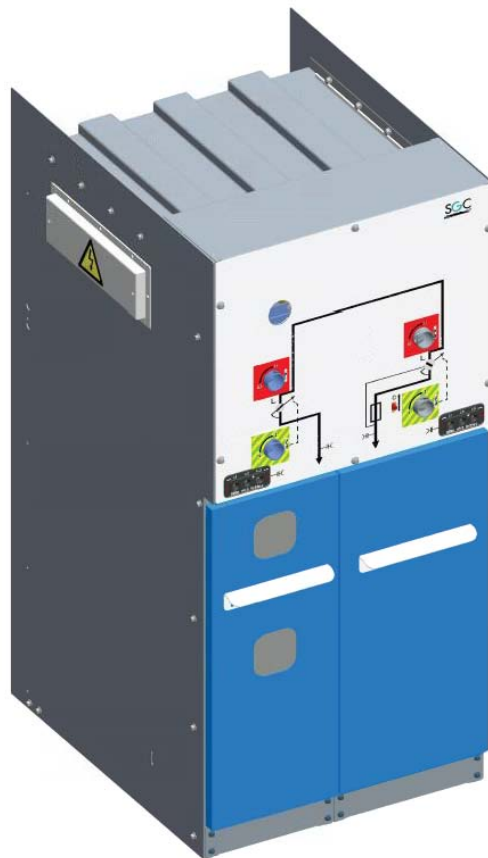


# DR-6E

## MEDIUM VOLTAGE SWITCHGEAR EXTENDABLE RING MAIN UNIT



### Complementary Installation Manual DR-6E / DR-6+ E

READ THIS DOCUMENT CAREFULLY BEFORE ANY OPERATION



THE SPECIALIST IN **MEDIUM VOLTAGE SWITCHGEAR**

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The information contained within is applicable to the standard version of the DR-6 medium-voltage switchgear. Therefore, SGC nv - SwitchGear Company cannot be held liable for any damage resulting from specifications that differ from the standard version of the DR-6 medium-voltage switchgear.

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## PREFACE

### Introduction

This document is intended as a reference for qualified and trained operators to install the medium voltage switchgear in a safe and economical way.

This document uses the term “medium voltage switchgear” to denote a random, but in actual practice, existing combination of DR6 functions that, mutually coupled and connected, constitute a client-specific transformation or distribution station.

In the documentation the words “left”, “right”, “front” and “behind” are used to indicate a specific part of the medium voltage switchgear. The starting point is always the position of the operator, standing in front of the medium voltage switchgear, facing the switchgear.

### Pictograms and safety symbols in and on the medium voltage switchgear

Depending on the version, the following pictograms are used on the medium voltage switchgear:



#### **WARNING**

Danger of high voltage

Access to this cubicle is only allowed after this cubicle and both the directly adjacent cubicles (previous and next one) are de-energized.



#### **WARNING**

Drilling prohibited.

Drilling is strictly prohibited on surfaces equipped with this pictogram.

## Pictograms in the documentation

The following pictograms apply to the medium voltage switchgear user documents:



### CAUTION!

A procedure that can, if not carried out with the proper care, result in damage to the medium voltage switchgear, the surrounding area or the environment.



### WARNING

High Voltage Danger



### CAUTION!

Clamping danger



Notes, suggestions and advice.



Make this cubicle, the next one and the previous cubicle, voltage-free, before carrying out the work described.



Open the load break switch and the earthing switch before carrying out the work described in the manual.



Consult the indicated information sources first.



Protect the medium voltage switchgear from water and damp.

## Related documentation

The following technical documentation for medium voltage switchgear is available:

- Transport manual DR-6C / DR-6E
- User manual DR-6C / DR-6E

## **Service and technical support**

For information concerning specific settings, maintenance or repair work which are not covered in the manual, please contact SGC - SwitchGear Company nv.

When contacting SGC – Switchgear Company nv, always provide the following information:

- Cubicle designation and characteristics
- Serial number of the cubicle(s)

## **General safety directions and instructions**

SGC – SwitchGear Company nv does not accept any liability for damage or injury caused by not (strictly) following the safety directions and instructions, or by negligence during the installation, use, maintenance, or the repair of the medium voltage switchgear and its accompanying options.

Depending on specific user circumstances, or installed options, extra safety instructions may be required. Please contact SGC – SwitchGear Company nv immediately if you encounter a potential danger during the operation of the medium voltage switchgear.

**The owner/operator of the medium voltage switchgear is fully responsible at all times for following the locally applicable safety directions and guidelines.**

### **User manual**

- Anyone who uses or operates the medium voltage switchgear, must be familiar with the contents of the user manual, and follow the directions contained within very closely. The owner/operator must educate the users in accordance with the user manual and obey all directions and instructions.
- Never change the order of the required actions.
- Always keep the user manual in the vicinity of the medium voltage switchgear.

### **Pictograms and safety symbols**

The pictograms, symbols and instructions applied to the medium voltage switchgear are a part of the safety equipment. They may therefore not be covered or removed, and must be present and clearly readable throughout the entire lifespan of the medium voltage switchgear.

- Replace or repair unreadable or damaged pictograms, symbols and instruction immediately. Therefore, contact SGC – SwitchGear Company nv.

### **Operators**

The execution of the work described (transport, installation, use and maintenance) is strictly reserved for trained and qualified operators, who are familiar with the dangers that can occur when operating medium voltage switchgear. Temporary staff and personnel in training may not operate the medium voltage switchgear under any circumstances.

## Technical specifications

- Technical specifications may not be changed.
- Modification of the medium voltage switchgear (or parts thereof) is not permitted.

## Transport, storage, installation, operation and maintenance

See corresponding documents:

- “Safety guidelines – transport”
- “Safety guidelines – storage”
- “Safety guidelines – installation”
- “Safety guidelines – operation”
- “Safety guidelines – maintenance”



Cubicles that fell over or have otherwise been damaged always **HAVE TO BE RETURNED** to SGC - SwitchGear Company for a checkup

## Intended use

The medium voltage switchgear is designed exclusively for use as transformation or distribution stations, in accordance to the specifications and conditions provided by SGC – SwitchGear Company nv. Any other or further use is not in accordance with the intended use.<sup>1</sup>

SGC – SwitchGear Company nv does not accept any liability for damage(s) or injuries resulting from deviation(s) of the intended use.

The medium voltage switchgear complies with the current norms and guidelines. See: Technical Brochure

- Only use the medium voltage switchgear in technically perfect condition, in accordance with the intended use described above.



Leave the sealed connections intact, at all times. Breaking the sealed connections irrevocably voids any guarantee claims.

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<sup>1</sup> The “Intended use” as defined in EN 292-1 “is the use for which the technical product is suited as specified by the manufacturer including his directions in the sales brochure.” In case of doubt, it is the use that can be deduced from the construction, the model and the function of the technical product that is considered normal use. Operating the product within the limits of its intended use also involves observing the instructions in the user manual.

# 1 GENERAL INSTALLATION GUIDELINES

## 1.1 Safety instructions – installation

The general applicable safety and installation instructions are included in the full user manual.

## 1.2 Arrangement of the installation area

For the first extendible switchgear that will be installed in the substation or switchgear room, the general installation guidelines mentioned in the installation manual of the DR-6C are applicable.

To be able to install the subsequent extendible switchgear, the following recommendations are made:

- Ensure that there is sufficient clearance towards the lateral wall. Width of the subsequent switchgear + 150mm are mandatory, an extra 500mm is advised for the assembly of the switchgear (see Figure 1).
- The surface on which the medium voltage switchgear must be installed, needs to be firm and completely level. The maximum permissible difference in level is **2 mm/m**. Metal supports are advised.

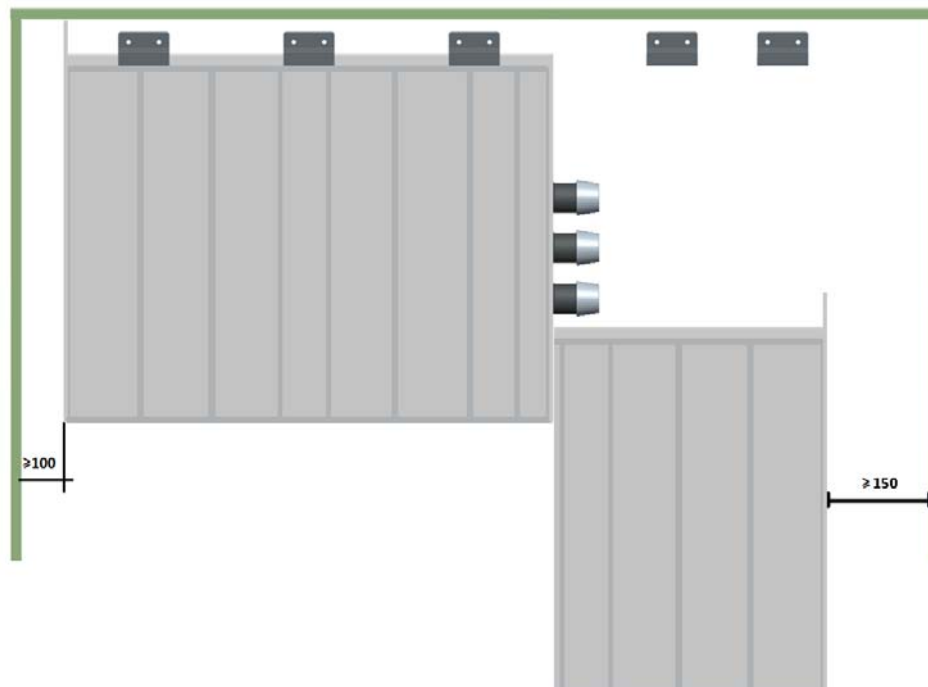


Figure 1: Minimum required lateral free space



## 2 CONTENT OF EXTENSION KIT DR000062

The extension kit contains all items to link two opposite extendible switchgears DR-6E, the busbar link and the bolts for the switchgears connections are included.

When the extension kit (DR000062) is ordered together with the extendible switchgear, the kit will be located in the cable compartment of the extendible switchgear.



Figure 2: Content extension kit DR000062

A: Busbar link  
 B: Busbar insulation  
 C: Busbar insulation earth linkage

D: Grease  
 E: Set of fixing materials DR-6E  
 F: Threaded rod

### 3 SWITCHGEAR ARRANGEMENT

#### 3.1 Installing the fixation clips

The general installation guidelines mentioned in the installation manual of the DR-6C are applicable for the first extendible switchgear that will be installed in the substation or switchgear room.

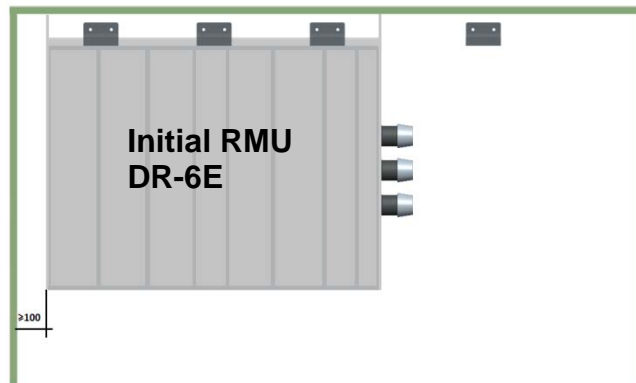


Figure 3: Installation fixation clips

For each functional unit of the DR-6E, a fixation clip needs to be installed as represented in Figure 4. **The fixation clip needs to be installed before the DR-6E switchgear in its definitive place.**

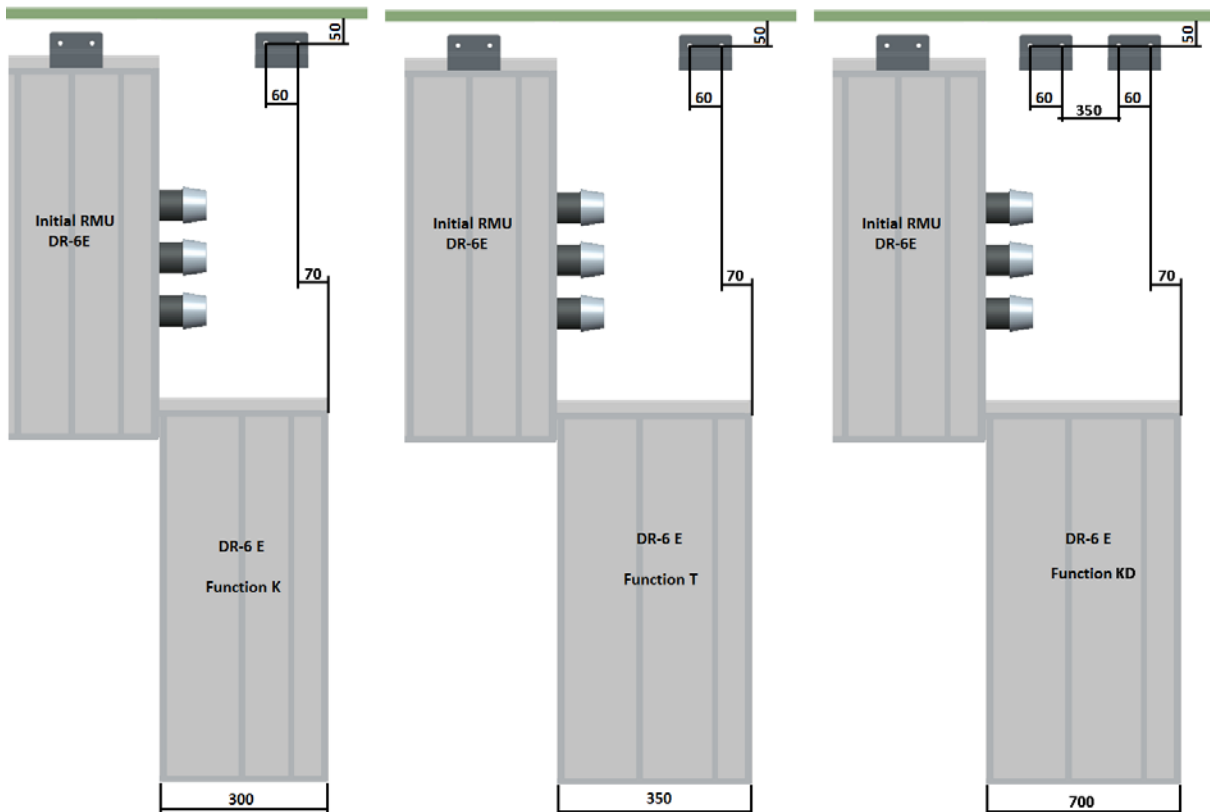


Figure 4: Installation fixation clips extendible switchgears

### 3.2 Preparation of the RMU DR-6E to be extended



Ensure that the cubicle, the next one, and the previous one are de-energized and earthed. Ensure that the busbar is de-energized before proceeding.

Depending on whether the installation is constructed in one or various phases, some of the steps have already been performed in the factory.

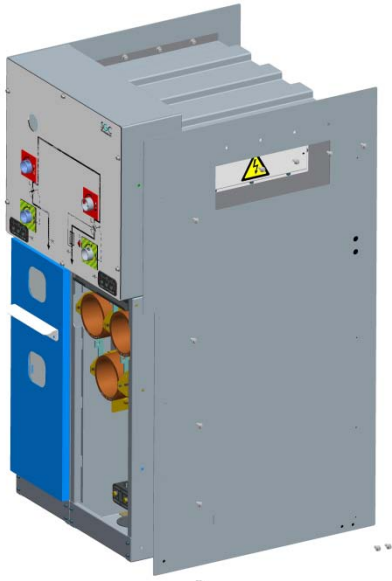


Figure 5: Disengage end panel

Remove the door of the cable compartment and the front cover.

Disengage the copper earthing strip, installed in the cable compartment on the side where the busbar extension will take place.

Disengage the end panel (if present) on the side where the busbar extension will take place (Figure 5).

**In any case, one should remove all bolts located at this side.**

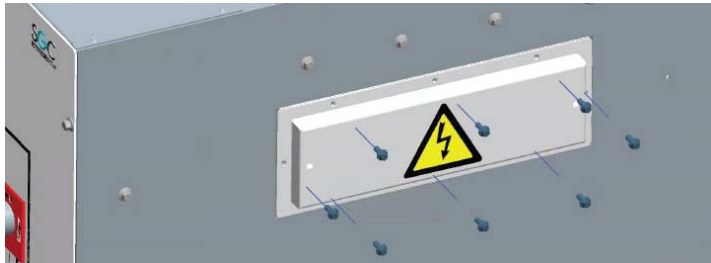


Figure 6: Remove protective cover

Remove the protective cover (if present) by means of the 8 bolts (Figure 6).



Figure 7: Dummy plug

Remove the insulating dummy plugs (if present).

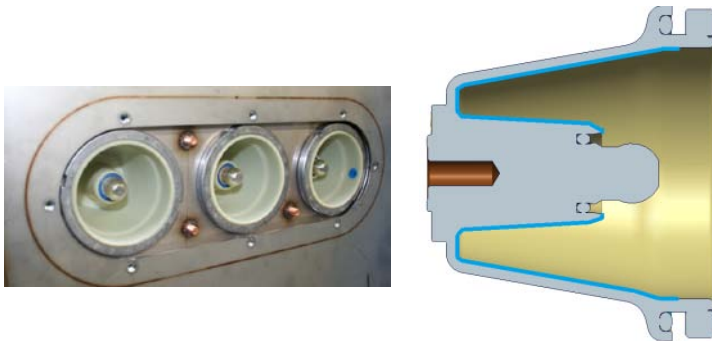




**Figure 8: Protective cover**

When the above mentioned steps are performed in the factory, the DR-6E will be delivered with protective caps.

Those should be removed as well when the busbar connection will be made.



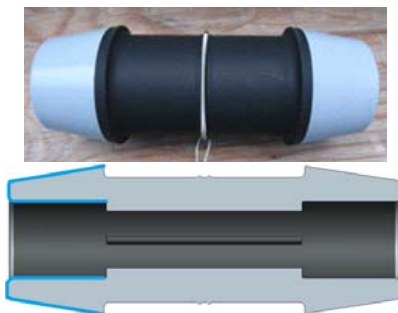
**Figure 9: Cleaning of the extension**

Clean the interior of the extension bushings. No dust or other contamination may be present. Distribute the silicone grease evenly over extension bushing like indicated by the blue line in Figure 9.



**Figure 10: Busbar extension**

Insert the busbar link onto the extension bushing. The busbar link can be found in the delivered kit.



**Figure 11: Busbar insulation**

Distribute the silicone grease evenly over one of the grey surfaces and the interior of the busbar insulation like indicated by the blue line in Figure 11.

Pay attention that no dust or other contamination is present.



**Figure 12: Busbar insulation mounted**

Place the busbar insulation, with the greased side, over the busbar link into the extension bushing like indicated in Figure 12.



Figure 13: Ground connection

A ground wire is attached onto the outer shell of the busbar insulation. Connect this ground connection onto a stud and fix with a M8 nut, supplied in the kit. For each phase, a stud is provided near the extension bushing.

Distribute silicone grease evenly over the remaining grey surface and the interior of the busbar insulation like indicated by the blue line in Figure 11.. Pay attention that no dust or other contamination is present..

### 3.3 Preparation of the appended RMU DR-6E



**Ensure that the cubicle, the next one, and the previous one are de-energized and earthed. Ensure that the busbar is de-energized before proceeding.**

Depending on whether the installation is constructed in one or various phases, some of the steps have already been performed in the factory.

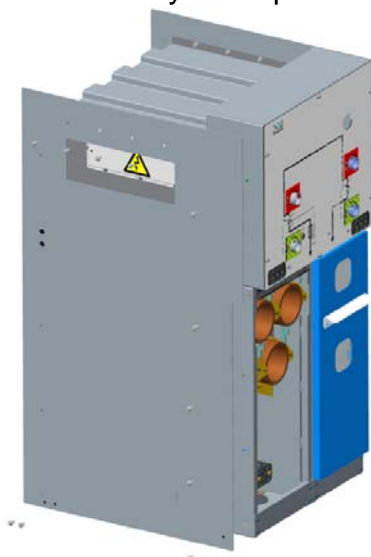


Figure 14: Disengage end panel

Remove the door of the cable compartment and the front cover.

Disengage the end panel (if present) on the side where the busbar extension will take place (Figure 14).

**In any case, one should remove all bolts located at this side.**

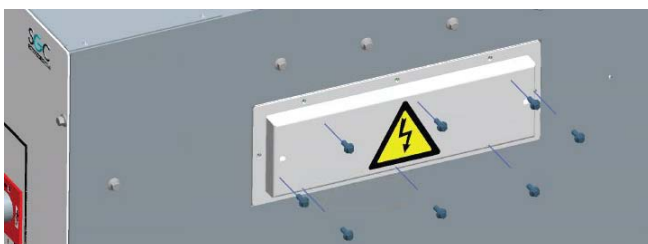


Figure 15: Remove protective cover

Remove the protective cover (if present) by means of the 8 bolts (Figure 16).



**Figure 16: Dummy plug**

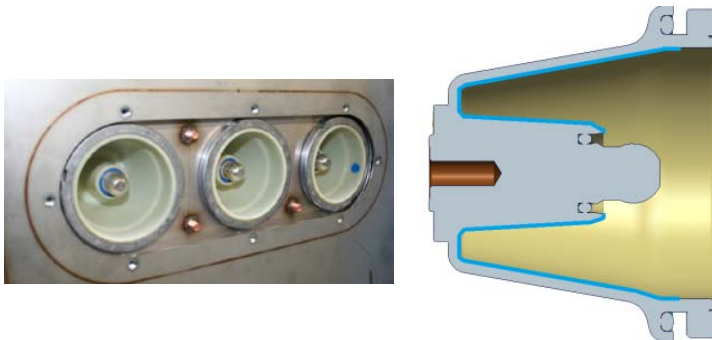
Remove the insulating dummy plugs (if present).



**Figure 17: Protective cover**

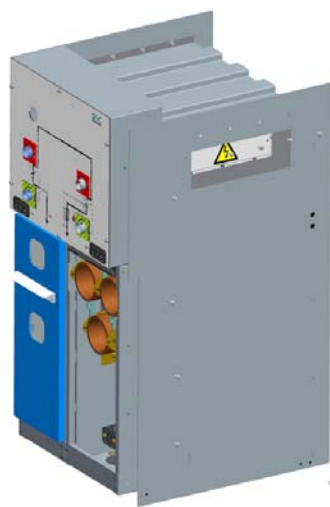
When the above mentioned steps are performed in the factory, the DR-6E will be delivered with protective caps.

Those should be removed as well when the busbar connection will be made.



**Figure 18: Cleaning of the extension**

Clean the interior of the extension bushings. No dust or other contamination may be present. Distribute the silicone grease evenly over extension bushing like indicated by the blue line in Figure 18.



**Figure 19: Disengage end panel**

Disengage the end panel on the opposite side. (Figure 19).

**The protective cover should not be removed!**

The appended DR-6E is now ready to be mounted.

## 4 ASSEMBLING OF EXTENDIBLE RMU'S DR-6E

### 4.1 Positioning

Once both units are prepared like described in §3.2 and §3.3 and the fixation clips are installed like mentioned in §3.1, the assembling of both extendible units can be started.

Position de appended DR-6E next to the busbar insulation and move the DR-6E backwards, the fixation clip will limit this movement.

The DR-6E should now be moved side wards like indicated in Figure 20. The grey surface of the busbar insulation will now enter the extension bushing.

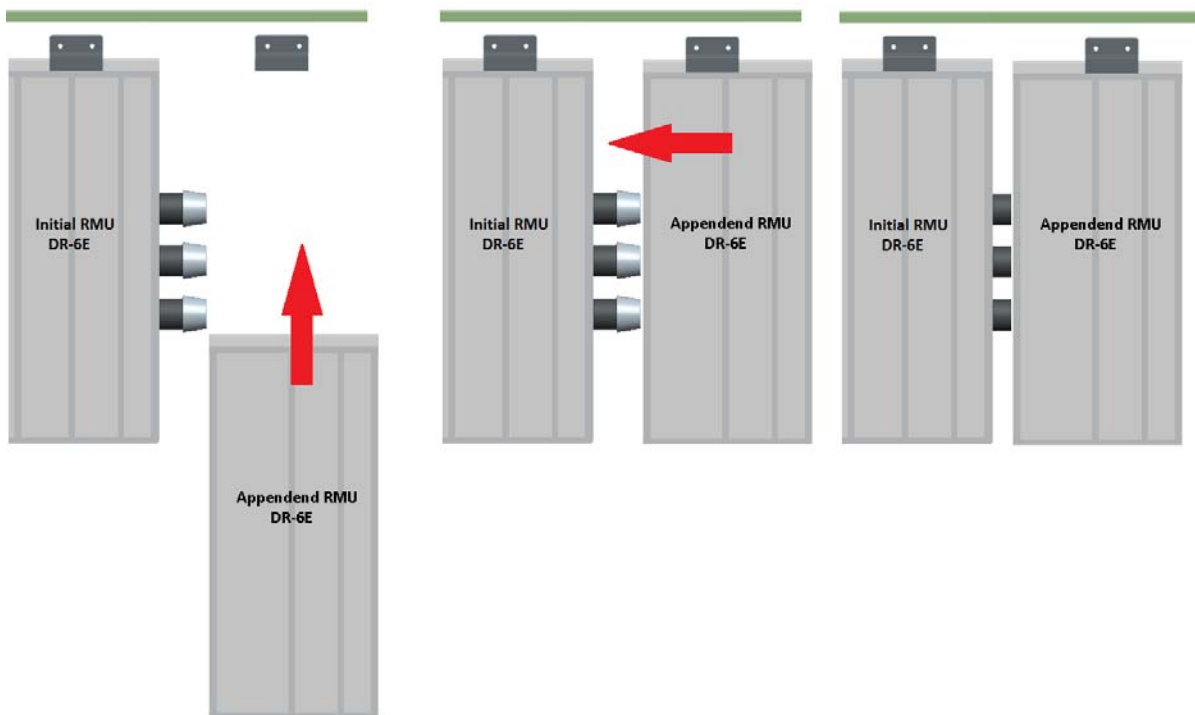
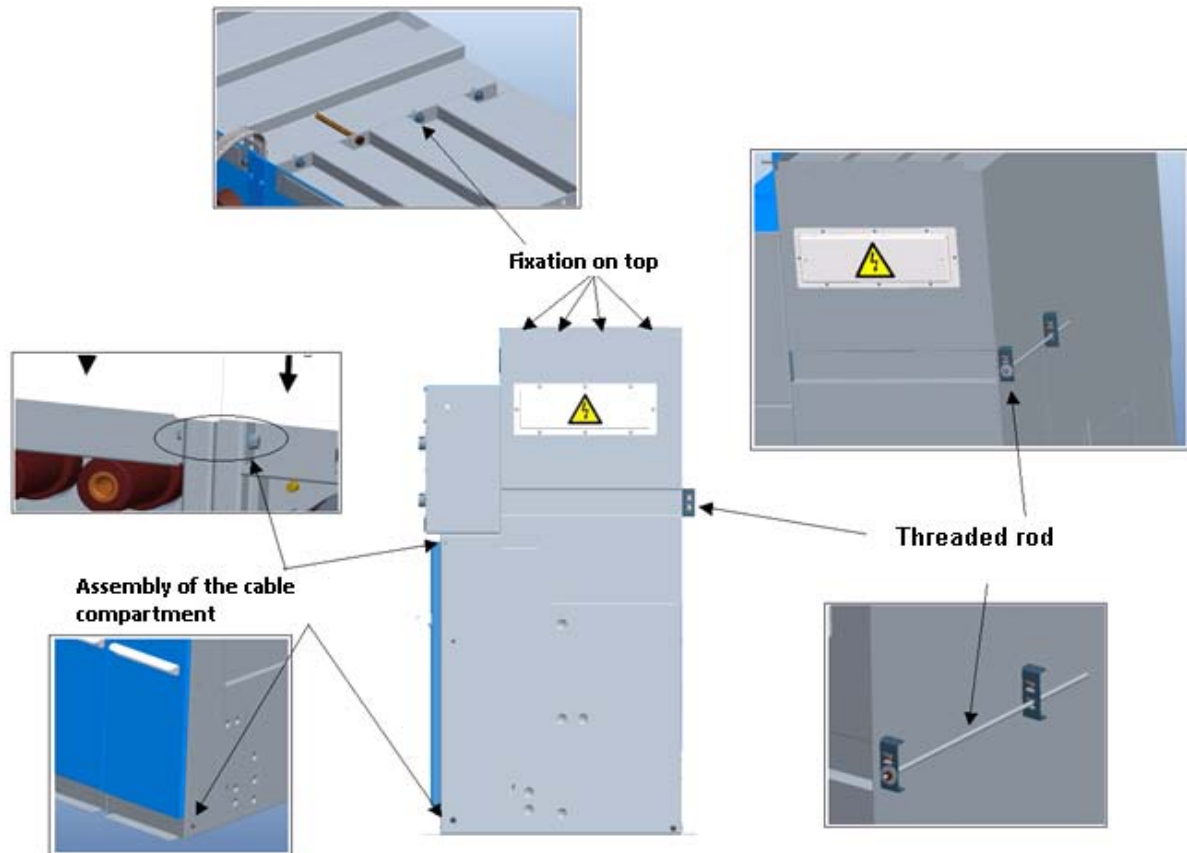


Figure 20: Assembly DR-6E

## 4.2 Joining the DR-6E assembly

Both DR-6E assemblies can be joined together by tightening of 7 connection points.

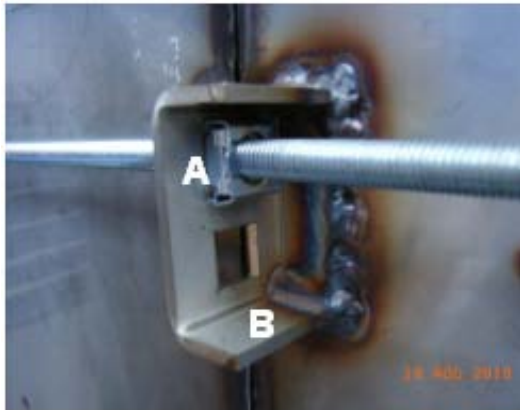


**Figure 21: Overview of the connection points for joining both RMU'S**



Tightening evenly all 7 connection points to ensure a parallel movement of the appended RMU.  
During this operation, permanently ensure the proper alignment of the extension busbar and insulation.





**Figure 22: Support on back plate DR-6E**

The cage nut "A" should be placed alternately.

If necessary: reposition the cage nut "A" on the support "B" of the appended DR-6E.



**Figure 23: Threaded rod**

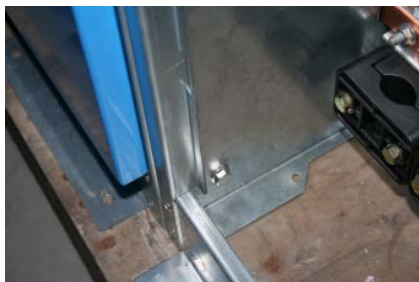
Provide the threaded rod with a flat washer and a nut M8 (supplied in kit).

Insert the threaded rod through the free opening in the support "B2" and screw it into the support "B2" with cage nut.



**Figure 24: Connection 1 cable compartment**

Place the bolt M8 x 100 and nut at the top of the cable compartment like indicated in Figure 24.



**Figure 25: Connection 2 cable compartment**

Place the bolt M8 x 70 and nut at the bottom of the cable compartment like indicated in Figure 25.



Place the 4 bolts M8x70 and nuts on the roof of coupled unit.

**Figure 26: Connection on top of DR-6E**



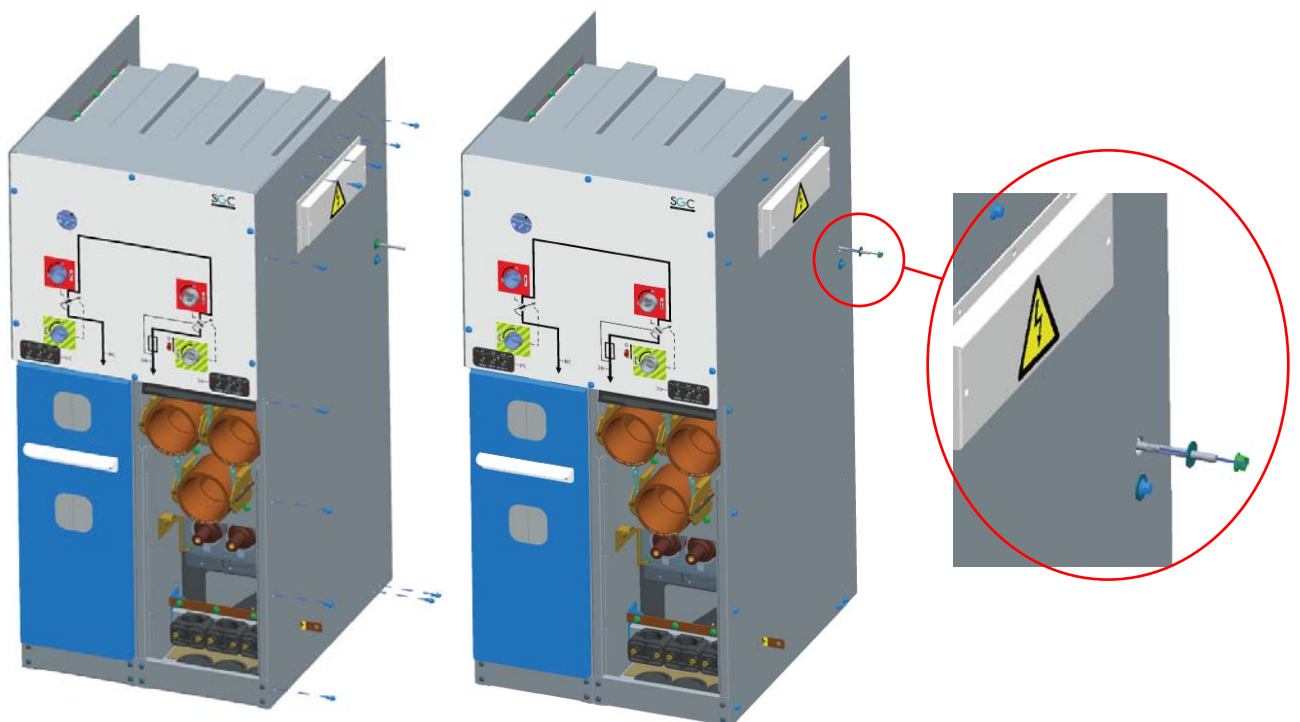
Tightening evenly all 7 connection points to ensure a parallel movement of the appended RMU. During this operation, permanently ensure the proper alignment of the extension busbar and insulation.

**Anchor the front of the DR-6E like described in §4 of the DR-6C installation manual.**

### 4.3 Reinstall end panel DR-6E

The end panel which has been disengaged in Figure 19 needs to be refitted after the joining both extendible RMU's DR-6E. The fixing material can be re-used for this purpose.

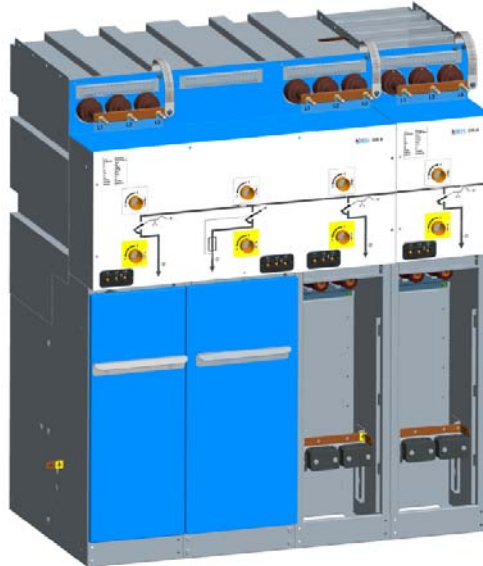
An additional plane washer and nut M8 is supplied in the kit for mounting on the threaded rod onto the end panel. If necessary, reposition the mounted bolt in the end panel (detail Figure 27).



**Figure 27: Reinstalling end panel**

## 4.4 Continuity of earthing

In each double extendible DR-6E, an interconnection copper is installed in the left cable compartment. This should be used to connect both earthing strips.



## 5 INITIAL COMMISSIONING

Verify the installation manual of the DR-6C for all necessary actions and run all necessary tests before commission.

The actual connection to the MV grid and the initial commissioning of the medium voltage switchgear can be done by qualified and trained staff employed by the power supply company only, observing the locally applicable safety regulations.