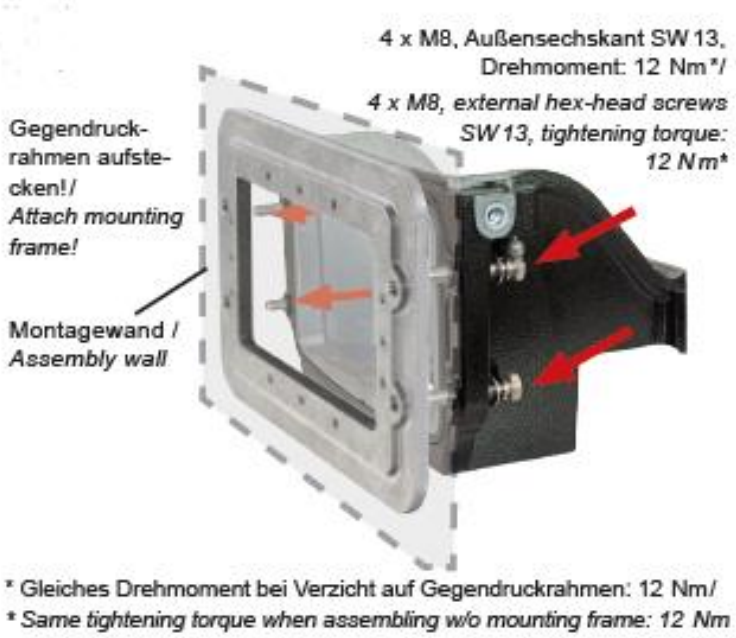
INSTALLATION PROCEDURES:

WARNING! ***Inside the connector are components and conductors which can store perilous high voltage. Inappropriate use may result in an electric shock, serious burns or death. Switch off the connector before working on it! Secure the connectors – Han® inserts or Han-Modular® modules – against unintentional restart!***

- ***In accordance with EN 50 110-1 /-2 (VDE 0105 Part 100), only qualified personnel are allowed to carry out transport, installation, commissioning and maintenance tasks. Guidelines contained in IEC 60 364 and HD 384 (DIN VDE 0100) as well as relevant national regulations must be observed.***
- ***No changes to the installation may be made while the unit is in operation.***
- ***Only work with the connecting terminals at zero voltage.***

i) HAN® 24 HPR VARIOSHELL - Scope of delivery.

**** Screw set with spring washer, washer, and rubber seal.***

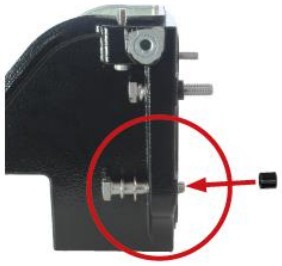


ii) HAN® 24 HPR VARIOSHELL - Product check

**** Pre-assembled cover fixing hexagon socket screws SW 5***

**** Check circumferential profile seal for proper positioning and damage***

iii) HAN® 24 HPR VARIOSHELL – Assembly



- ***Push screw from the front into the through hole, fix rubber seal from the wall side and Push rubber seal properly into the through hole.***
- ***Now HAN® 24 HPR VARIOSHELL ready for Wall mounting or Box mounting.***
- ***After box mounting refer the housings assembly for 350A female connector assembly.***

iv) HOUSINGS ASSEMBLY WITH (350A FEMALE CONNECTOR) HAN® 24 HPR VARIOSHELL ASSEMBLY.

- ***350A female connector Housing assembly with Varioshell Assembly.***
- ***Refer the assembly of 350A connector frame with female module assembly details.***

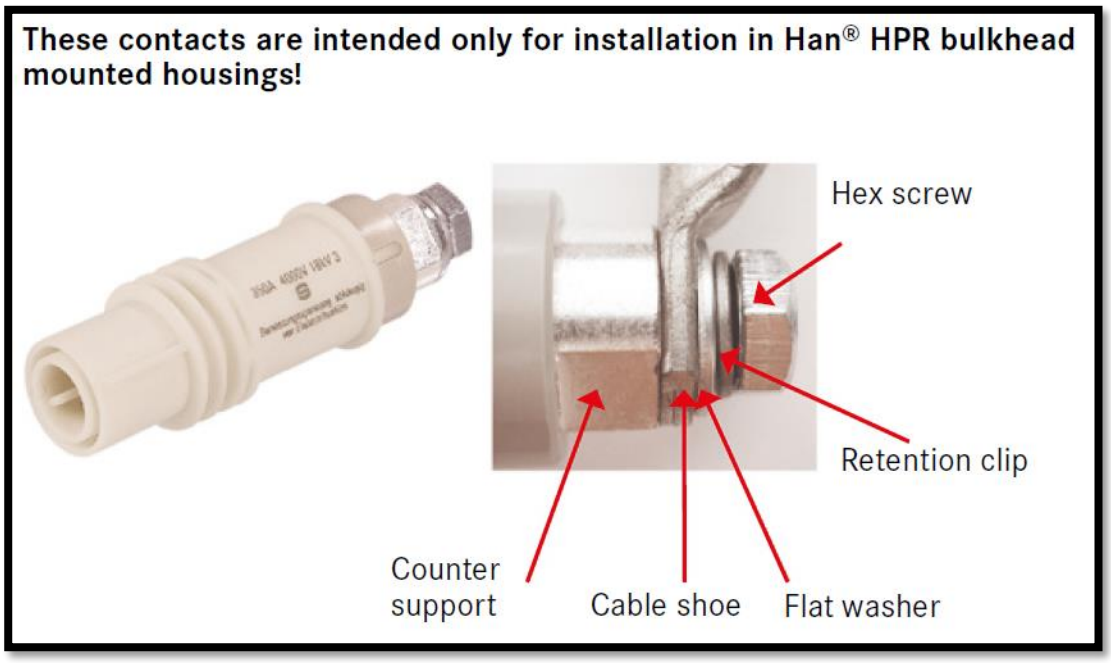
6.3 350A CONNECTOR FRAME WITH FEMALE MODULE ASSEMBLY.

1. In accordance with EN 50 110-1 /-2 (VDE 0105 Part 100), qualified personnel only are allowed to carry out transport, installation, commissioning, and maintenance tasks. Guidelines contained in IEC 60 364 and HD 384 (DIN VDE 0100) as well as relevant national regulations must be observed.

2. No changes to the installation may be while the unit is in operation and refer the below "STEP" for connector assembly procedure.

STEP 1:

Refer the below assembly details for socket female module assembly using with cable lug connection.

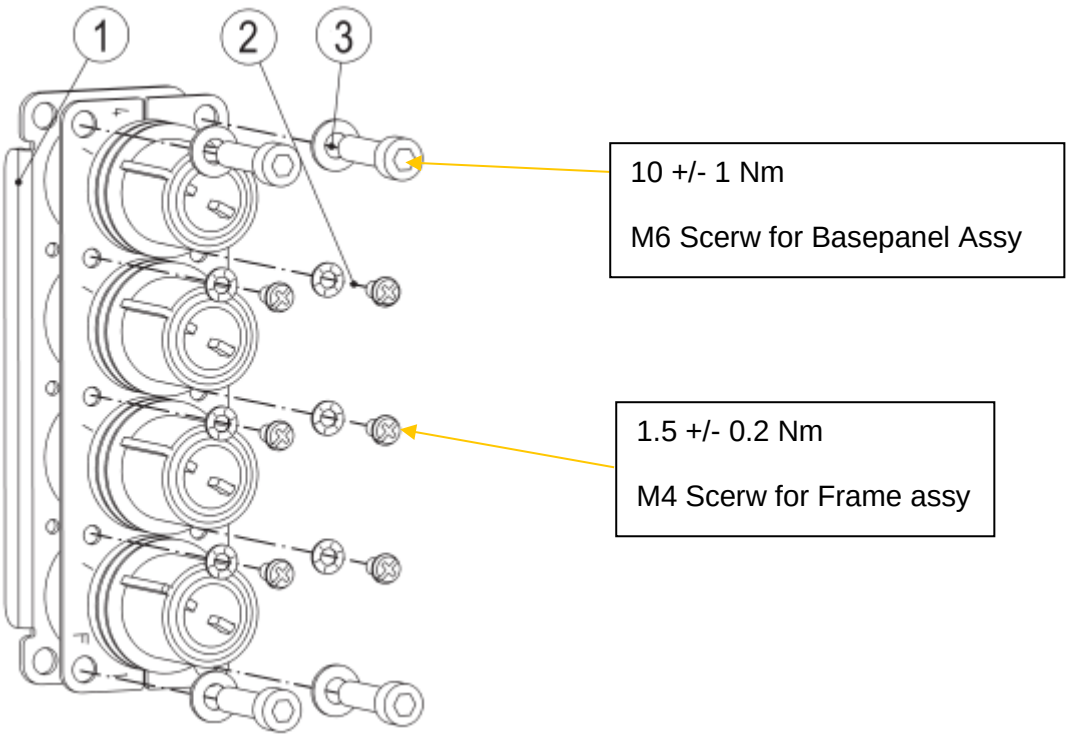


On above connection side, they consist of a flat washer a retention clip and a hex screw (M10). During installation of the cable lug or shoe, be sure the components that are placed over the hex screw are placed on in the proper order, first cable Lug or Shoe assembly after Flat washer and retention clip with M10 screw and must also apply counter pressure to the counter support of the contact using a spanner wrench (Han HC modular 350A). This will stop the spread of the torque. If you do not take this step, the insert can be damage and the interface may malfunction.

The recommended torque is 14 Nm for the Han HC modular 350A.

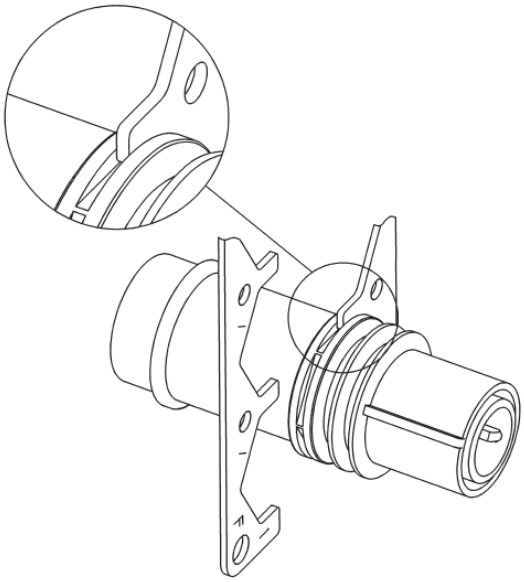
STEP 2:

Assemble the inserts into the frame. Note the indicated tightening torques!



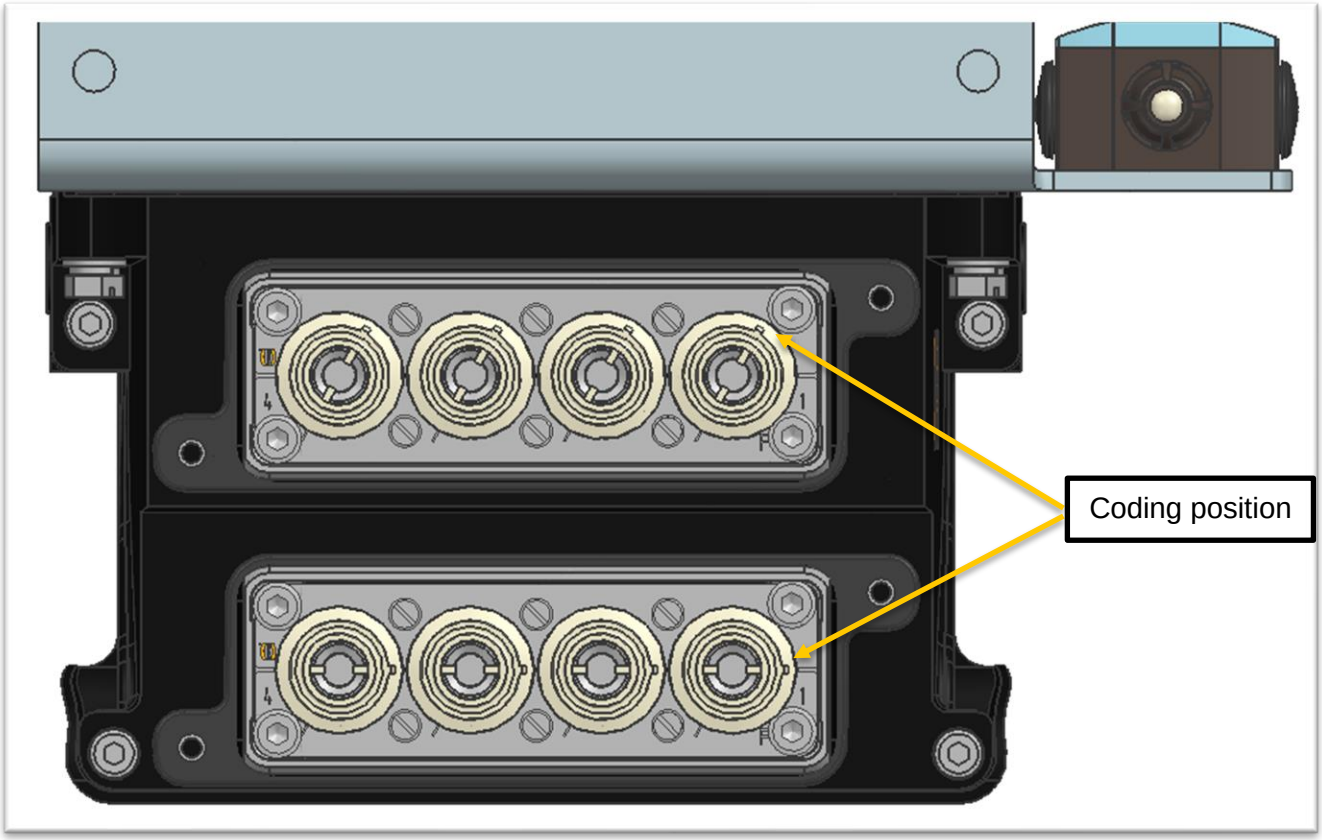
STEP 3:

The inserts are correct mounted in the frame.

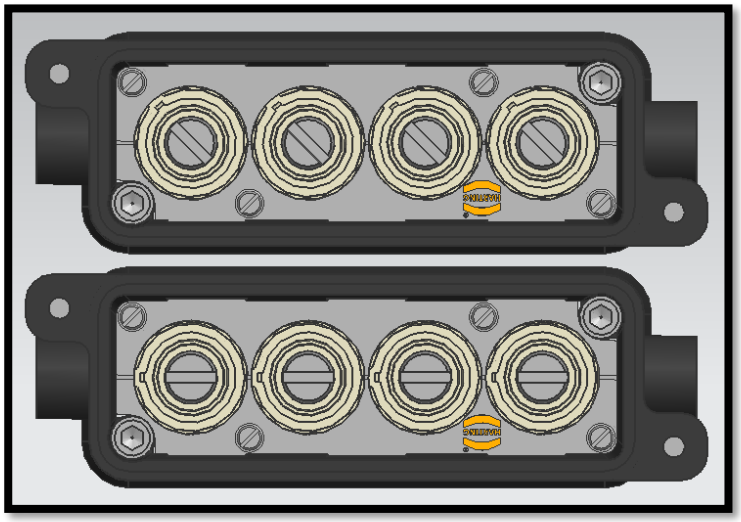


STEP 4:

<u>Bio Tank Side - Connector Coding Pin Assembly</u>

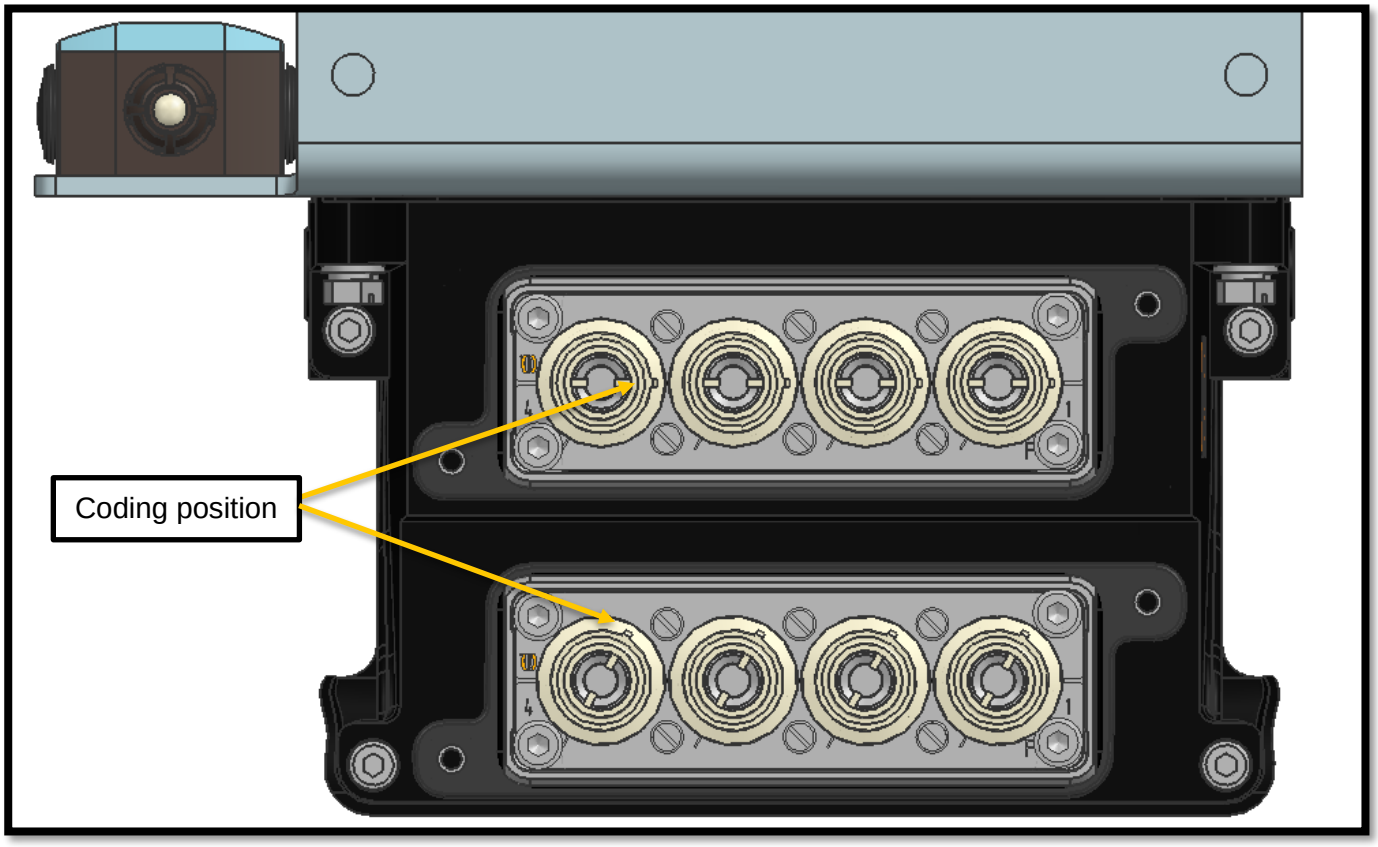


Refer the below jumper coding pin assembly for Socket connection.

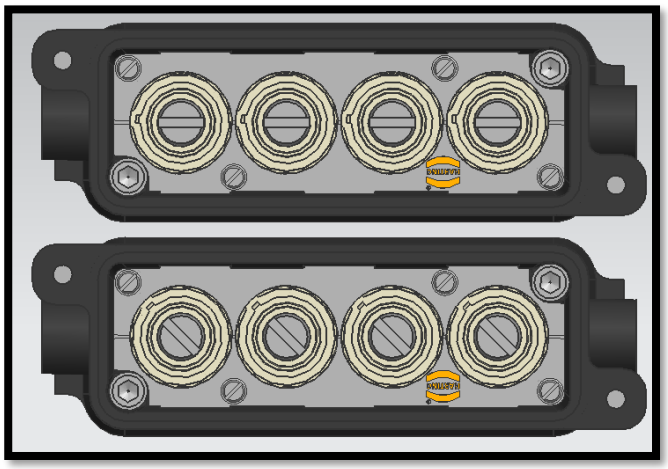


STEP 5:

<u>Non-Bio Tank Side - Connector Coding Pin Assembly</u>

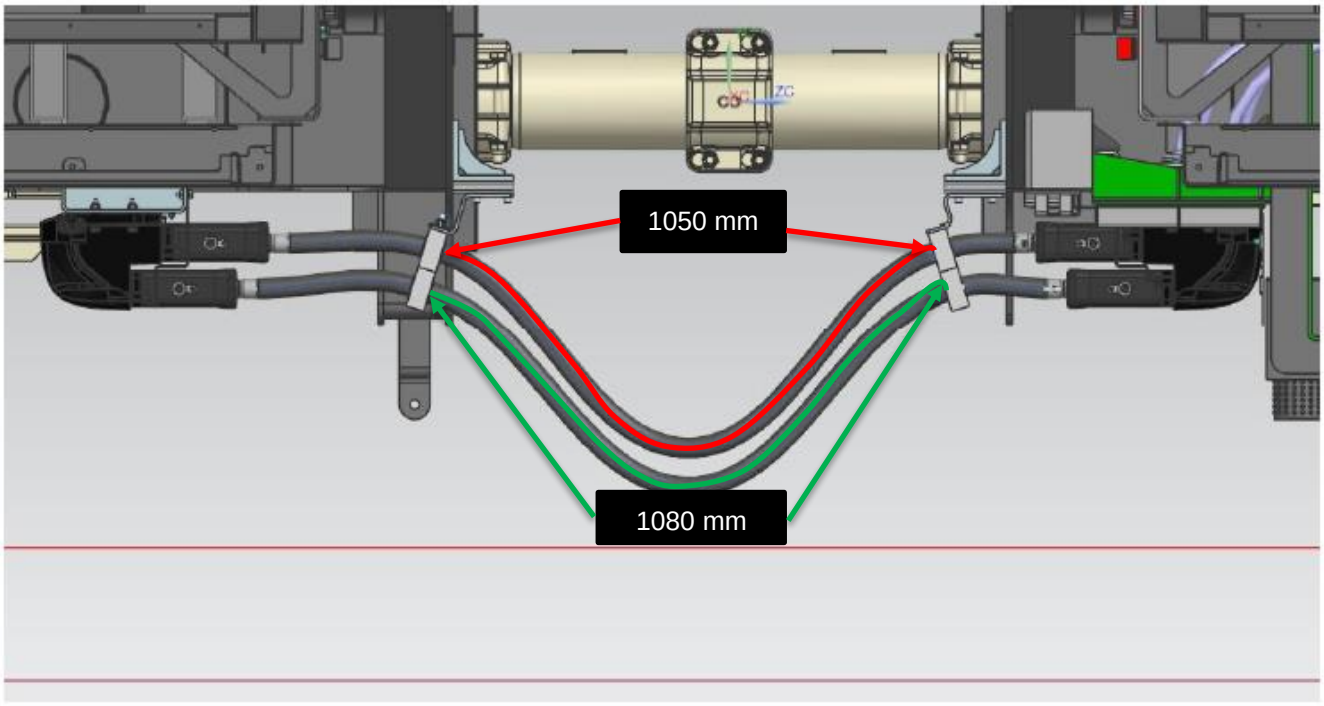


Refer the below jumper coding pin assembly for Socket connection.



STEP 6:

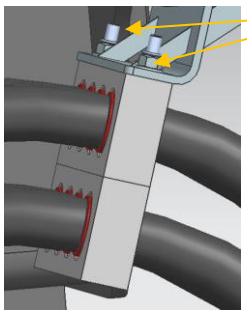
After Jumper Assembly or after re-work in the jumper, Check the Power Jumper cable length between the conduit holding adapter. Refer the below image for length details.



Description Han® HC Modular 350

Han® HC Modular 350 in crimp termination technology for the railroad industry. The high-current connector Han® HC Modular 350 impresses with its small footprint, flexible configuration options and reliable transmission of high currents for applications in the railroad sector. The one-piece crimp contact Han® HC Modular 350 can be assembled in different frame geometries as required in the Han® HPR housing. Reliable, easy to assemble.

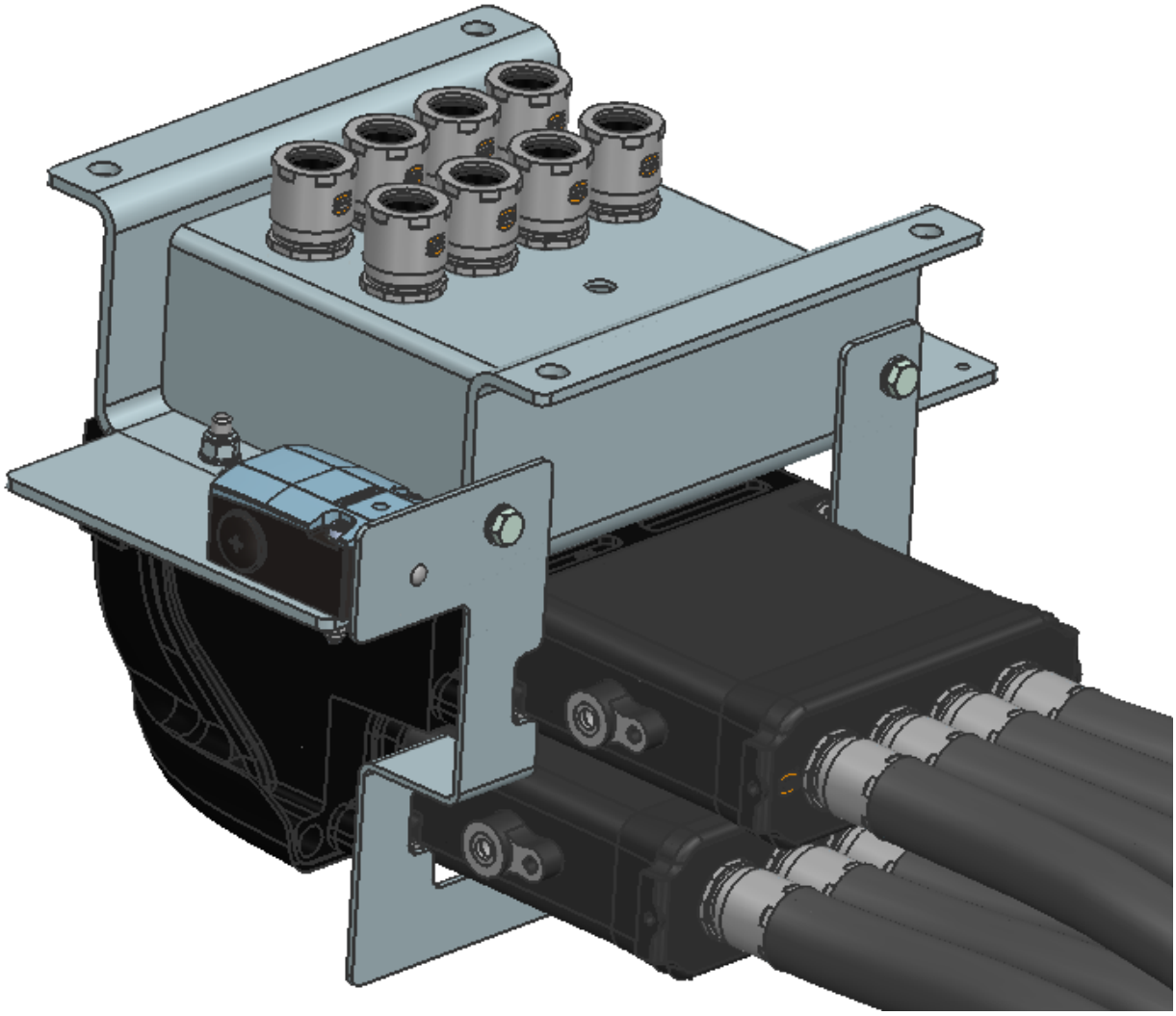
Conduit Adapter assembly torque details:



M8 x160mm length scerw assembly torque is 10Nm

6.4 AFTER JUMPER ASSEMBLY VIEW WITH SOCKET BOX ASSEMBLY

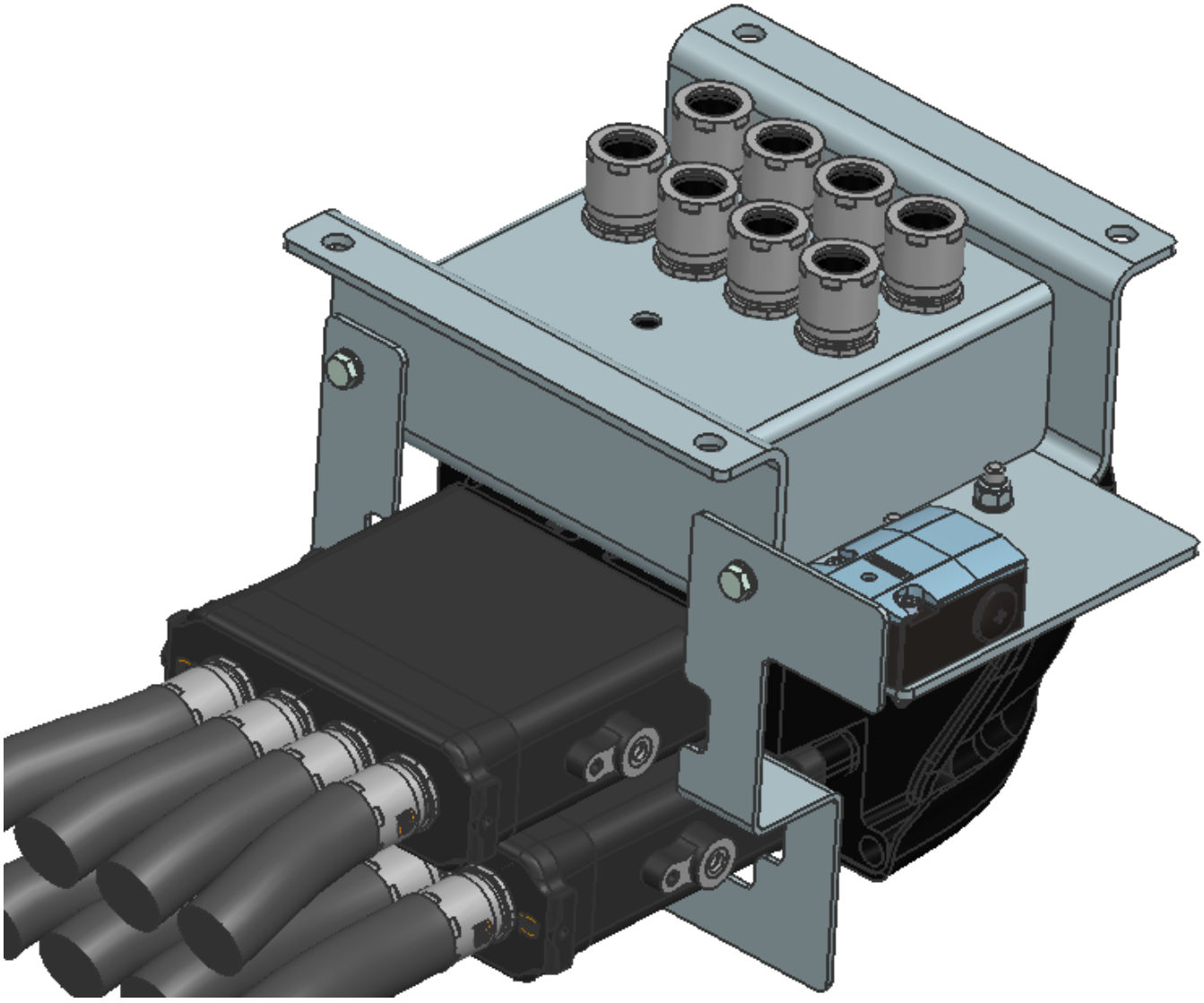
1. NON-BIO TANK SIDE ASSEMBLY



Gland Torque Details:

1. ***The recommended torque is 20 Nm for the cable gland assembly.***

2. BIO TANK SIDE ASSEMBLY



Gland Torque Details:

1. ***The recommended torque is 20 Nm for the cable gland assembly.***

6.5 Power Coupler Installation procedure:

Step 1:

Cut the cables after finalizing the length between the plate and varioshell Lug Fixing position.

Insert the required ferrule as per the drawing

Make sure there is no crosscut at the end

Step 2:

Strip the cable as per the required length for Crimping the Lugs.

Make sure the stripping are fully covers the Lug crimping area.

Tinned copper strands should be fully inserted and visible through the inspection hole.

Step 3:

Crimping should be in the middle of Crimping area.

Make sure the Pull-out force achieved after crimping.

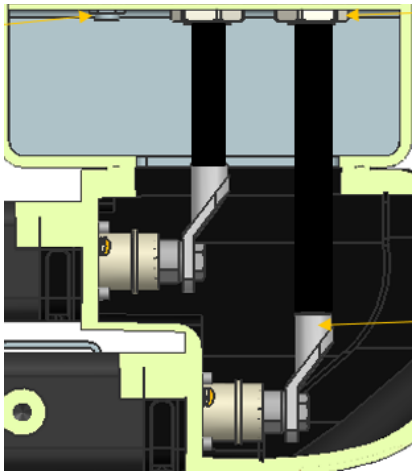
There should be no catier formed in lug after crimping

Step 4:

The lugs must be tightened to the connector as per the Wiring chart and 14 Nm must be maintained.

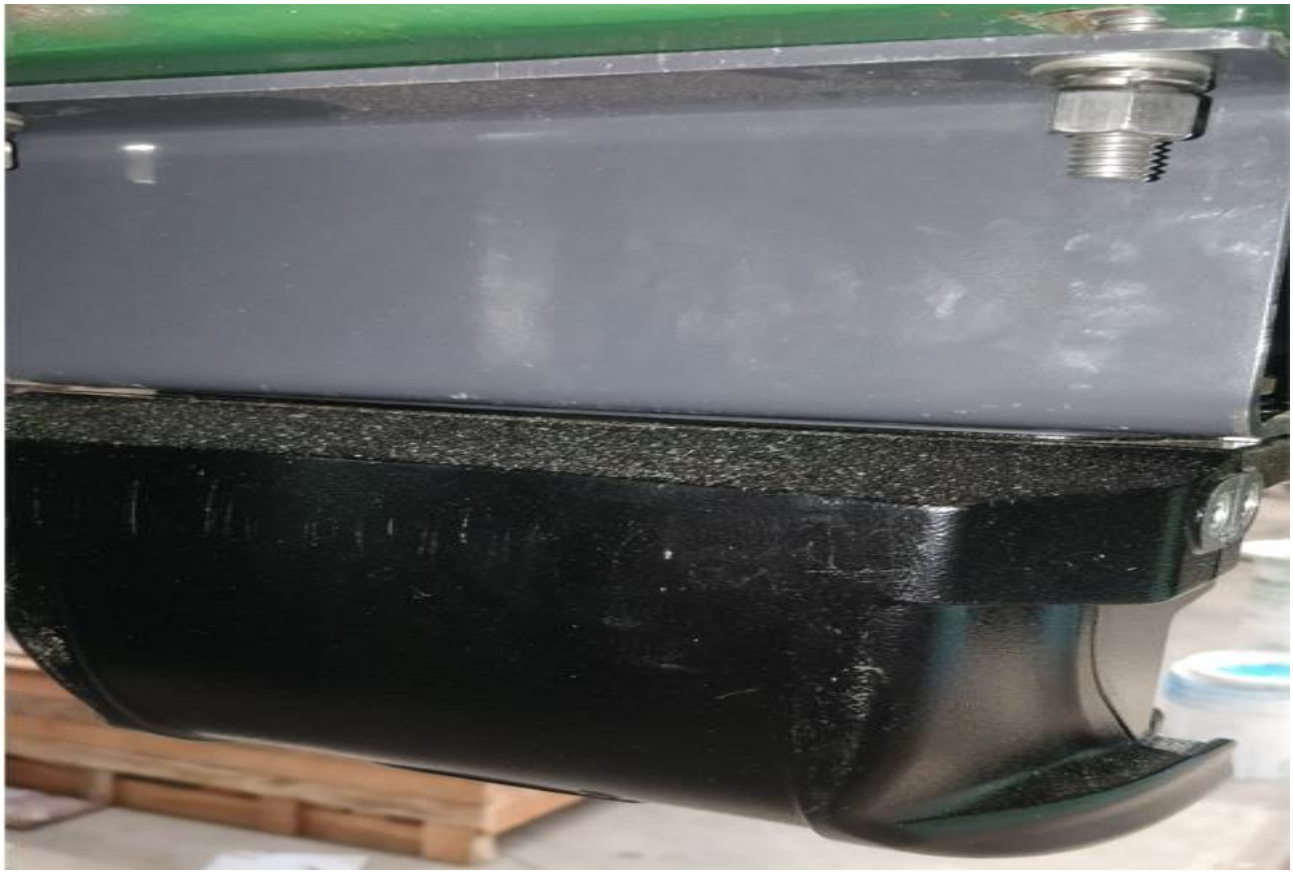
First Assemble the first module (Upper part) then go to the other connector.

After fixings the Lugs the cap should be inserted in order to isolate each lug to avoid short circuit between the Lugs.



Step 5:

Close the cover in the Varioshell after fixing all the assembly



Step 6:

Tighten the gland in the plate after finishing all the assembly procedure in Varioshell. Gland should be tightened in-order to comply the IP requirement, after tightened the gland assembly only mounting box to assemble at train side with M12 bolt (Torque – 73Nm).

Step 7:

Siemens Limit switch should be mounted and fixed with respective hardware's and tightened with torque (M5x50mm length screw torque is 5.5Nm). Front cover plate should be fixed after fixing the Siemens switch and after Mating of Jumpers in Socket coupler.