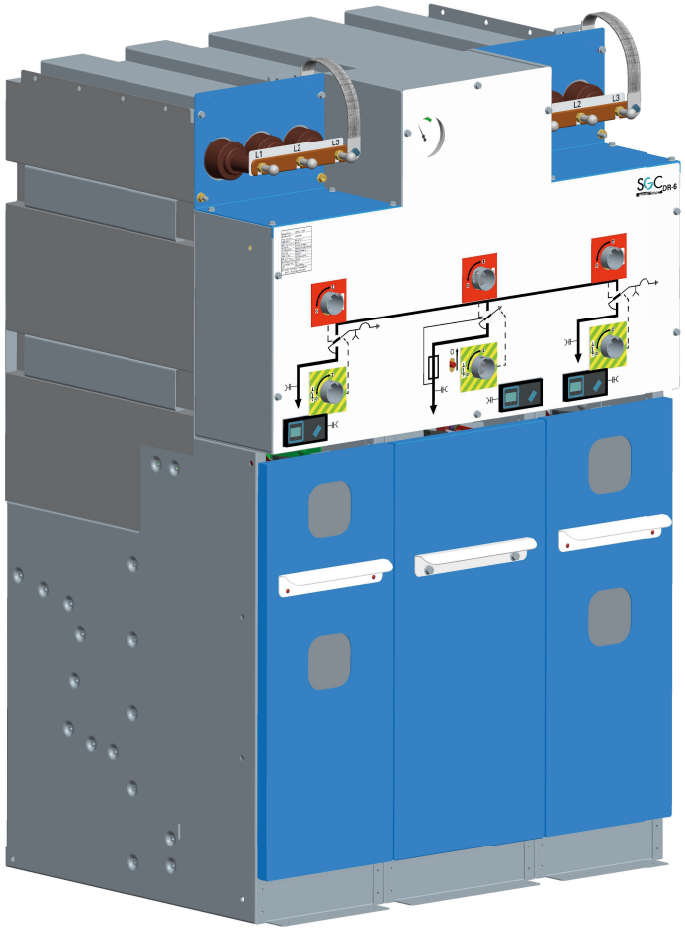
DR-6 C DV

MEDIUM VOLTAGE SWITCHGEAR

SF_6 GAS INSULATED COMPACT SWITCHGEAR

WITH TEST AND MEDIUM VOLTAGE CABLE INJECTION SYSTEM



Installation manual

SGC SwitchGear Company

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PREFACE

This document

This document is intended as a reference with which qualified and trained operators can transport, install, use and maintain the medium voltage switchgear in a safe and economic way.

In this document the expression “medium voltage switchgear” is used to indicate an assembly of functional units DR-6 that, connected together, form a customer specific transformation or distribution switchgear. See in this regard “General description”

The chapters and sections are numbered. The page numbering (consisting of the chapter number and the page number) and the document code can be found at the bottom of each page.

In the documentation the words “left”, “right”, “front” and “behind” are used to indicate a specific part of the medium voltage switchgear. The reference position is always the position of the operator standing at the front of the cubicle or of the switchgear.

Pictograms and safety symbols used in and on the medium voltage switchgear.

Depending of the model, the following pictograms may be used on the medium voltage switchgear.

WARNING
Danger: electrical voltage
Access to the particular cubicle is only allowed after the cubicle itself, the directly following and the previous cubicle are voltage free..

CAUTION
Prohibited from drilling
It is strictly forbidden to drill the surfaces provided with this pictogram.

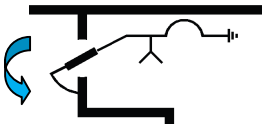
Pictograms used in the documentation

In the user manual of this medium voltage switchgear, the following pictograms are used :

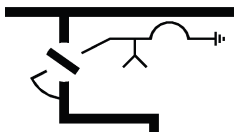
ATTENTION!
Procedure that can – when not carried out with the necessary care – result in damage to the medium voltage switchgear, the surrounding area or the environment.

WARNING
Danger: presence of electrical voltage

Notes, suggestions and advices



Before carrying out the work, put the concerned functional unit, the downstream functional unit and the upstream functional unit in the boucle free of voltage.



Before carrying out the work, open the load break switch and the earthing switch.

Consult the indicated information sources first.

Protect the medium voltage switchgear from water and/or damp.

Related documentation

The following technical documentation is available for the medium voltage switchgear :

- Transport manual DR-6 C DV
- User manual DR-6 C DV

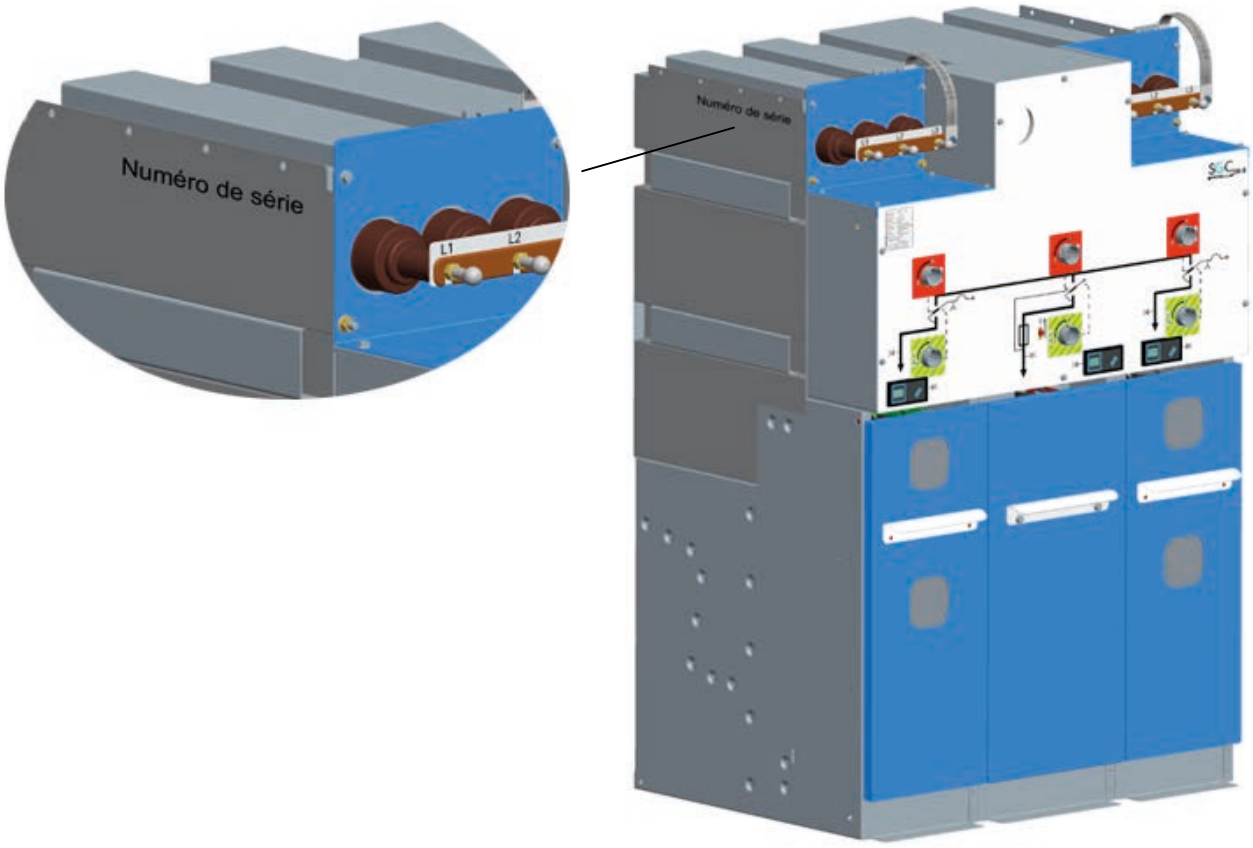
Service and technical support

For information concerning specific settings, maintenance or repair work that is not mentioned here, please contact SGC - SwitchGear Company nv.

- In this case, always mention the following data's:
  - Type of the switchgear and voltage
  - Serial number of the switchgear

Where to find these information

Every medium voltage switchgear or assembly of functional unit is fitted with an identification plate and a serial number stamped on the left lateral side wall of the compact switchgear or of the functional unit.



General safety directions and instructions

SGC - SwitchGear Company nv. does not accept any liability for damage or injury caused by the strict non-observation of the safety directions and instructions or by negligence during installation, use, maintenance or repair of the medium voltage switchgear and eventual associated options.
Depending on the specific conditions of use of the options fitted, extra safety instructions may be necessary. Please contact immediately SGC - SwitchGear Company nv. if you encounter a potential danger when using the medium voltage switchgear.

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

User manual

- Anyone who uses or operates the medium voltage switchgear must know the contents of this user's manual and follow scrupulously the contained directions. The owner / operator must teach the users in accordance with this user's manual and take into account all instructions and indications.
- Never change the order of the actions to be taken.
- The user manual should always be placed in the vicinity of the medium voltage switchgear.

Pictograms and safety symbols

The pictograms, symbols and instructions fitted on the medium voltage switchgear are a part of the safety equipment. They may therefore not be covered or removed. They have to be present and clearly visible throughout the entire lifetime of the medium voltage switchgear.

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

Operators

The performance of the works described (transport, installation, use and maintenance) is strictly reserved for operators trained and qualified to do so who are familiar with the dangers that can occur when using medium voltage switchgears. Temporary staff and personnel in training may not operate the medium voltage switchgear in any way.

Technical specifications

- The technical specifications may not be changed.
- It is strictly forbidden to modify the medium voltage switchgear or its components.

Transport, storage, installation, use and maintenance

- See respectively:
  - "Safety instructions - transport"
  - "Safety instructions - storage"
  - "Safety instructions - installation"
  - "Safety instructions - use"
  - "Safety instructions - maintenance"

Intended use

The medium voltage switchgear is exclusively designed to be used as a transformer or distribution switchgear, in accordance with the specifications and conditions provided by SGC - SwitchGear Company nv. Any other or further use is not in conformity with the purpose [1].

[1] "Intended use" as laid down 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 use that can be deduced from the

SGC - SwitchGear Company nv. accepts no liability for any damage or injury resulting from a not intended use.

The medium voltage switchgear is in accordance with the actual standards and guidelines.

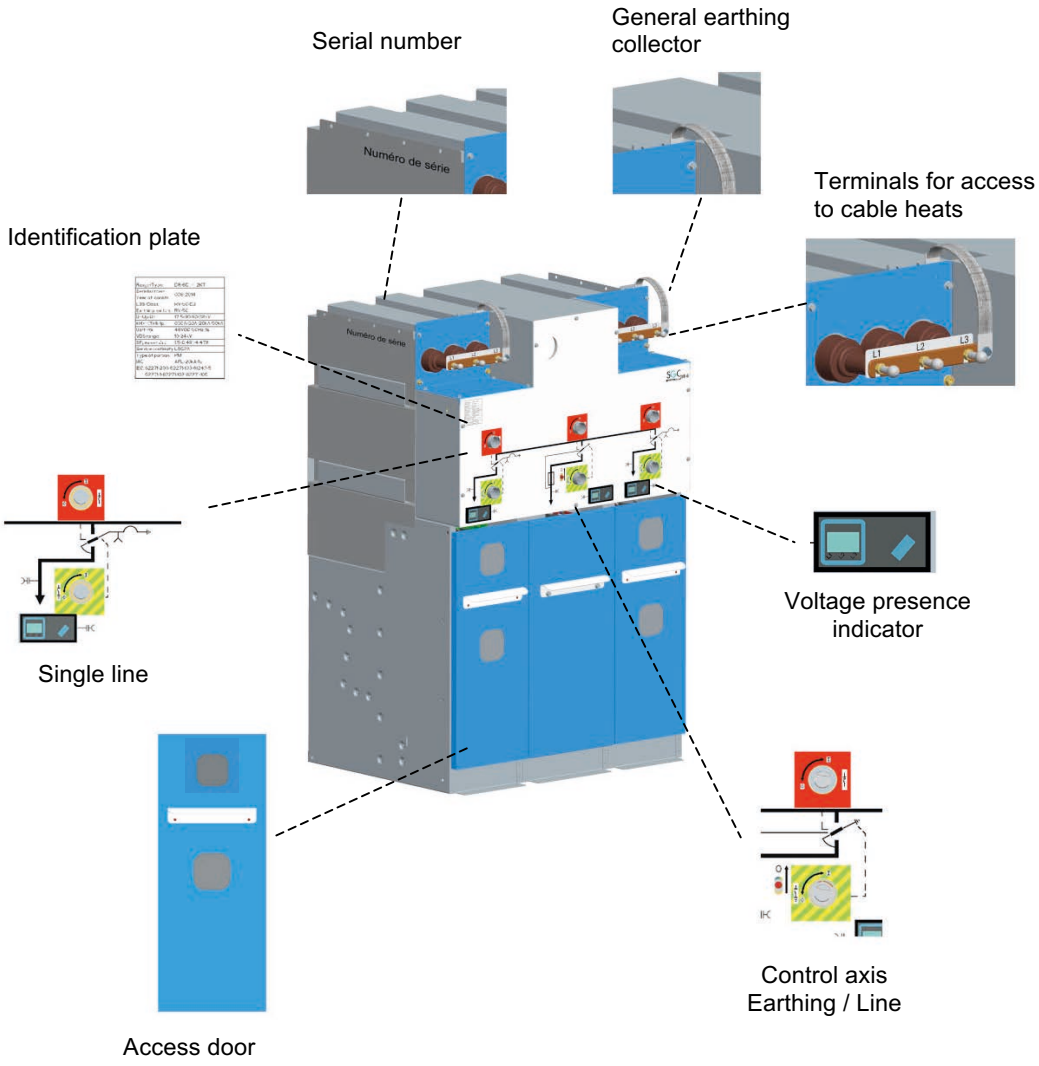
- Only use the medium voltage switchgear in technically perfect condition, in accordance with the intended use described above.

Keep always sealed connections intact at all times. Breaking the sealed connections irrevocably voids any claims under guarantee.

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 PRESENTATION OF THE SWITCHGEAR

1.1 Description



1.2 Physical specifications – Overall dimensions

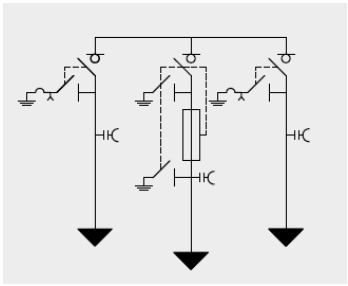
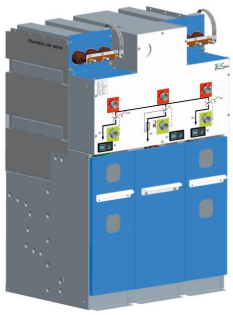
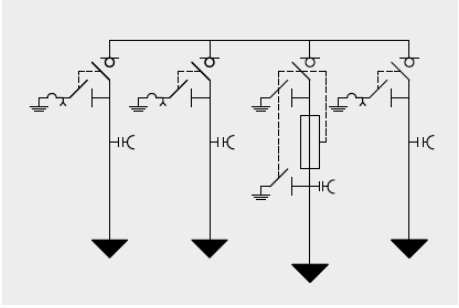
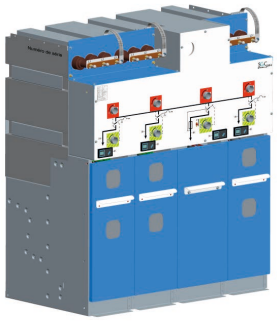
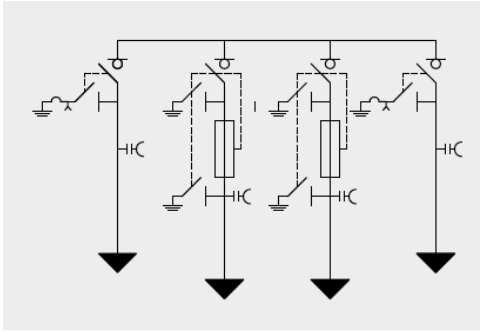
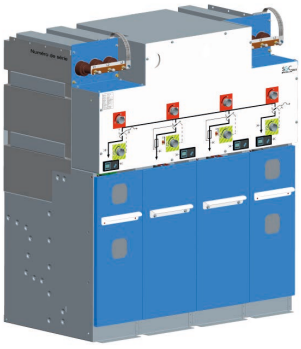
Product range	Total width (mm)	Depth (mm)	Total height (mm)	weight (kg)	Gas volume SF_6 (l)
DR-6 C DV 2KT (2T + 1K)	950	755	1510	450	387
DR-6 C DV 3KT	1250	755	1510	550	492
DR-6 C DV 2K2T	1300	755	1510	550	566

1.3 Type definitions and functions

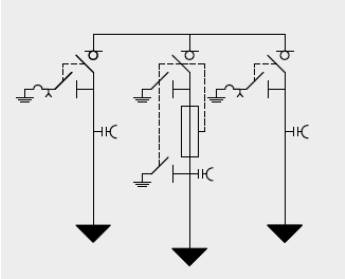
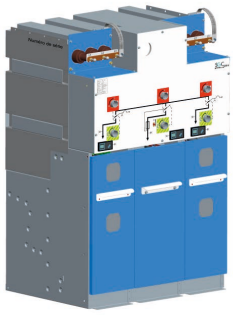
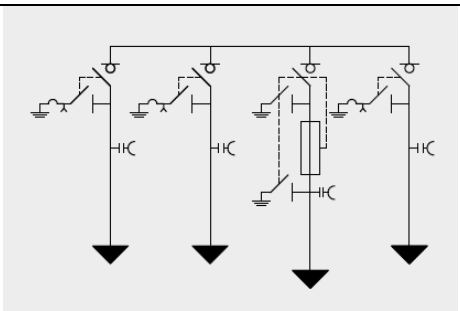
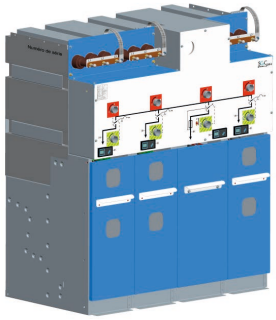
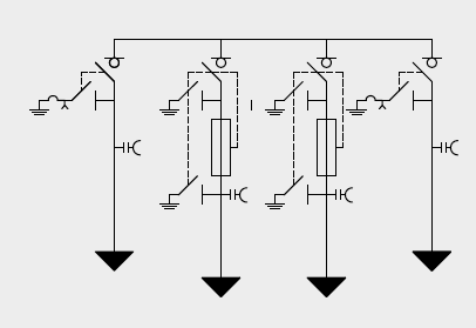
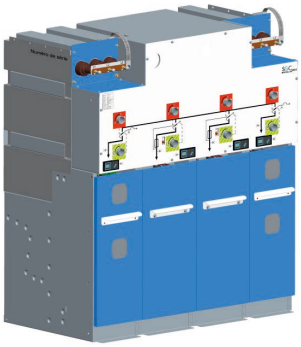
1.3.1 Monobloc switchgear DR-6 C(+) DV 2KT

DR-6	Denomination of the MV monobloc compact switchgear family
C	Compact range (non-extensible)
DV	Test and medium voltage cable injection system
2	Number of repetitive functions
K	Function K (Incoming load break switch)
T	Function T (Load break switch fuse combination)
+	Arc limiting device

1.4 Single lines of the functions DR-6 C DV

		Compact monobloc DR-6 version Compact – DR-6 C DV Type : DR-6 C DV 2KT Two load break switch incomers and one fuse protection
		Compact monobloc DR-6 version Compact – DR-6 C DV Type : DR-6 C DV 3KT Three load break switch incomers and one fuse protection
		Compact monobloc DR-6 version Compact – DR-6 C DV Type : DR-6 C DV 2K2T Two load break switch incomers and two fuse protection

1.5 Single lines of the functions DR-6+ C DV

		Compact monobloc DR-6 version Compact – DR-6 C+ DV Type : DR-6 C+ DV 2KT Two load break switch incomers and one fuse protection
		Compact monobloc DR-6 version Compact – DR-6 C+ DV Type : DR-6 C+ DV 3KT Three load break switch incomers and one fuse protection
		Compact monobloc DR-6 version Compact – DR-6 C+ DV Type : DR-6 C+ DV 2K2T Two load break switch incomers and two fuse protections

2 INSTALLATION

2.1 Safety instructions - installation

2.1.1 General

Installation of the medium voltage switchgear is restricted to qualified and trained operators with strictly observance of the locally applicable safety instructions and guidelines.
The connection and the first putting into service must be done by qualified and authorized staff who are employed by the power supply company.

- Also see “General safety and instructions”.
- Never leave tools or other materials in or on top of the medium voltage switchgear.
- Install the medium voltage switchgear only in areas that are fully in compliance with the following recommendation (IEC 60298).

2.1.2 Recommendations - installation area

The recommendations concerning the installation area are classified as follow:

- The floor surface
- The surrounding conditions
- The ventilation of the room
- The free height of the room
- The dimensions of the access doors to the room
- The freeway in front of the cubicles
- The internal arc withstand, it means room BB00 following the Belgian specifications of Synergrid C2/112

2.1.2.1 The floor surface

The floor on which the medium voltage switchgear will be installed must be sufficient strong and completely levelled. The maximum permissible level difference may not be higher than **2 mm/m.**

2.1.2.2 *Surrounding conditions*

The DR-6 C DV are designed for **indoor use and installation** under the following surrounding conditions

description	values
Ambient temperature	min. -25 °C - max. +50 °C
Relative humidity	min. 10% - max. 70% (without formation of condensation)
Installation height	max. 1.000 m above sea level

Table 1: Surrounding conditions

What practically means:

- Avoid installation in dusty areas
- Avoid installation in areas with high relative humidity
- Avoid installation in areas subject to lightning strikes
- Avoid installation in surroundings where the cubicles may be exposed to aggressive gases or liquids.

Contact SGC - SwitchGear Company nv if the cubicles must be installed in areas where the above requested surrounding conditions cannot be fulfilled.

2.1.2.3 *Ventilation*

- In function of the losses of the transformers, insure that there is a good ventilation in the installation area.
- Secure the ventilation openings so that little animals or vermin do not have access to the installation area.

Special care will be given to medium voltage switchgear containing one or more transformer functions. Refer to the table below when calculating the ventilation coefficient. The table below indicates the transformer losses in function of its power in the case of cast resin transformers.

Power of the transformer (in kVA)	P à (W)
100	1.605
160	2.175
250	2.850
315	3.412
400	4.012
500	4.837
630	5.745
800	6.787
1.000	7.875
1.250	10.350
1.600	12.450
2.000	16.125

Table 2: Overview of the losses in function of the power of a cast resin transformer

2.1.2.4 Free height of the installation area

The free height of an installation area must be at least **2200 mm.**
Some power supply companies, however, require more free height. The optimal height, accepted by the majority of the power supply companies is **2500 mm.**

2.1.2.5 Dimensions of the entrance doors of the installation area

The heights and widths indicated below refer to all doors accessing the installation area. These minimal dimensions also apply when the installation area is not directly accessible from the outside.

description	values
Height of the access door	min. 2 200 mm
Width of the access door	min. 100 mm + width of the widest cubicle

Table 3: Dimensions of the access doors

If the switchgear must be installed in a cellar, an entrance hatch must be foreseen whose length and width are 400 mm larger than the dimensions of the largest cubicle

.

2.1.2.6 Freeway in front of the switchgear

The freeway in front of the cubicles is depending of the arrangement of the medium voltage switchgear

2.1.2.7 Internal arc protection

To prevent major material damages and serious injury or electrocution in the (unlikely) event of an internal arc, the following installation instructions apply :

- Leave at least a free space between the rear wall of the cubicle and the wall of the installation area as described in figure 1 below. This implantation corresponds to the assembly of which the lateral closing plates are going until the rear of the installation area. In this way, the free space behind the cubicles is completely closed.

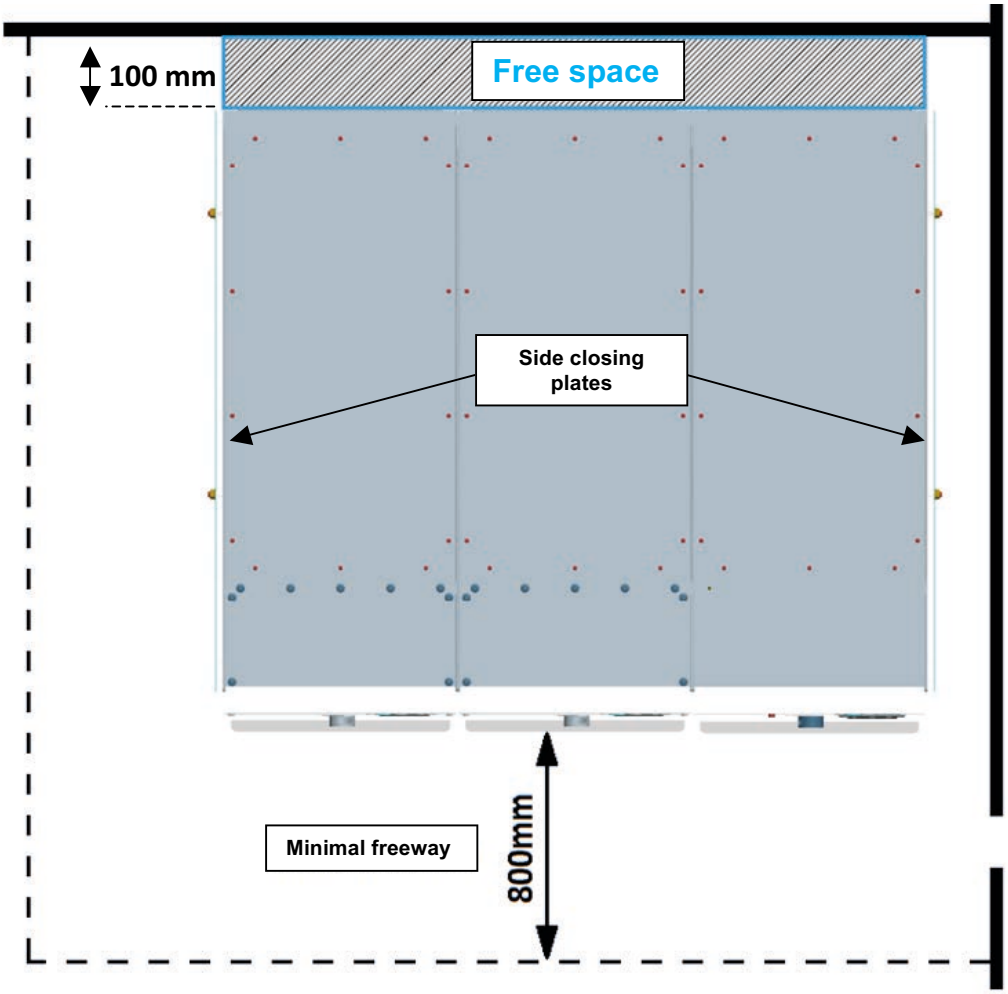


Figure 1: Elevation view of the installed cubicles

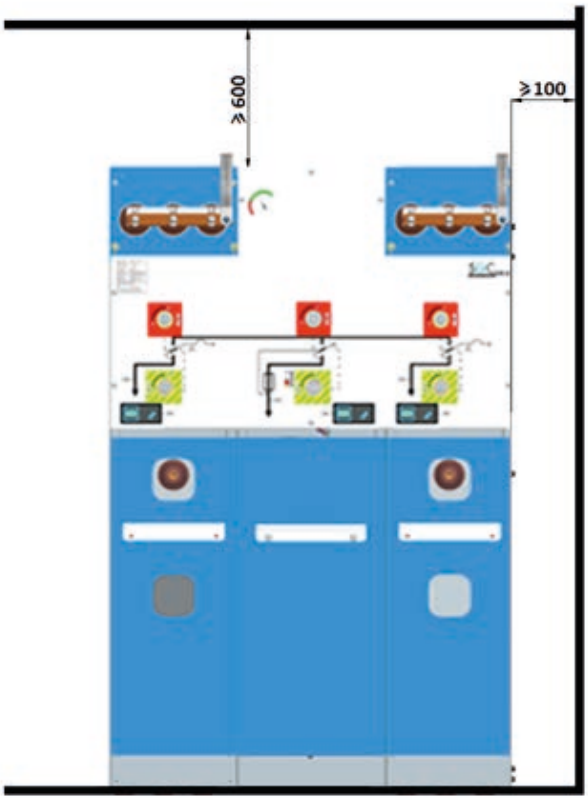


Figure 2: Free height is minimum ≥ 600 with a DR-6 C + DV installation

Anchor the medium voltage switchgear as described in the installation manual.

In medium voltage switchgear installed in accordance with the above mentioned installation procedure, the (unlikely) internal arc will always be restricted to the compartment in which it has occurred.

3 INSTALLATION INSTRUCTIONS: INSTALLATION OF THE DR-6

3.1 Installation in presence of a cable cellar

3.1.1 Generality

When installing a DR-6 compact switchgear, maximum protection is guaranteed to ensure the evacuation of the gases caused by an internal arc, to the expansion volume constituted by the cable cellar. In this way, the consequences of an internal arc are reduced to a minimum.

3.1.2 Conditions to be fulfilled

- Expansion volume of the cable cellar ≥ 0.7 m³
- Section of the evacuation to a secured area ≥ 0.04 m²
- Sealing of all other openings.

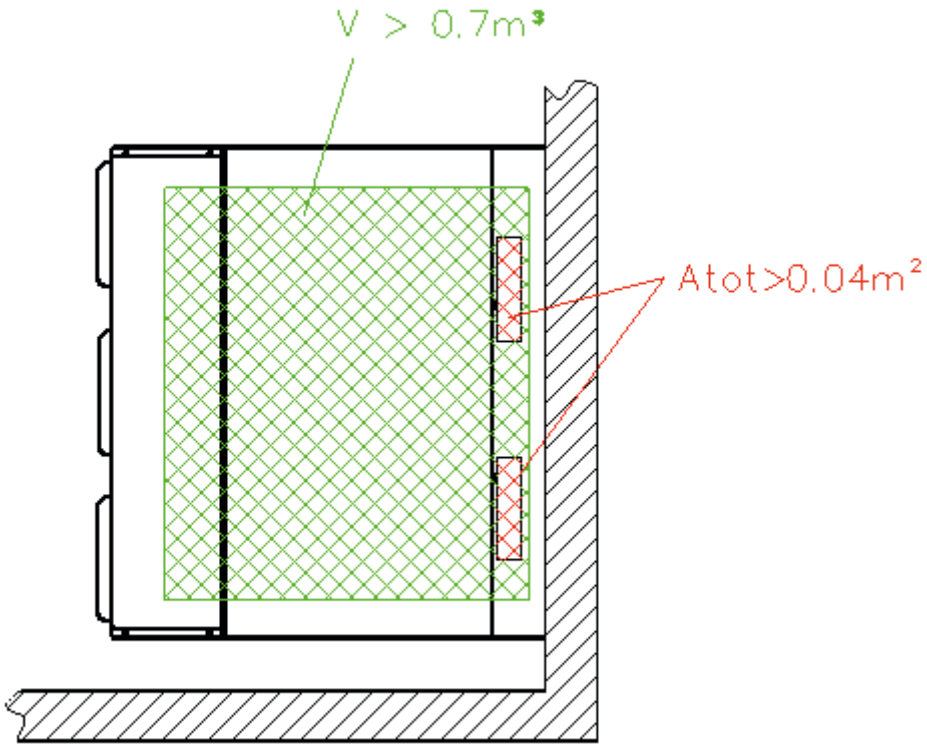


Figure 3: Elevation view of the installation

3.1.3 Gas exhausting way

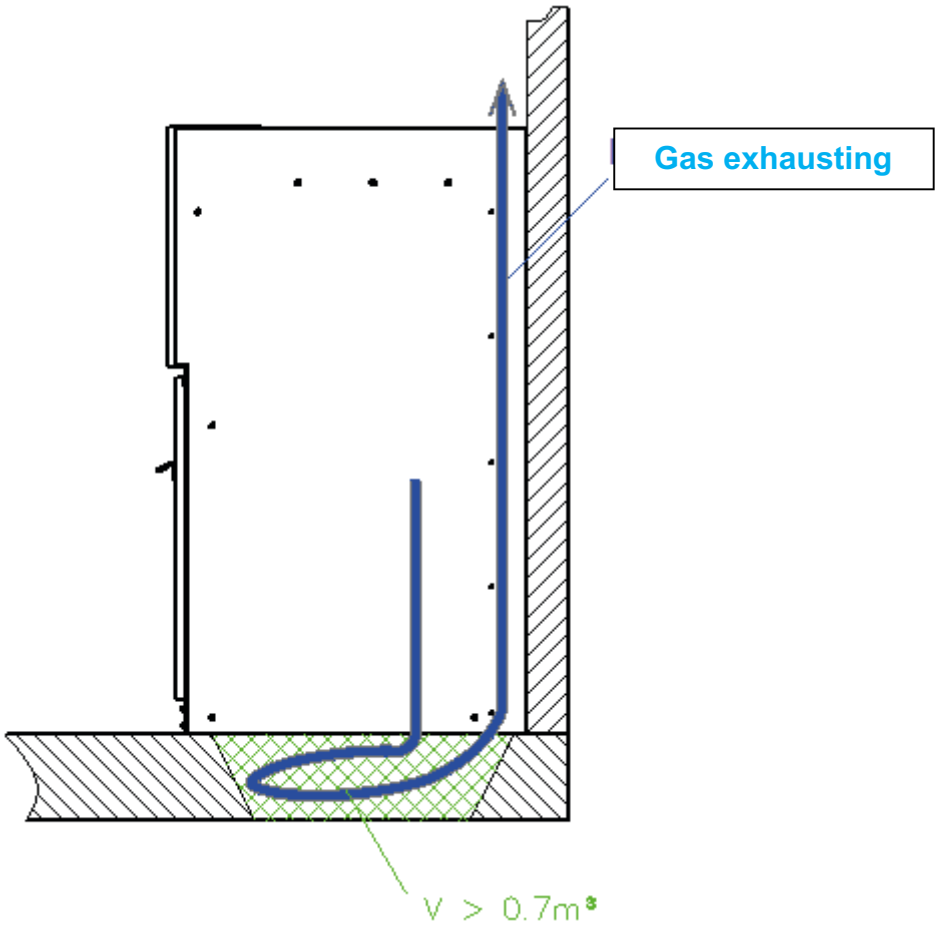


Figure 4: Gas exhausting way when installing a DR-6 in presence of a cable cellar (left lateral view of the installation)

3.2 In presence of an exhausting volume at the rear of the equipment

3.2.1 Generality

When installing a DR-6 compact switchgear, maximum protection is guaranteed to ensure the evacuation of the gases caused by an internal arc, to the expansion volume at the rear of the equipment. By this, the consequences of an internal arc are reduced to a minimum to create the safest operating conditions for the operator.

3.2.2 Conditions to be fulfilled

- Expansion volume of the cellar ≥ 0.7 m³
- Section of the evacuation to a secured area ≥ 0.04 m²
- Sealing of all other openings.

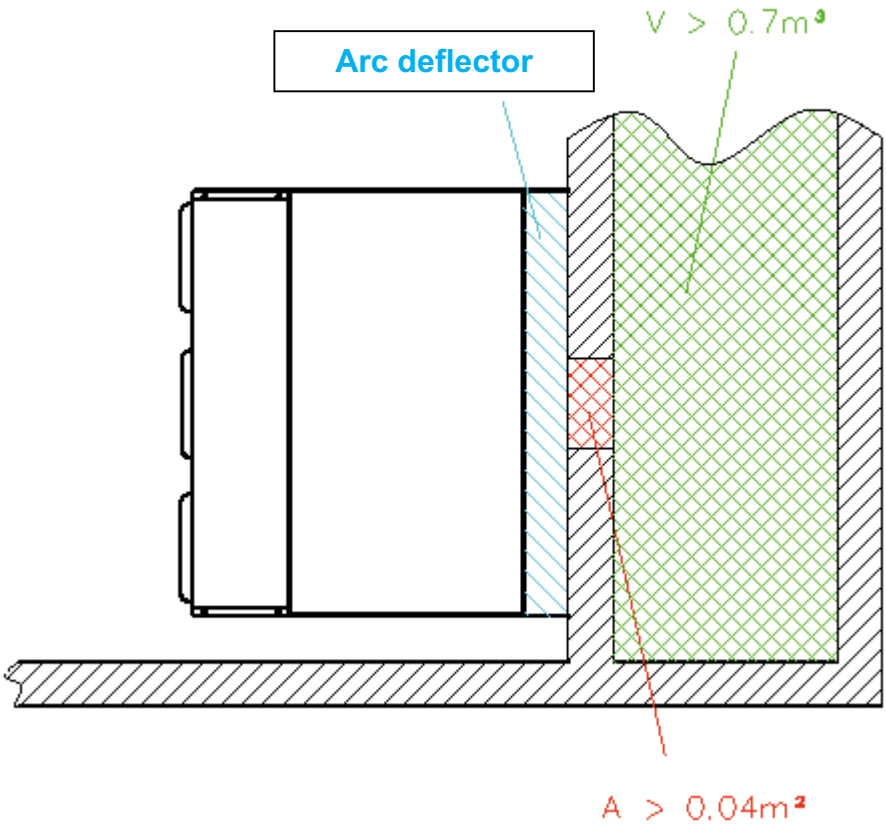


Figure 5: Elevation view of the equipment

3.2.3 Material to install

- DR-6 Ring Main Unit, equipped with its lateral closing plates
- Arc deflection kit, closing of the upper side (DR029670)

3.2.4 Gas exhausting way

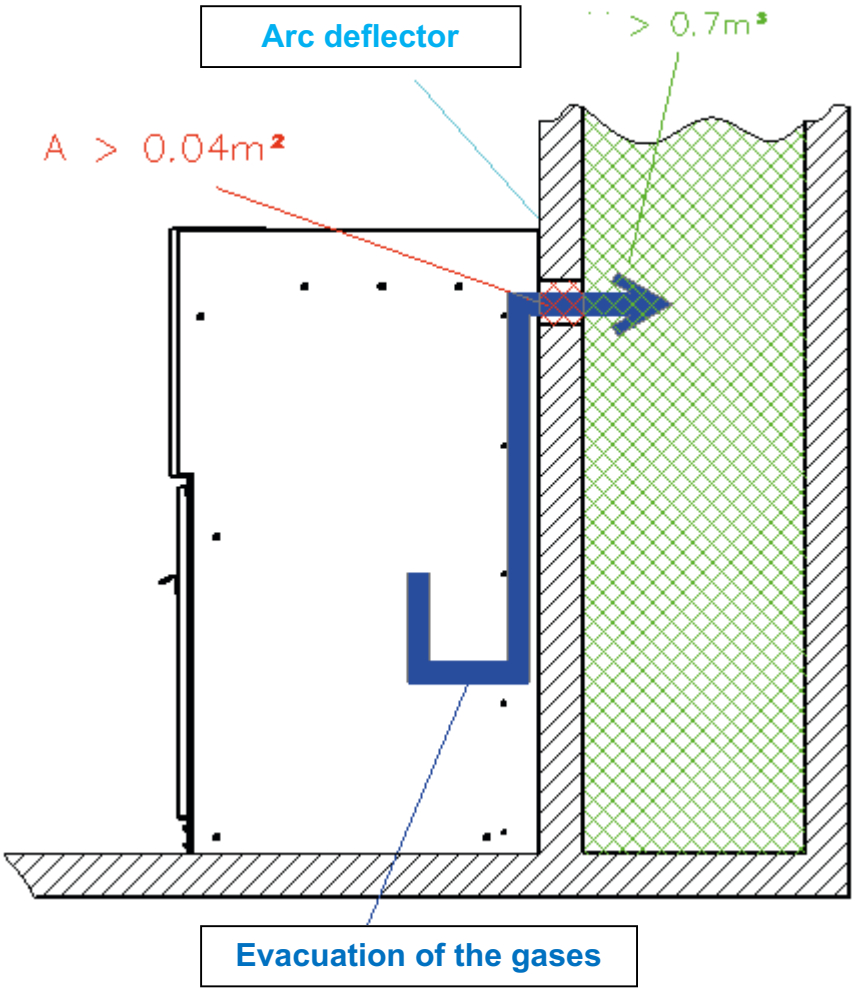


Figure 6: Gas exhausting way when installing a DR-6 in presence of an expansion volume at the rear of the equipment (left lateral view of the installation)

3.3 Installation in absence of a cable cellar or a transformer room.

3.3.1 Generality

When installing a compact DR-6 switchgear, in absence of a cable cellar or a transformer room, special protection is applied to ensure the evacuation of the gases, caused by an internal arc, to a certified DR-6 cooling plinth. This cooling plinth is used as a buffer volume. By this, the consequences of an internal arc are reduced to a minimum to create the safest operating conditions for the operator

3.3.2 Conditions to be fulfilled

The installation, may in no way, limit the proper functioning of the over pressure deflectors located in the cooling plinth.

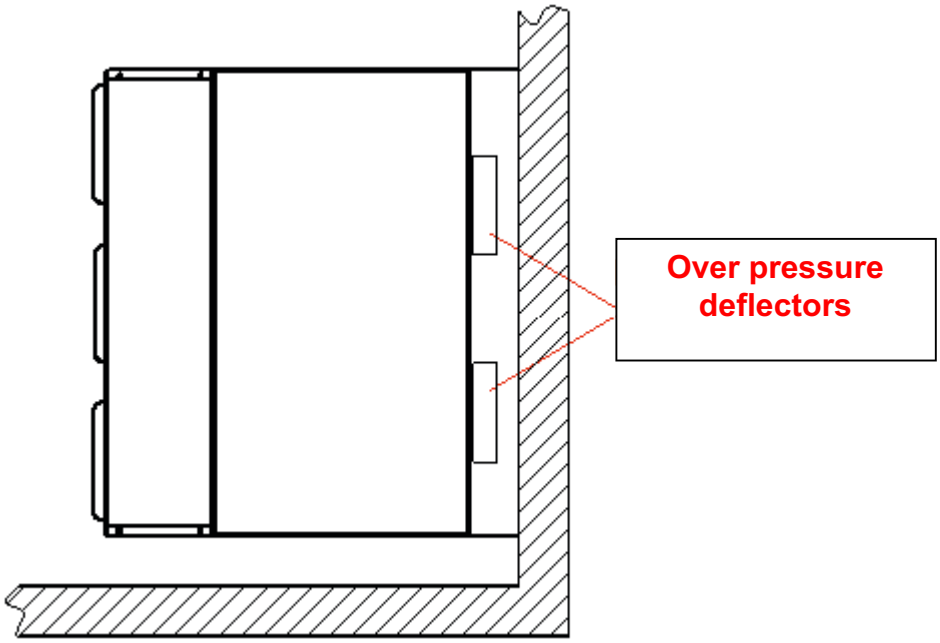


Figure 7: Elevation view of the equipment

3.3.3 Material to install

- DR-6 C Ring Main Unit
- DR-6 C cooling plinth (DR029670)

3.3.4 Gas exhausting way

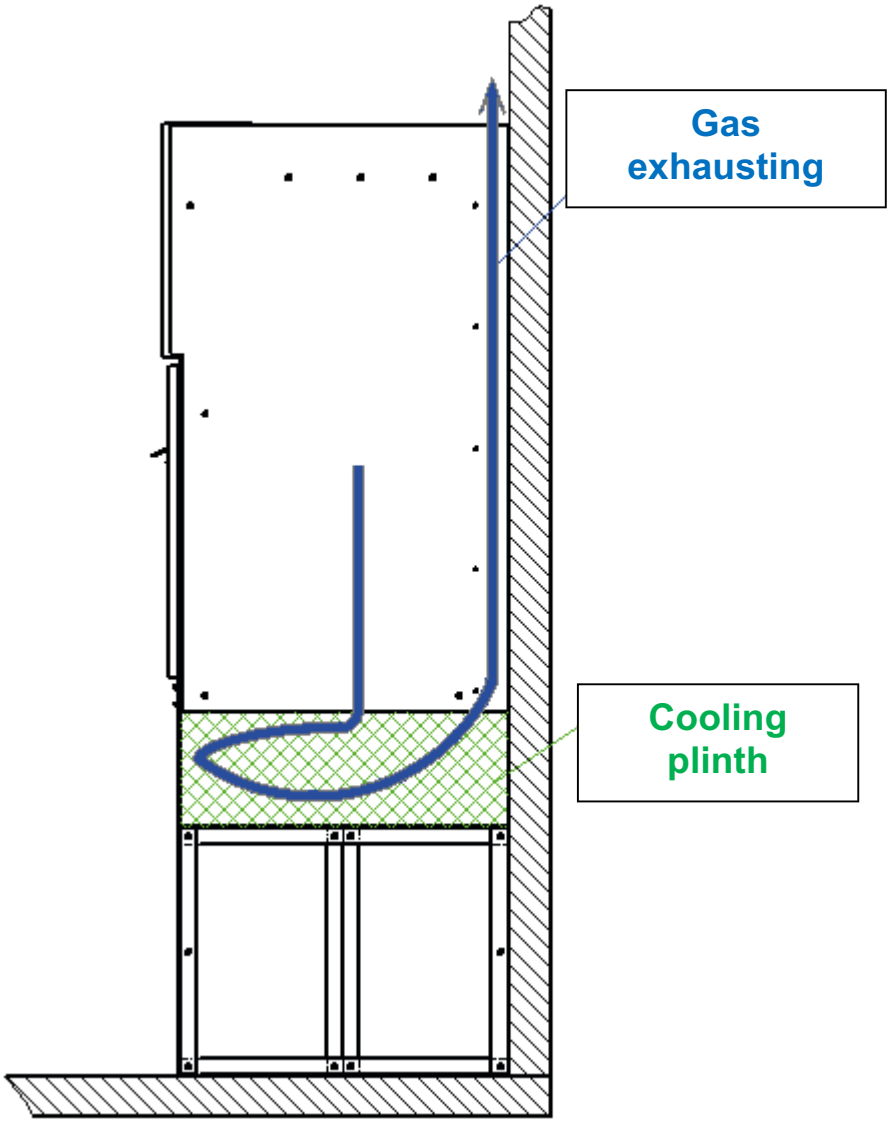


Figure 8: Gas exhausting way when installing a DR-6 on its cooling plinth (left lateral view of the installation)

The height of the bedrock on which the cooling plinth is fixed, must be in relation with the standards relating to the bending radius of the cables.

4 INSTALLATION INSTRUCTIONS: INSTALLATION OF THE DR-6+

4.1 Installation in presence of a cable cellar

4.1.1 Generality

When installing a compact switchgear DR-6+, a maximum protection is guaranteed in the case of an internal arc. The internal arc is extinguished in less than 50 ms. This fast limitation of the internal arc limits any rise of internal pressure which prevents the evacuation of gas.

4.1.2 Conditions to be fulfilled

To offer a maximum protection in the unlikely event of a non-functioning of the internal arc limiting device (SV-50), an over pressure flap is foreseen. To guarantee the correct operation of the over pressure flaps, the free space between the rear of the equipment and the wall of the installation room must be respected. The installation may in no way limit the proper functioning of these over pressure flaps.

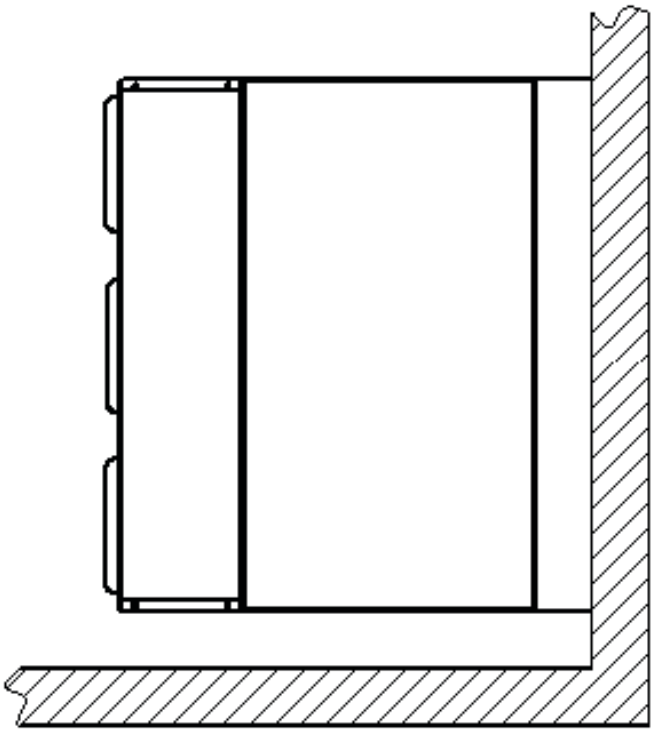


Figure 9: Elevation view of the equipment

4.1.3 Material to install

- DR-6+ Ring Main Unit

4.1.4 Gas exhausting way

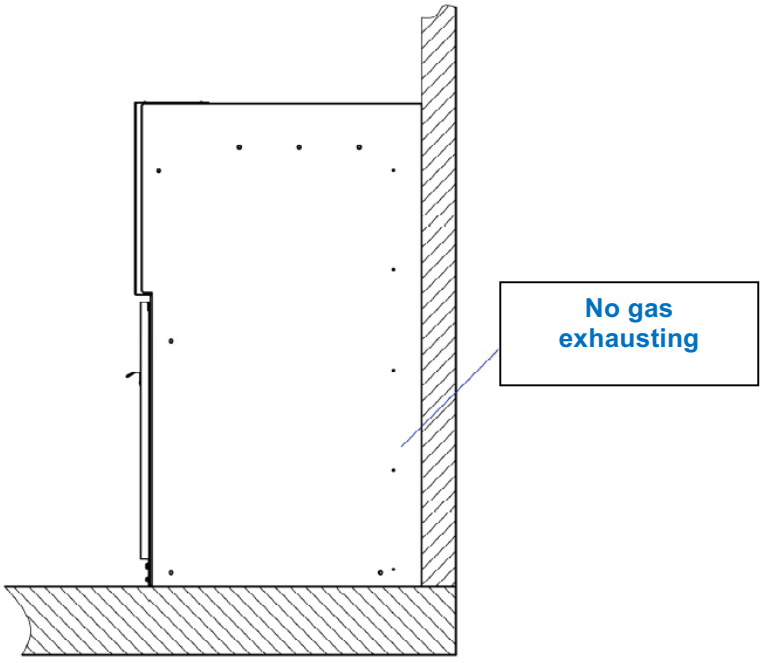


Figure 10: Gas exhausting way when installing a DR-6+ equipment in presence of a cable cellar (lateral view of the installation)

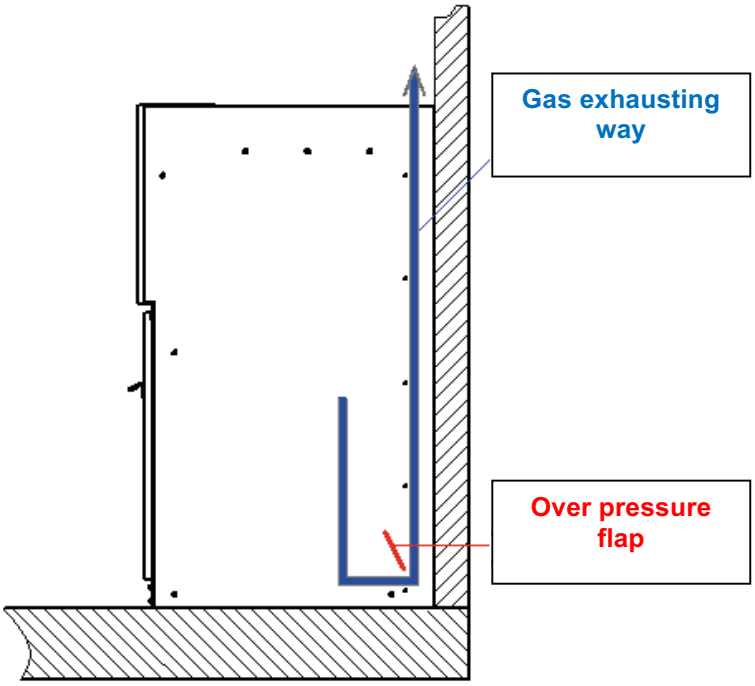


Figure 10: Gas exhausting way in the unlikely event of the non-functioning of the internal arc limiting device

4.2 Installation in absence of a cable cellar

4.2.1 Generality

When installing a compact switchgear DR-6+, a maximum protection is guaranteed in the case of an internal arc. The internal arc is extinguished in less than 50 ms. This fast limitation of the internal arc limits any rise of internal pressure which prevents the evacuation of gas.

4.2.2 Conditions to be fulfilled

To offer a maximum protection in the unlikely event of a non-functioning of the internal arc limiting device (SV-50), an over pressure flap is foreseen. To guarantee the correct operation of the over pressure flaps, the free space between the rear of the equipment and the wall of the installation room must be respected. The installation may in no way limit the proper functioning of these over pressure flaps.

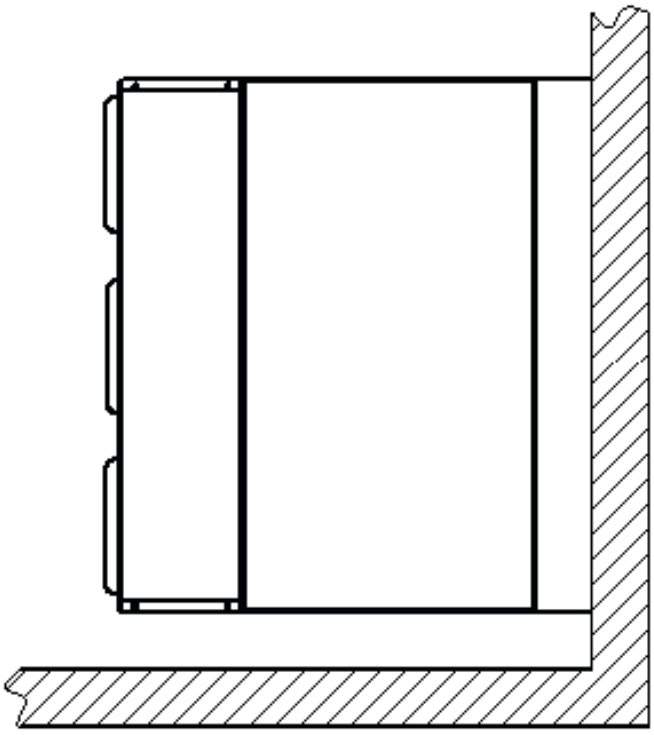


Figure 11: Elevation view of the equipment

4.2.3 Materiel to install

- DR-6+ Ring Main Unit

4.2.4 Gas exhausting way

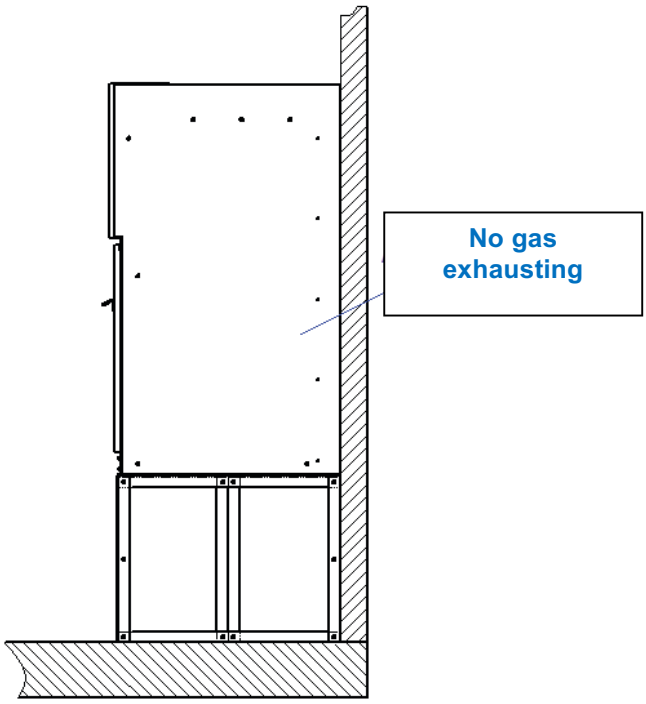


Figure 12: Gas exhausting way when installing a DR-6+ C equipment in absence of a cable cellar (lateral view of the installation)

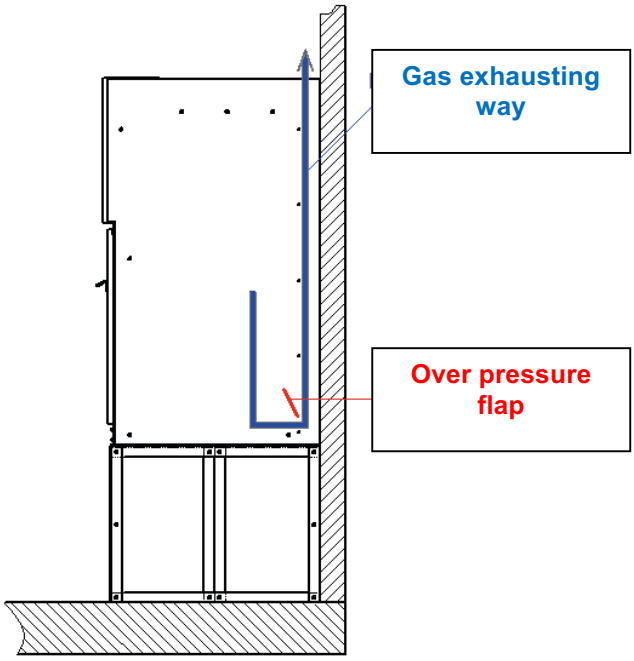


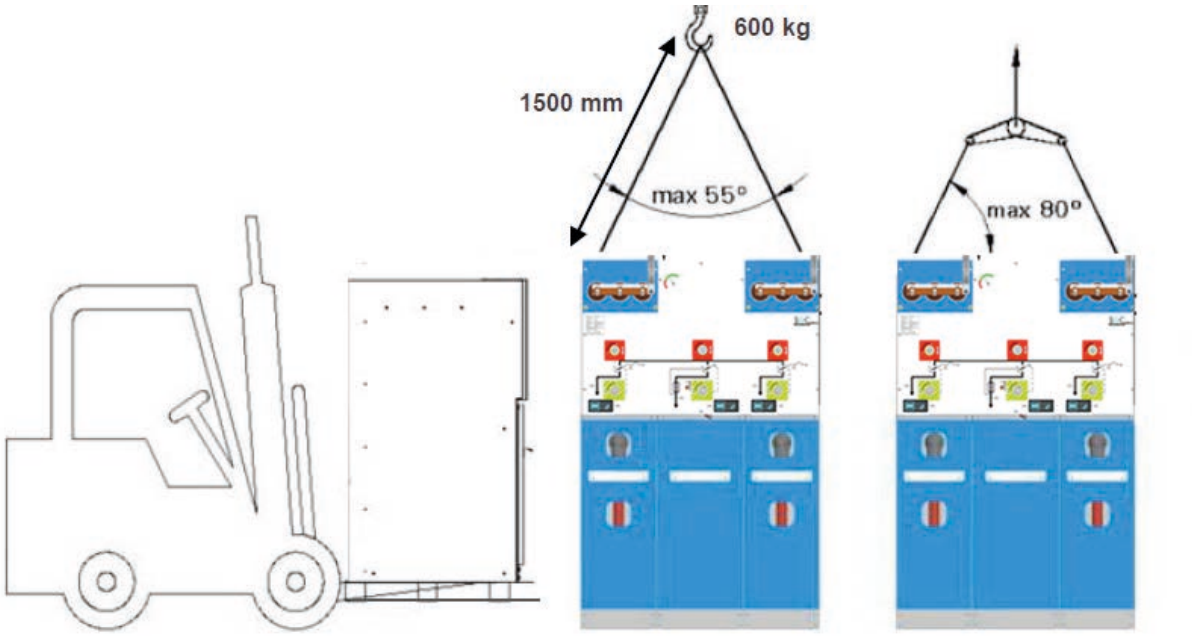
Figure 13: Gas exhausting way in the unlikely event of the non-functioning of the arc limiting device, installation in absence of a cable cellar

The height of the bedrock on which the cooling plinth is fixed, must be in relation with the standards relating to the bending radius of the cables.

5 HANDLING

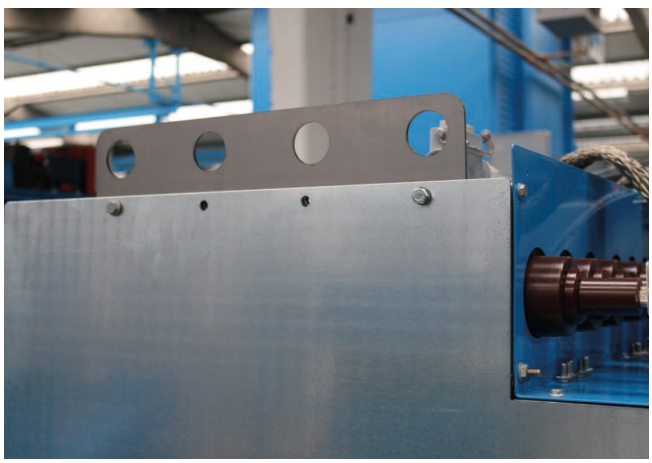
The material handling can be done as follow :

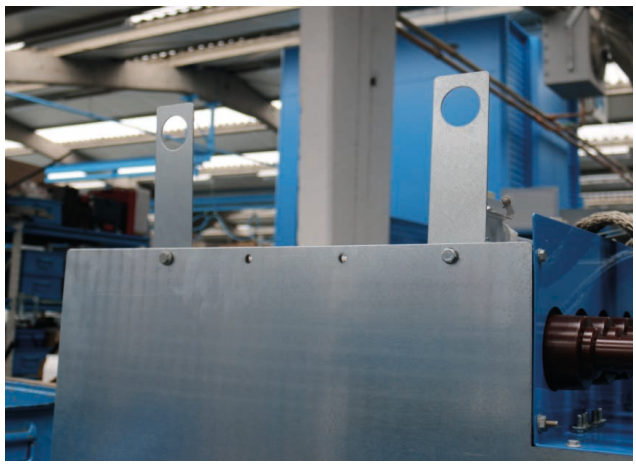
- With slings of a length of **3000 mm**, capable of supporting a load of **600 kg**
- With a **forklift**



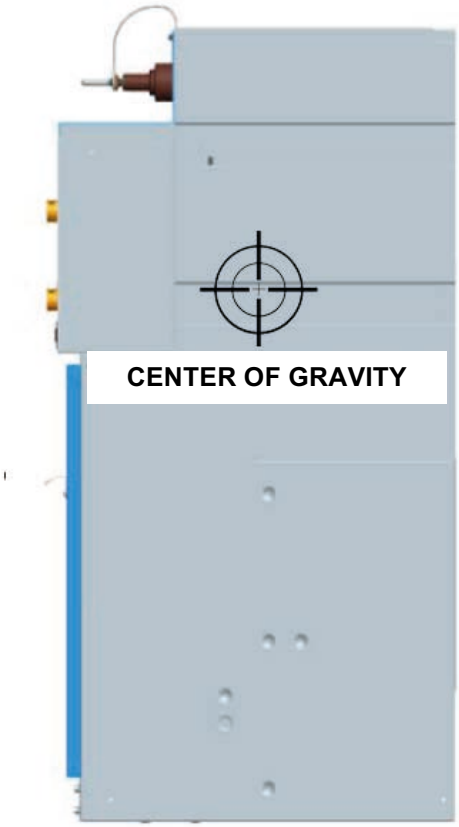
The choice will be made according to the conditions and possibilities available on site.

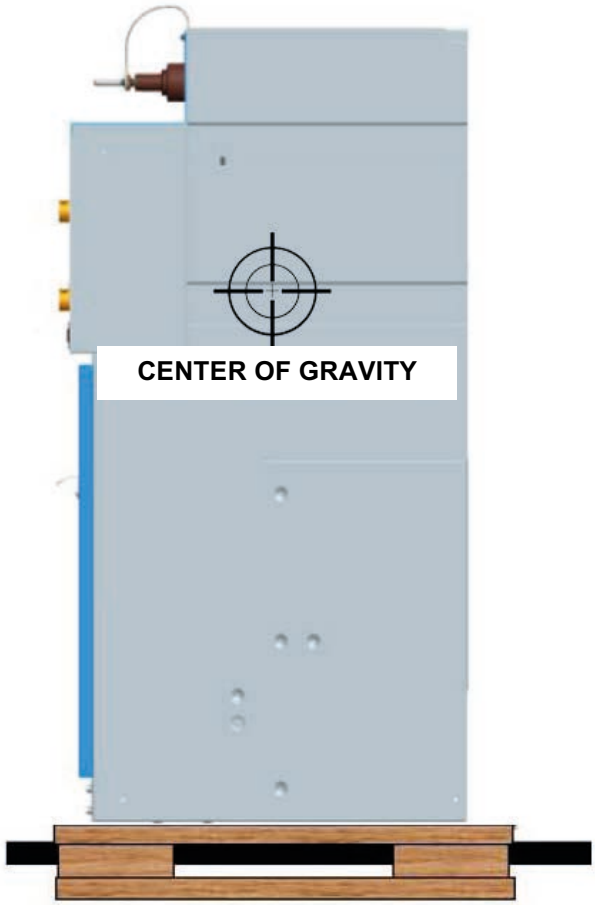
Material handling must always be done with the functional unit upright. Always use the **4 lifting eyes**, **2 on each side**.





When handling with a **forklift**, pay special attention to the center of gravity.





6 INSTALLATION

6.1 Anchor the medium voltage switchgear DR-6

6.1.1 Installing the fixing brackets

Before to install the medium voltage switchgear DR-6 at the definitive place, a fixing bracket must be fasten for every functional unit (see figure 15). For a 2KT configuration, fast 3 fixing brackets.

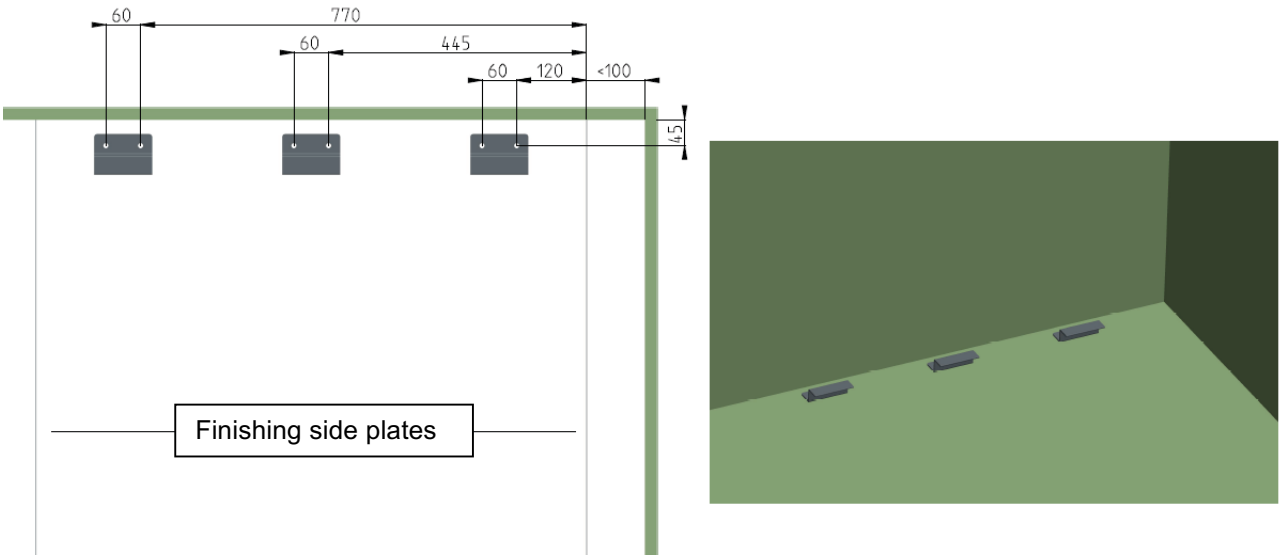
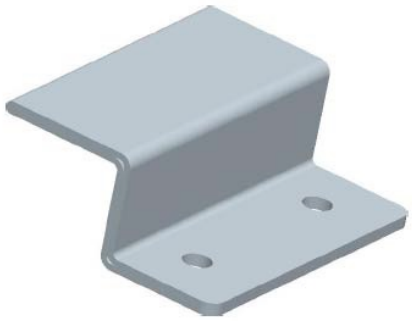


Figure 14: Installation: Fast the fixing brackets



Fasten by means of expansion bolts M8x55 and dowels
Flatness of the floor – 5 mm on the length of the switchgear.

After attaching the fastening brackets, the medium voltage switchgear can be installed on its definitive place. The rear side of the DR-6 cubicle is now fixed.

6.1.2 Anchor the front side of the DR-6 cubicle

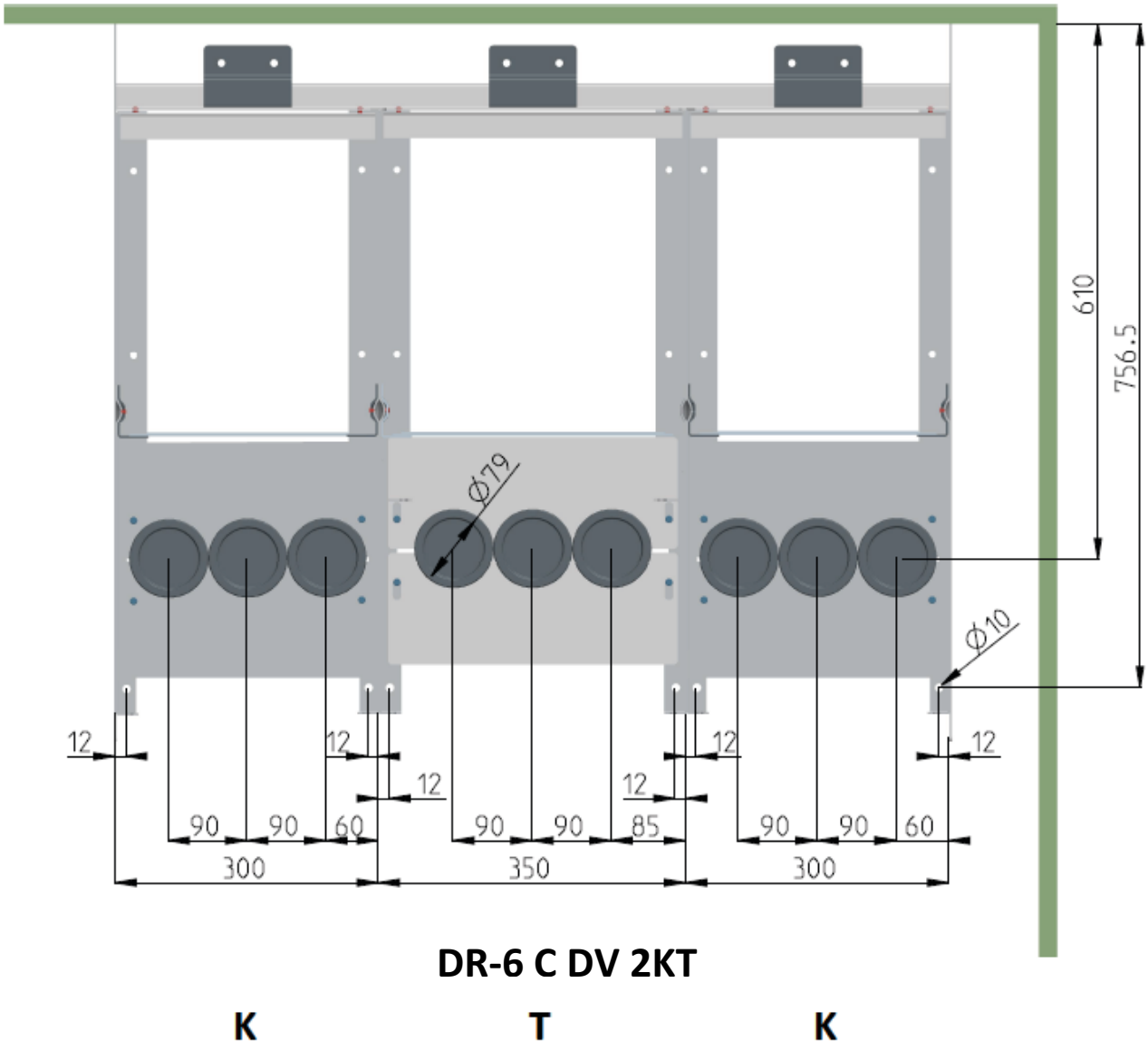


Figure 15: Installation: Fix the DR-6

Consult the assembly drawing(s), wiring diagram and floor plans before starting the effective installation of the medium voltage switchgear.
.

Leave a free space between the rear side of the cubicle and the wall of the installation room. Thus in the case of an eventual internal arc, the exhaust system provided at the rear of the cubicles can function properly.
.

- After attaching the brackets, place the DR-6 perfectly horizontal in the final position by sliding it against the brackets.

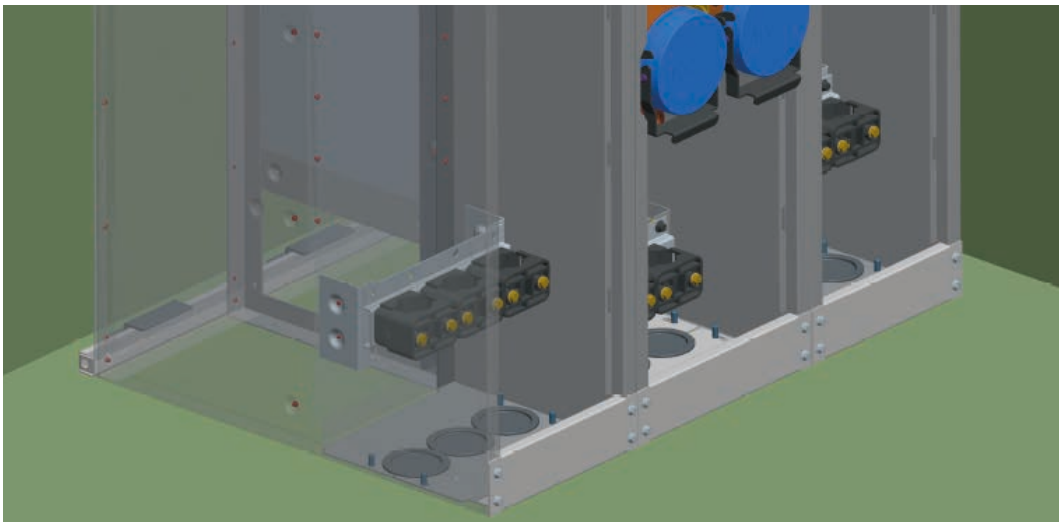


Figure 16: Place the DR-6 at the final position in the installation room.

- Anchor every functional unit on the bottom by means of 2 screws and 2 dowels (see figure 17 A). Use the foreseen holes (see figure 17 B). For an easier access, you may dismantle the bottom plates (see figure 17 B) and the steel angles (see figure 17 C)

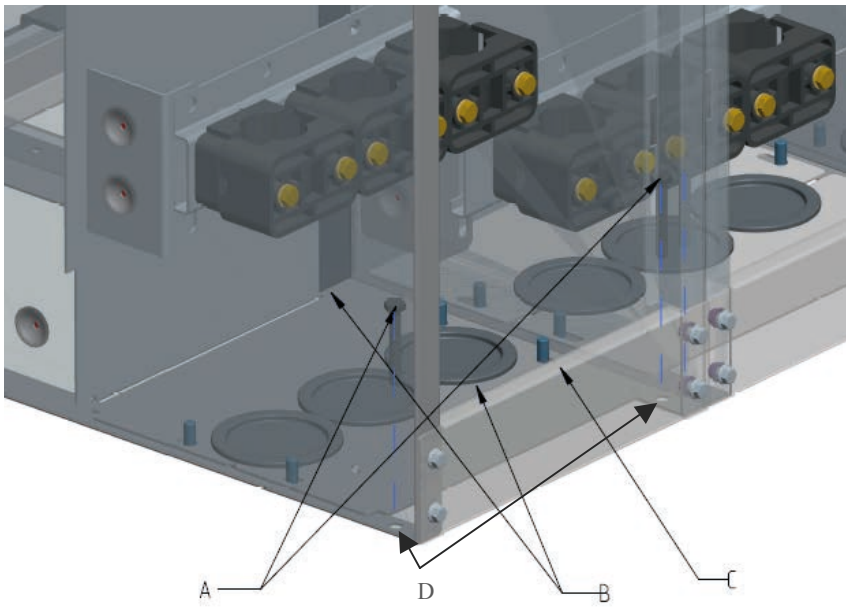


Figure 17: Installation : Anchor a DR-6

Ensure that the DR-6 is perfectly leveled to avoid any twisting of the switchgear. On request we can provide a base plinth to be placed under the DR-6.

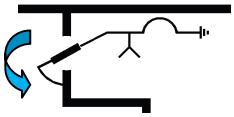
6.2 Connecting the cables, placement of the bottom plates

Since during the installation of the DR-6, the placement of the bottom plates and the connection of the cables take place almost at the same time, these works will be described simultaneously.

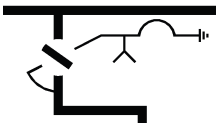
In any circumstance:

the connection of the cables has to be done by authorized and qualified personal trained by the power distribution company, by using fastening material supplied by SGC-SwitchGear Company nv. The cables may never cross each other.

6.2.1 Preparations



Before proceeding with the works, put the concerned functional unit, the upstream functional unit and the downstream functional unit out of voltage.



Before proceeding with the works, open the load break switch and the earthing switch.

Remove the door by releasing the locking lip, provided for the padlock. Afterwards, firmly grasp the door handle of the cable compartment with both hands, and gently release the door at the top. Place the door in a place where it is not likely to be damaged.

6.2.2 Access to the cable compartment

The cable connection in the DR-6 will be facilitated by removing the steel angle of the cable compartment (see figure 18 C) fixed by 4 screws (A) and 4 nuts (B) with hexagonal head.

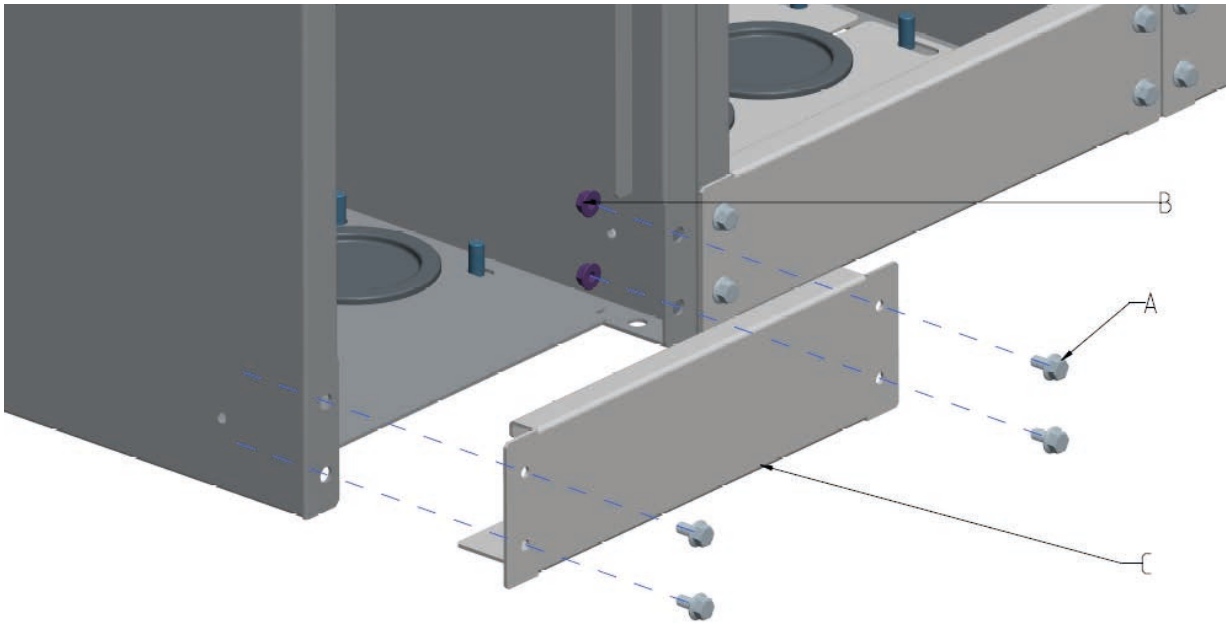


Figure 18: Dismantling of the front face of the cable compartment.

After removing the front face of the cable compartment, the front bottom plate (see figure 19 D) of the cable compartment can be removed after disassembling the hexagonal head screws (E). At this stage the 3 cable rubber glands could be removed from the cable compartment.

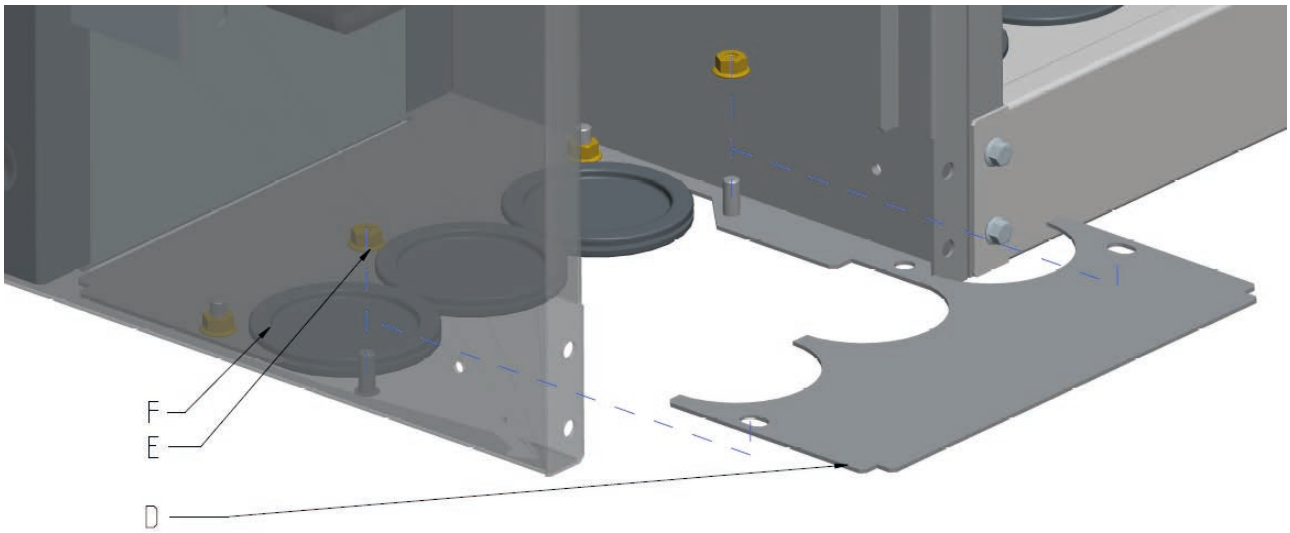


Figure 19: Dismantling of the front bottom plate

The back bottom plate (G) must be installed, after dismantling the 2 nuts with hexagonal head (H), visible on Figure 20.

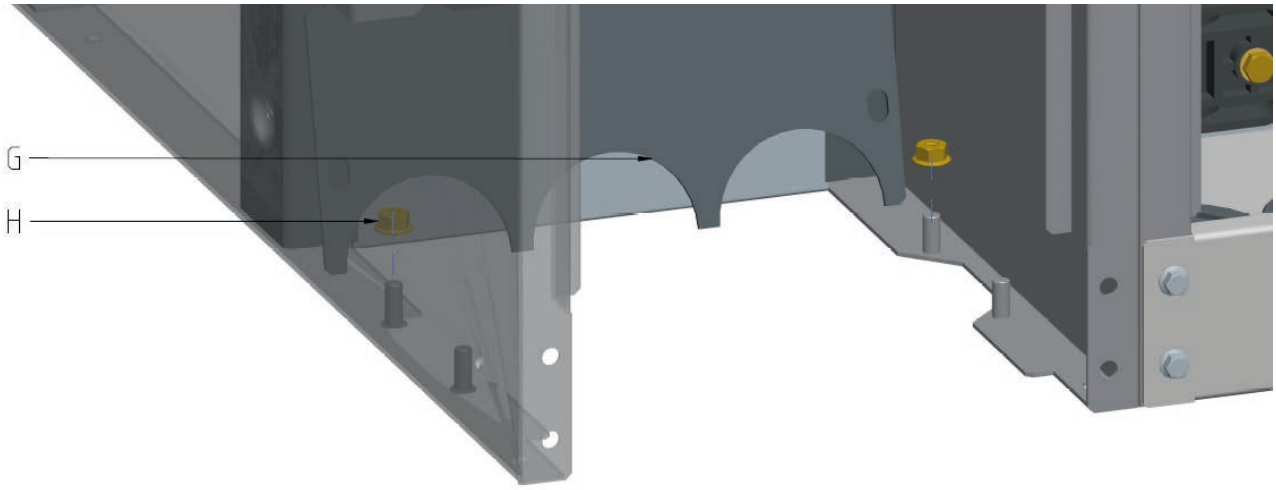


Figure 20: Dismantling of the back bottom plate.

6.2.3 Mounting instructions of cable connection

- Unscrew the hexagonal head bolt (A) from the cable clamps (B+C) to remove them completely...

Depending of the cable sections, it may be necessary to dismantle entirely the cable clamps (Figure 22 D).

- Incise the cable glands with a cutting tool (Figure 22 F)
- Slide the cable gland along the cable.
- Connect the cable on the plug in bushing :
    - Realize and fix the MV cable terminals as instructed by the manufacturer (Figure 22E).

- The entire bushing has to be cleaned with a dry cloth and then apply a layer of silicone supplied with the bushings

- Slide the rubber cable gland (Figure 22 F) along the cable on the adequate height.

- Place the first part of the cable fixing clamp (Figure 23 C) between the cable (Figure 23 E) and the cable support (Figure 23 D)
- Place the second part of the cable fixing clamp (Figure 23 B) on the cable and fix it (Figure 23 A) by screwing the 2 hexagonal head screws.
- Placer la deuxième partie de la bride de serrage de câble (Figure 23B) sur le câble et fixer (Figure 23A) en vissant des deux vis à tête hexagonale.
  Tightening torque M_A **40Nm**.

- Proceed on the same way for the 2 other phases..

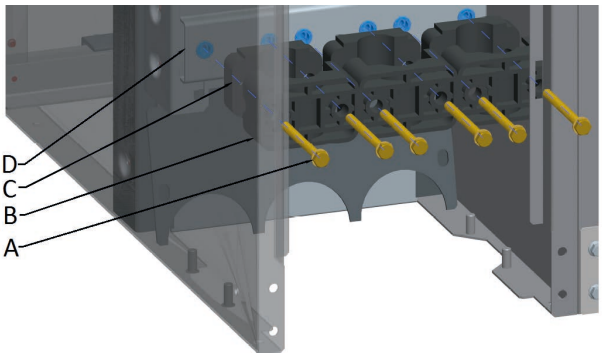


Figure 21: Mounting f the bottom plate

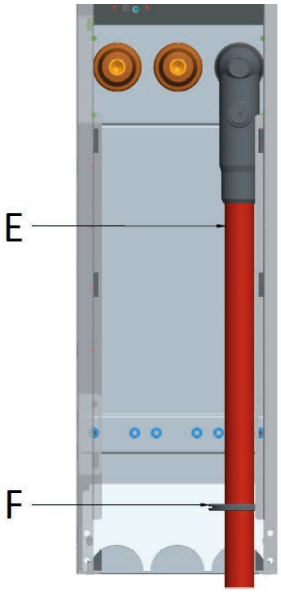


Figure 22: Mounting of the cable connections

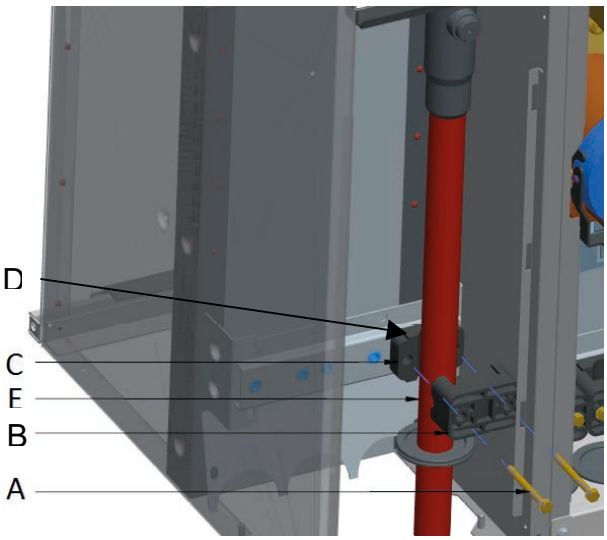


Figure 23: Mounting of the cable fixing clamp.

- Connect the 3 cable screens (Figure 25 G) at the earthing rod of the cable compartment with the hexagonal head bolts and nuts (Figure 26 H). Do not forget the washers (Figure 26 I)
  Tightening torque M_A **40Nm**

- Place the back bottom plate (Figure 26 J) directly in the cable compartment and position the rubber cable glands (Figure 27 K) on such a way that the bottom plates are fixed.

- Fix the front bottom plate (Figure 27 L) on such a way that the rubber cable glands are fixed by the back bottom plates with 4 screws with hexagonal head (Figure 27 P)

- Finally the steel angle of the cable compartment (Figure 24 N) must be fixed again with the 4 hexagonal head bolts and nuts (Figure 24 O+P)

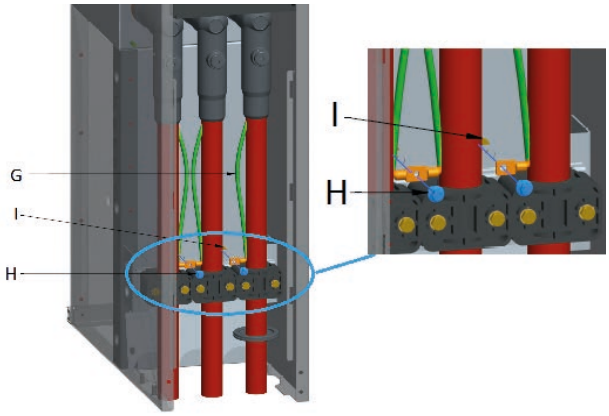


Figure 25: Mounting of the earthing cables

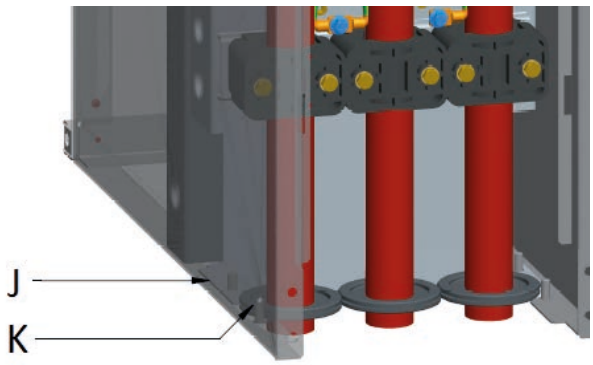


Figure 26: Position the back bottom plate

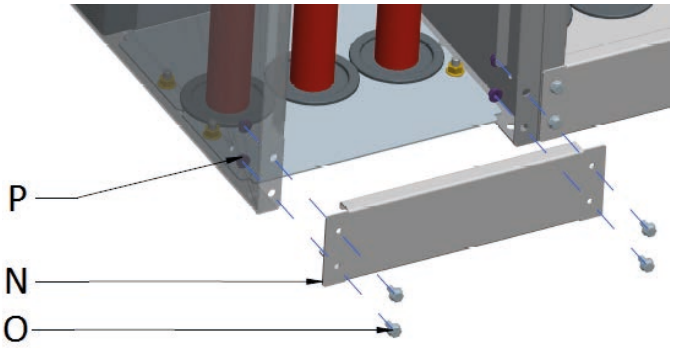


Figure 24: Fix the front side of the cable compartment

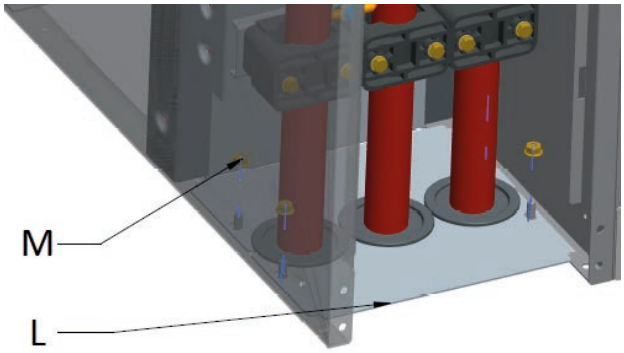


Figure 27: Reset the bottom plates

After the mounting of the bottom plates (and the cable connection) the access door of the compartment can be placed again.

For unused or unconnected functional units, it is necessary to lock the earthing switch in close position or to equip the plug-in bushings with an isolated shutter plug.

6.2.4 Fixing of the DR-6 on a plinth

STEP 1: Place the DR-6 on the plinth.

Place the DR-6 on the plinth (1) in order to position the anchor profiles in the U profiles of the back side of the cubicle (2). Slide now the DR-6 until the end (3).

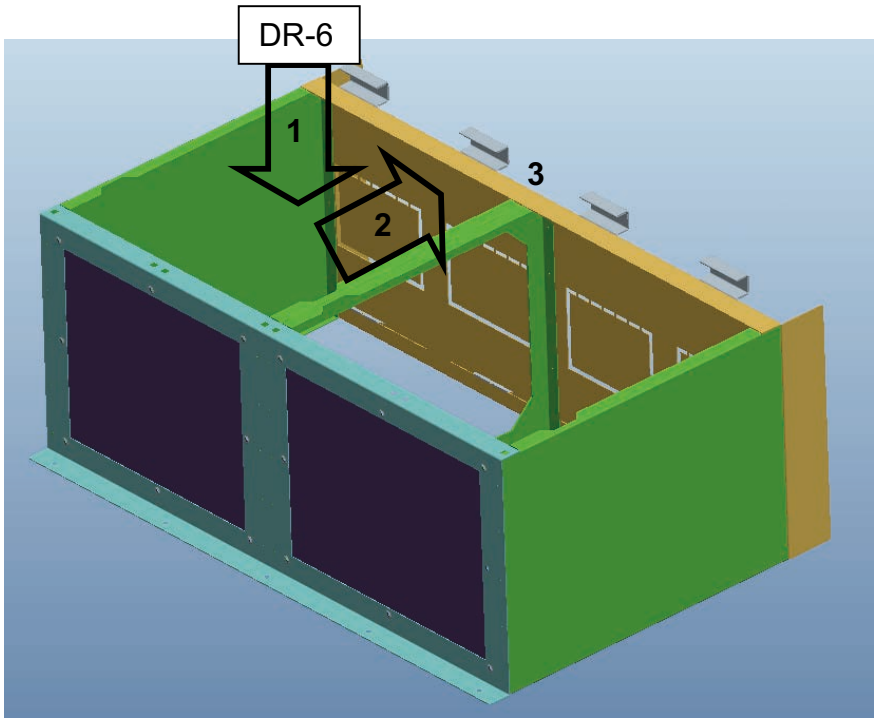


Figure 28: Positioning direction of the DR-6.

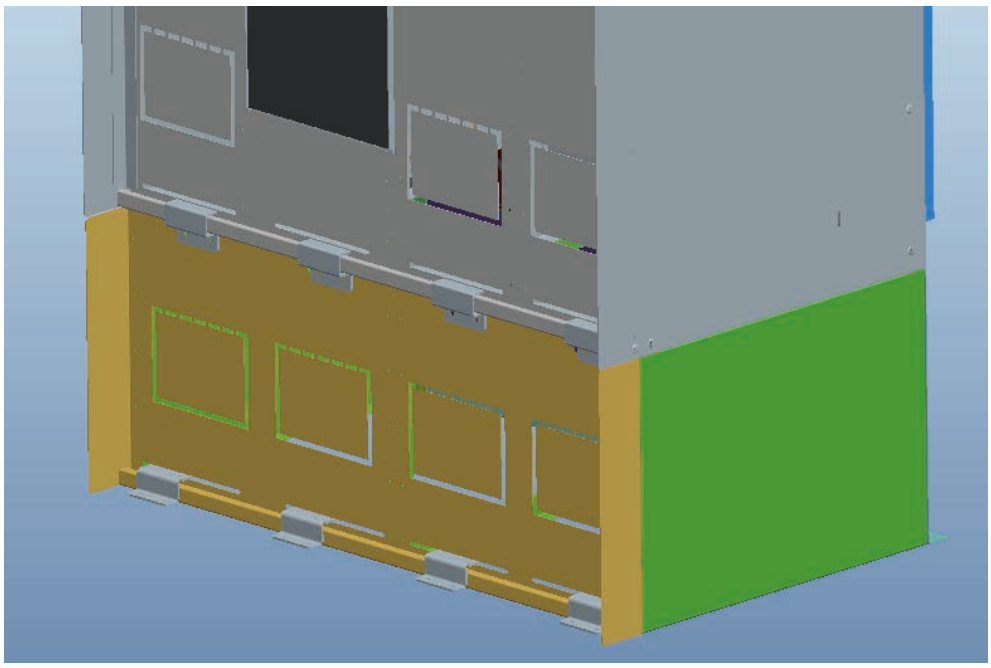


Figure 29: Final position of the DR-6 on the plinth.

The M8 cage nuts are foreseen for the front side of the plinth and in the cable compartment of the DR-6. The DR-6 has to be fixed with M8x25 screws.

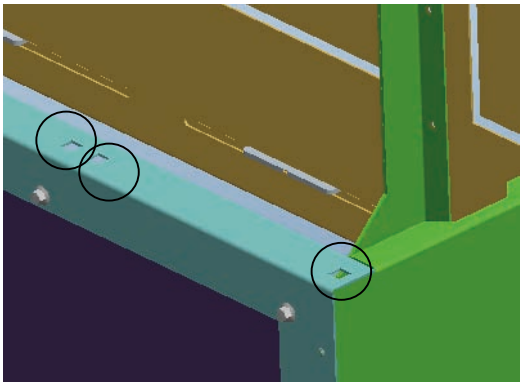


Figure 30: Wholes foreseen on the plinth

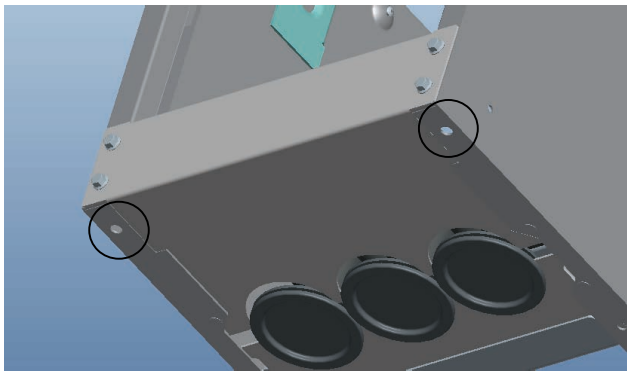


Figure 31: Wholes foreseen in the cable compartment.

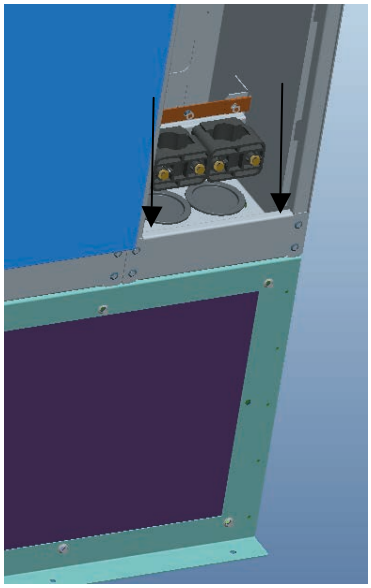


Figure 32: Tighten the plinth with the cubicle in each compartment.

STEP 2 : Connection of the medium voltage cables.

To facilitate the assembly of the cables, it is advisable to remove the front panel of the front side of the plinth. ATTENTION, the front panels have to be placed again trough the inside of the plinth.

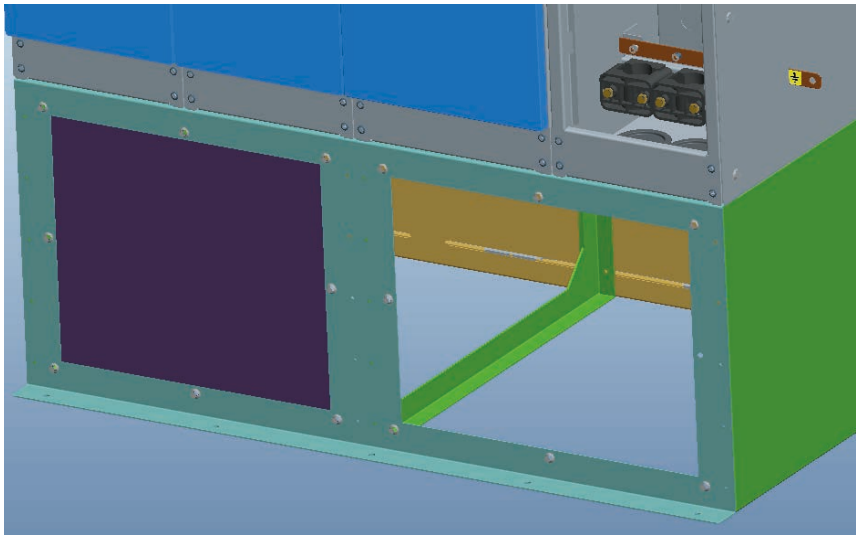
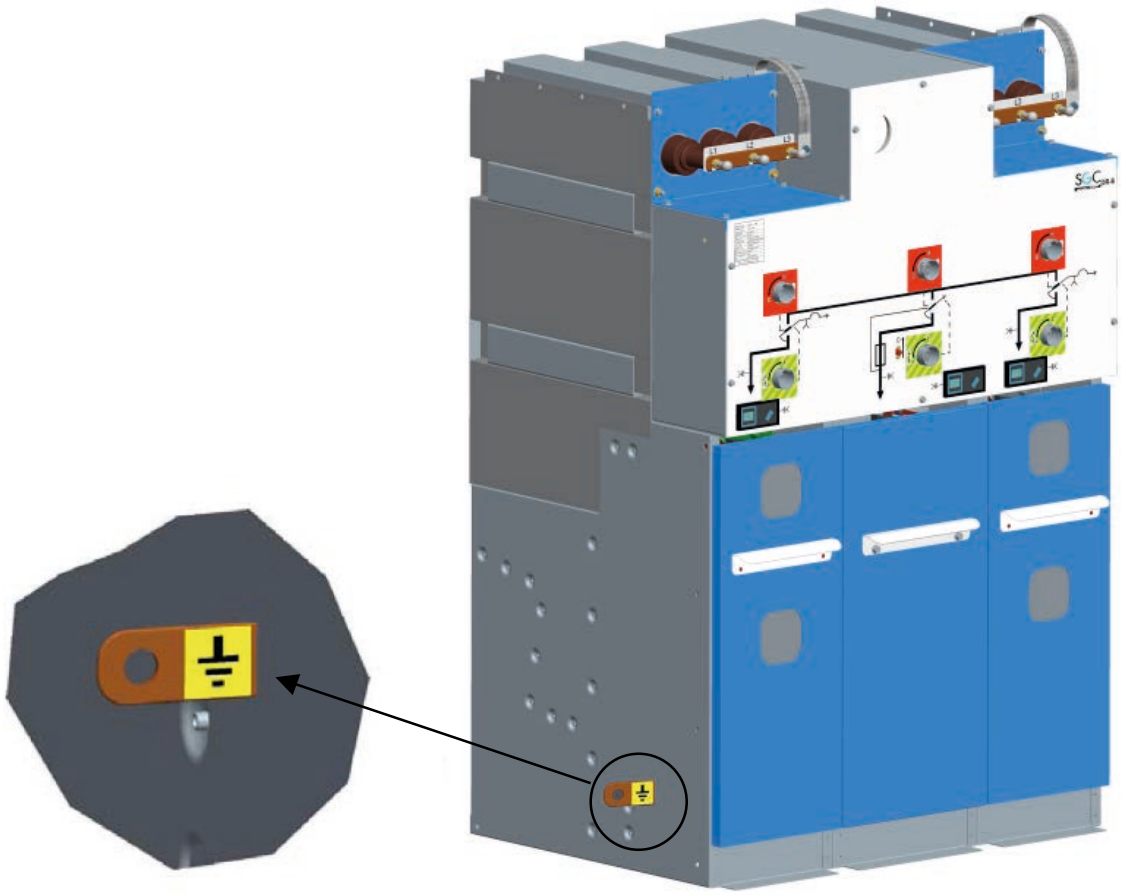


Figure 33: Access to the incoming cables by dismantling the front panel of the plinth.

6.2.5 Earthing of the equipment

The earthing point of the equipment is localized on the left (or on the right in function of the position of the wall versus the position of the equipment) and below the equipment. This point will be connected to the earthing point of the substation.



6.2.6 Standard plug-in bushings

The DR-6 is equipped plug-in bushings in accordance with EN50181 et IEC 60137 standards.

- Interface C (screwed contact M16x2) series 400, In = 630A
  Supplied with the functional units type K

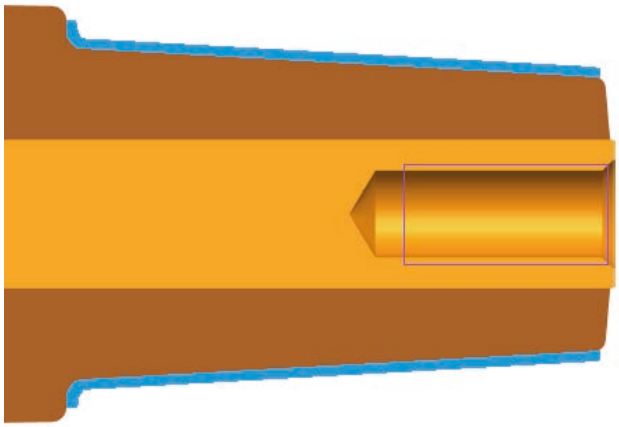


Figure 34: Cable bushing

Interface C type

- Interface A (sliding contact) series 200, In = 250A
  Supplied with the functional units type T.

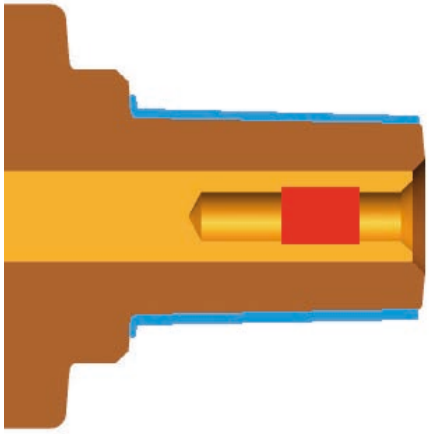


Figure 35: Cable bushing

Interface A type

The installation instruction of the manufacturer of the bushings must be strictly observed.

Following rules must be applied :

- **Meticulous cleaning of the bushings and the cable terminals**
- **The complete bushing must be cleaned with a dry cloth and the supplied silicone grease has to be applied on the terminals**
- **When connecting the cables, the mentioned tightening torque has to be respected.**

Exemple of cable terminals to be used :

Manufacturer	Nam of the terminal	Diameter of the conductor [mm²]	I_n [A]	Type of cable terminal
Euromold	K400TB/G	35-300	630A	Interface C
Euromold	K158LR/G	16-70	250A	Interface A

Following cable terminals manufacturers are recommended :

- Euromold/Elastimold
- Tyco Electronics

6.3 Verification of the phase sequences

6.3.1 Type LRM (concept)

The phase sequence is generally verified between the K functional units. The phase sequence can easily be verified by means of the taps of the voltage indicators (A) present on the front plate of the functional units.

- With a voltmeter / phase sequence indicator (B) measure between the phases of 2 functional units K. A phase verification indicator may be optionally supplied (RM086000)

If no voltage is detected between 2 identical phases of 2 functional units K, the phase sequence is correct. A control can be realized by checking the voltage between 2 **different** phases. In this case, if a voltage is present on the cables, a voltage will be detected.

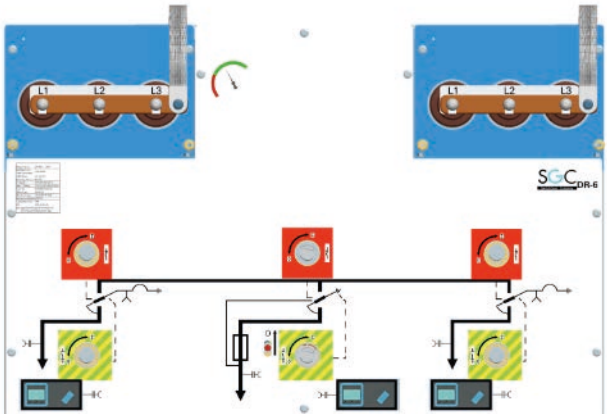


Figure 36: Verification of the phase sequence

6.3.2 Type HR-3

The voltage indicators of the type HR-3 are integrated in the single line diagram of the front plate of the monobloc switchgear or on the functional units. They are foreseen with a tap allowing the verification of the phase sequence.

To measure the phase sequence:

- Verify that the earthing switch of every phase is effectively deactivated.
- Put the switchgear under voltage.
- The voltage indicators light up and confirm the presence of a voltage on the cable
- Place the plugs of the phase verification unit (FT-2) in the corresponding taps of the functions to be controlled (L1 of the function 1 with L1 of the next function and so on).

Light oft – CONCORDANCE of the phases

Light on – NO phase concordance

This last position of the phase comparison unit (light on) allows also to check the correct functioning of the phase sequence verification unit.

6.3.3 Concordance table

	L1	L2	L3
L1	◎	O	O
L2	O	◎	O
L3	O	O	◎

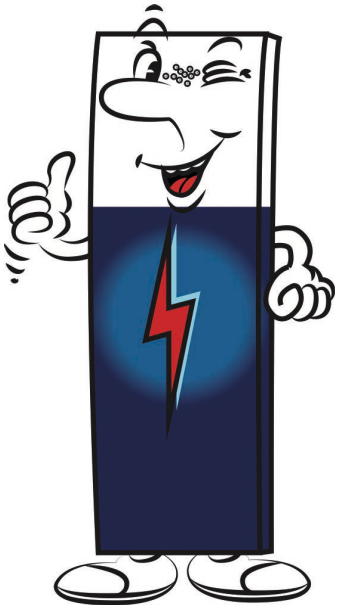
◎ Light of

O Light on

7 FIRST COMMISSIONING

The connection to the distribution grid and the commissioning of the medium voltage switchgear must be realized by trained and authorized personal of the energy distribution company, taking into account the local local safety instructions.

Notes:



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