MCSet M 7.2 kV

Medium Voltage Distribution
Withdrawable Type Motor Control Cubicle
With Vacuum Technology

Installation Guide

JYT8603901-02
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Schneider Electric

Validated *Mfg.Impact analysis*
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Legal Information

Contents

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1. Safety Information

1.1 Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided,
will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided,
could result in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided,
could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

1.2 Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

1.3 Before You Begin

- This manual is meant for qualified person who will install MCSet equipment: panel builder, installer or end user.
- This manual cannot be used to define or check the device's compatibility with every single user's application, nor its reliability within it. It is the duty of every user or panel builder to perform a complete impact analysis, evaluation and testing of the products in specific applications in accordance with applicable standards.
- To verify the right functioning of the device installed in the equipment, refer to equipment manufacturer documentation.
- When the products are used in applications with specific technical and safety rules, should follow the integration and protection rules for the specific application.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See standards or local equivalent.
- The vacuum contactor CVX and the MCSet equipment must only be installed and serviced by qualified electrical personnel.
- Perform work only after reading and understanding all the instructions contained in this guide.
- Before commissioning follow all the electrical safety measures.
- Confirm that there is zero voltage from all the directions related to this cubicle before commissioning.
- Check and record for zero voltage inside the bus bar, cables, auxiliary metering or related assembles of this cubicle.
- Then proceed for the work.
- Use only genuine Schneider Electric specific tools (operating crank, extraction table, and so on).
- Check all devices, covers and doors are in correct position before turning on power to the vacuum contactor CVX and MCSet equipment.
- Carefully inspect the work area for tools and objects that may have been left inside the vacuum contactor CVX and the MCSet equipment.
- Do not modify the mechanical or electrical parts.
- Do not operate the system with interlocks and protective barriers removed.

Failure to follow these instructions will result in death or serious injury.

NOTICE

HAZARD OF DEGRADED EQUIPMENT PERFORMANCE

- Respect the handling rules and avoid any shocks to the device.
- If the vacuum contactor CVX or the MCSet equipment in which the vacuum contactor CVX is mounted is stored before its final installation, observe the storage conditions.

Failure to follow these instructions can result in equipment damage.

2. General

2.1 Glossary

FU	Functional Unit (cubicle + mobile part + Sepam)
M1	Slim vacuum contactor feeder unit

Mobile part	
CVX	Vacuum contactor used in M1 panels

2.2 Recommendations

2.2.1 Installation above the switchboard

All type of equipment installation such as lamp or light are not allowed.

2.2.2 Marking

⚠ DANGER	
ISO 7010-P024 	**HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH** It is strictly forbidden to walk on the parts with this label. **Failure to follow these instructions will result in death or serious injury.**

⚠ ⚠ DANGER	
DM106732.ai 	**HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH** It is strictly forbidden to remove the parts with this label when the equipment is energized. **Failure to follow these instructions will result in death or serious injury.**

2.3 Standard Tightening Torques

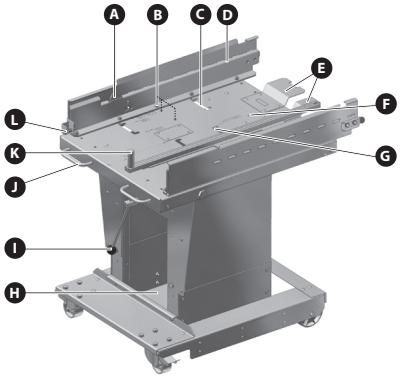
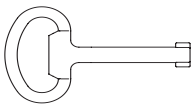
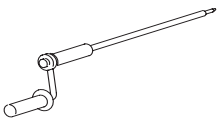
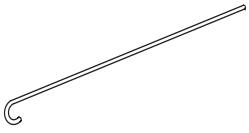
The elastic washers placed on the external sides of the connections and busbars verify better distribution of stress induced by the screw torque.

Table for non-greased screws and bolts

Screw	Torque in N.m
Ø 6	13
Ø 8	28
Ø 10	50
Ø 12	75
Ø 14	120

Tolerance range: ±10% is applicable.

2.4 List of Bags and Accessories

Switchboard package	Content
	⚠⚠ DANGER **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH** • Turn off all power before working on equipment. • Ensure to use proper earthing switch handle to open or close the earthing switch. • Key must be captive during earthing switch is in open condition. • Key must be free when earthing switch is in closed condition. **Failure to follow these instructions will result in death or serious injury.**
Earthing switch operation crank	
Contactor mobile part handling trolley	 **Transport trolley for truck** A Autonomous interlocking of the racked-in truck on the trolley B Variable screw connection of rail C Positioning of rail to adjust the various track widths Rail D Interlocking with panel E Variable screw connection of unlocking bar F Positioning of unlocking bar to match various panel versions G Tray for accessories (lever, keys, handle) H Lever to lock / unlock the transport trolley on the panel. Table of trolley is lifted or lowered. I Unlocking bar. The truck is unlocked in the panel. J Handle of trolley K Slide to unlock the truck from the trolley
Double bit key for switching device compartment cover	
Rack-in / Rack-out handle	
Tripping stick (optional)	

2.5 Packaging

Content	Cubicle packaging	Separate packaging
Screws and bolts for:		
- Busbar fastening	[1]	2
- Busbar shims	[1]	2
- Lock associated with the cubicle	1	2
- Lock unit	1	2
- Cubicle fastening on civil engineer. works		1
- Intercubicle fastening	2	1
- Coupling gaskets	2	1
Cable fastening (AD cubicle):		
- Flange supports	1	
- Flanges	1	
Cable floor:		
- Bottom plates	1	
- Cable support sleeves	1	
- Bag of screws and bolts	1	2
- Cable connection brackets	1	
- Zero frequence toroids	2	1
- Cable compartment		1
- Busbar 1250 A	1	2
- Busbars 2500 A	2	1
- Busbar covers	1	2

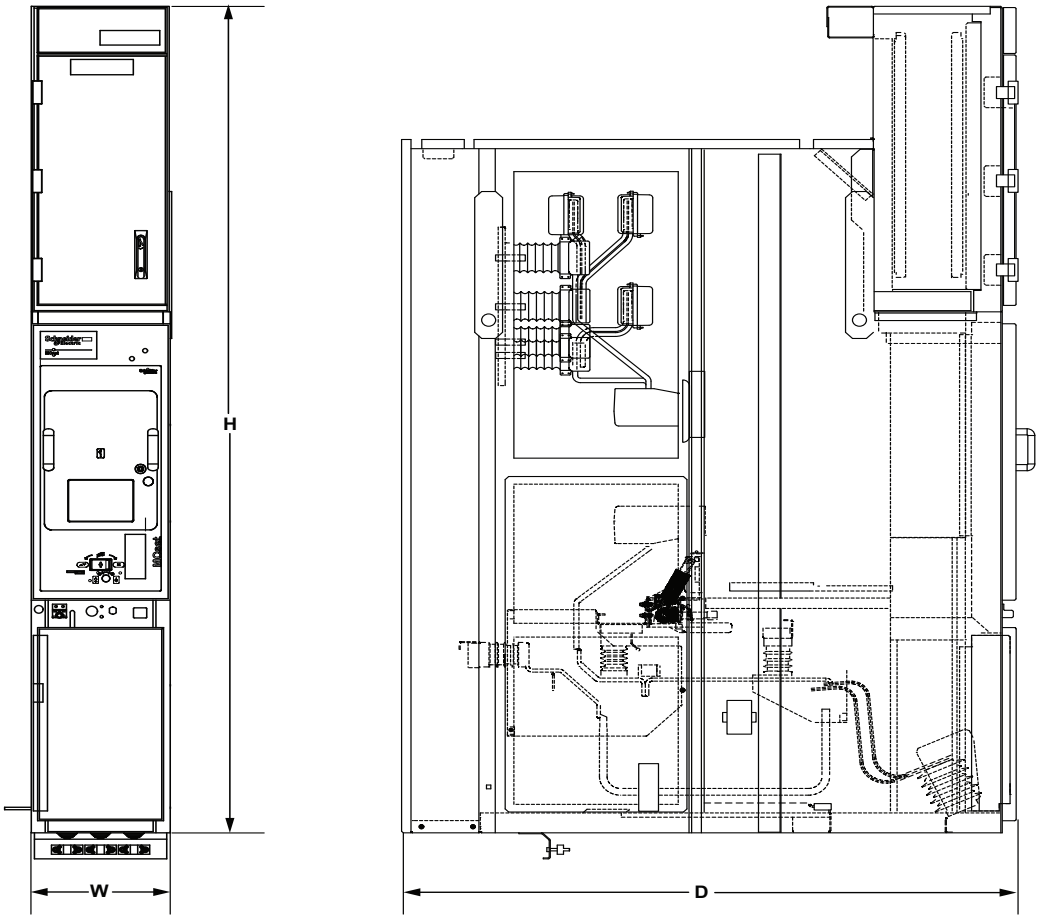
[1] In general.

The cable boxes installation drawings can be provided upon request:
AD1: AAV8094101
AD2: AAV8900201
AD3: BBV1456801.

3. Dimensions and Weights

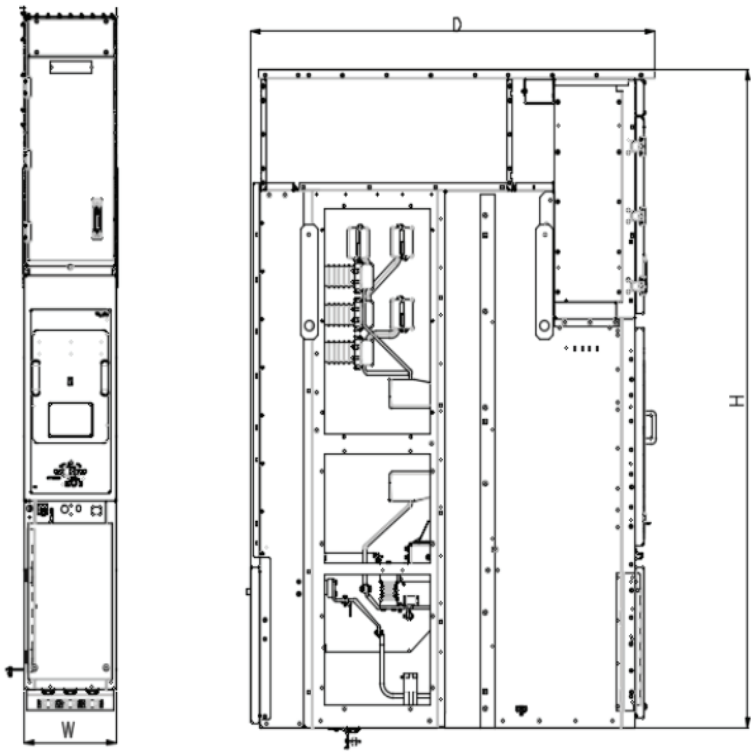
3.1 MCSet M Cubicle

Cubicle with rear access, internal arc withstand and gas exhaust version.



Dimensions	MCSet M
Height H mm	2700
Depth D mm	1725
Width W mm	400
Weight kg	700

3.2 Cubicle Fitted with IPX1 Roofs



Dimensions	MCSet M
Width W mm	400
Height H mm	2732
Depth of tunnel D mm	1825

4. Handling Instructions

⚠ WARNING

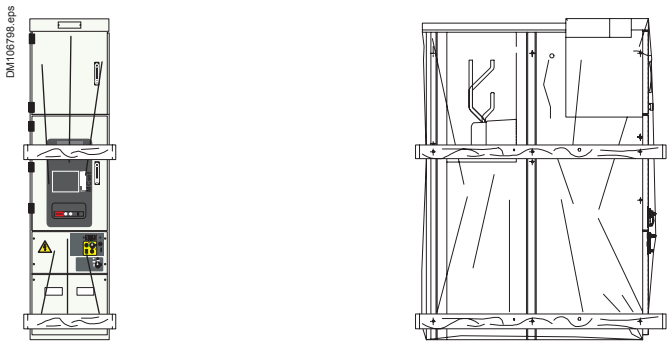
HAZARD OF EQUIPMENT TIP OVER OR TILT

- Wear appropriate personal protective equipment (PPE).
- Handle the equipement with utmost caution.
- Keep the cubicle in vertical orientation while handling.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

4.1 Land Packaging

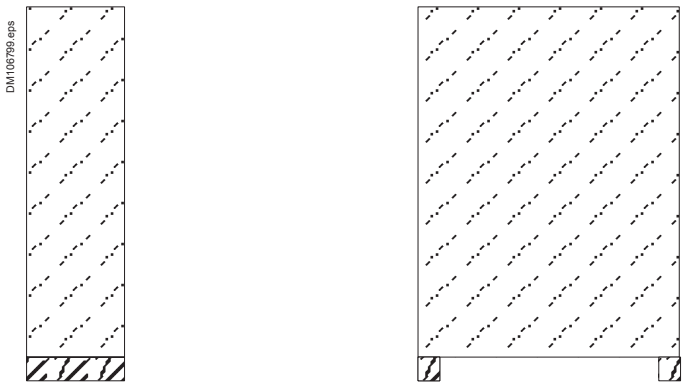
4.1.1 Functional unit



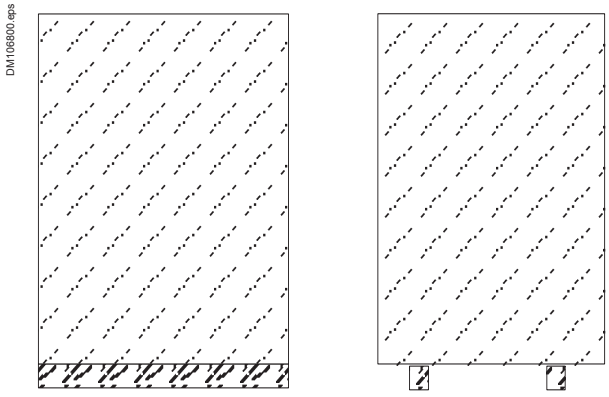
Depending on the height of the cubicle its packaging will vary.

4.2 Packaging of Maritime Expedition (Shipping)

4.2.1 Functional unit



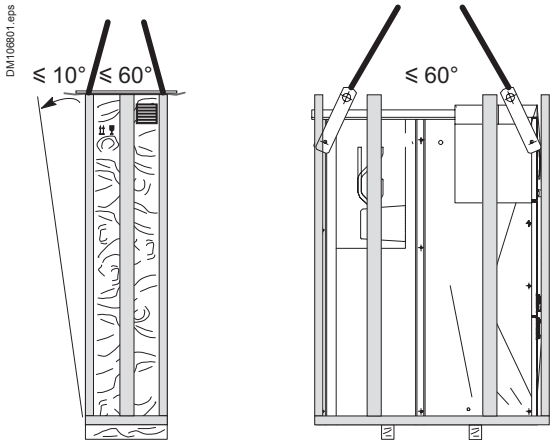
4.2.2 Cubicles packed by threes



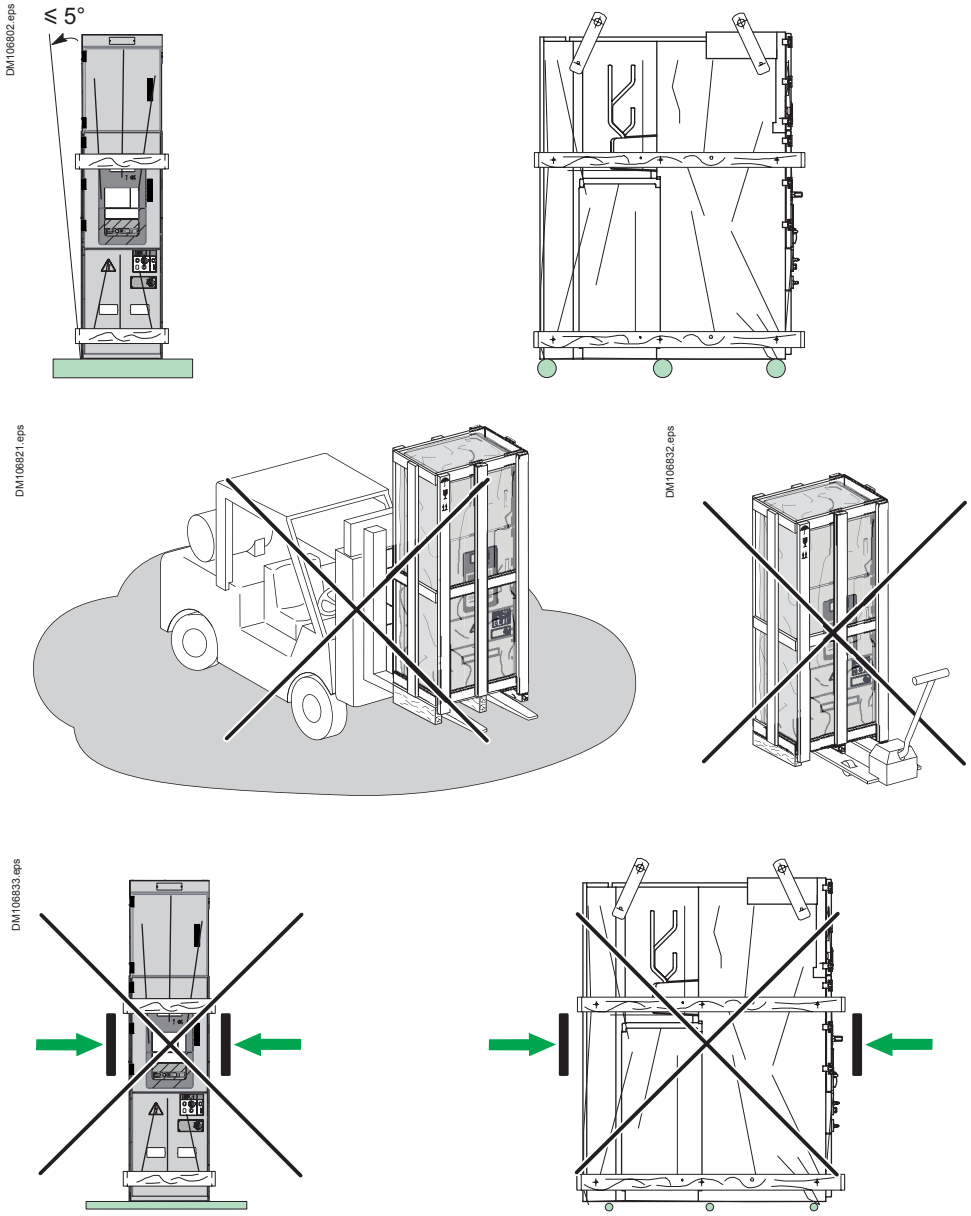
Based on shipping practices, local country guidelines and offer requirement packaging may vary.

4.3 Handling Using a Sling

4.3.1 Functional Unit with Vacuum Contactor CVX



4.4 Handling by Rolling



4.5 Storage

Store the devices in their original packaging, placed on dry ground or on a material insulating it from humidity.

⚠ CAUTION

HAZARD OF INAPPROPRIATE STORAGE CONDITION

- If the device is to be stored, observe all the storage instructions. The device is to be kept in the original packaging until final installation.
- Never install the device if damaged.

Failure to follow these instructions can result in injury or equipment damage.

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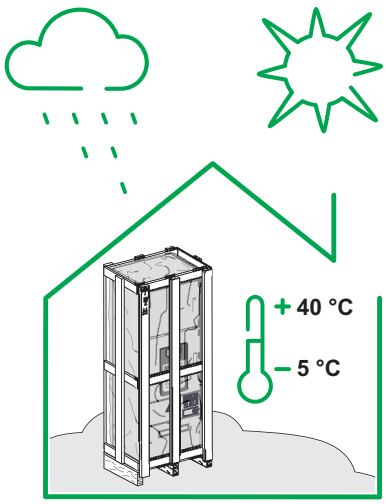


If the cubicle was stored:

- between 6 and 12 months, perform basic level preventive maintenance to verify a correct cubicle and withdrawable devices operation.
- beyond 12 months, contact Schneider Electric Service local representative for check-up.

After unpacking, check the cubicle carefully for:

- absence of broken or damaged parts
- absence of condensation marks or droplets
- absence of visible degradation (color change, rust, deposits, and so on).

In case of any change of the environmental conditions, contact Schneider Electric.

5. Installation and Operation Recommendation

5.1 Aging

The switchgear's resistance to aging in an MV substation depends on 3 main factors:

1. The necessity of correct implementation of connections:

New cold retractable or slip-on technology offers ease of installation that favours resistance over time.
Their design allows them to use in polluted environments with harsh climatic conditions.

2. Impact of the relative humidity factor:

⚠ DANGER

HAZARD OF INTERNAL ARC

- Installing a heating device is necessary in climates with high relative humidity levels and major temperature differences.
- Verify that draughts and/or thermal shocks are avoided in all cubicle compartments to avoid the creation of dew points (sources of partial discharges).
- The equipment should be installed in conformity with the relevant IEC standard.
- Outside of these normal usage conditions, contact Schneider Electric to determine the operations to be carried out as well as their frequency according to the actual service conditions.

Failure to follow these instructions will result in death or serious injury.

3. Electrical room ventilation control:

⚠ CAUTION

HAZARD OF EQUIPMENT OVERHEATING

Grid size need to be suited to the power dissipated in the substation.

Failure to follow these instructions can result in injury or equipment damage.

The grids need to be placed exclusively in the vicinity of the transformer to avoid air circulation on the LV switchboard.

5.2 Operation and Maintenance

Periodically carry out (minimum every 2 years approximately) a few operation cycles on operating devices.

Outside normal conditions of use (between -5 °C and 40 °C, absence of dust, corrosive gas, and so on), it is required to examine with the Schneider Electric services center, the steps to be taken to verify correct operation of the installation.

⚠ CAUTION

HAZARD OF INTERNAL ARC

Use calibrate torque wrenches. Refer the torque values mentioned in the chapter 2.3 Standard Tightening Torques on page 9.

Failure to follow these instructions can result in injury or equipment damage.

After 6 to 12 months of operation, required to check the busbars and MV cable connection torque. It should be done with a calibrated torque wrench.

If no issues are detected and if the busbars and cable connections have not been modified, it will not be necessary to do again this check.

In case of disassembly, the elastic contact washers need to be changed and replaced by new ones supplied by Schneider Electric.

Service center is at disposal at any time:

- to diagnose the installation,
- to offer, suitable maintenance operations,
- to offer maintenance contracts,
- to offer adaptations.

6. Floor Finishing and Cubicle Fastening

6.1 Surface Condition

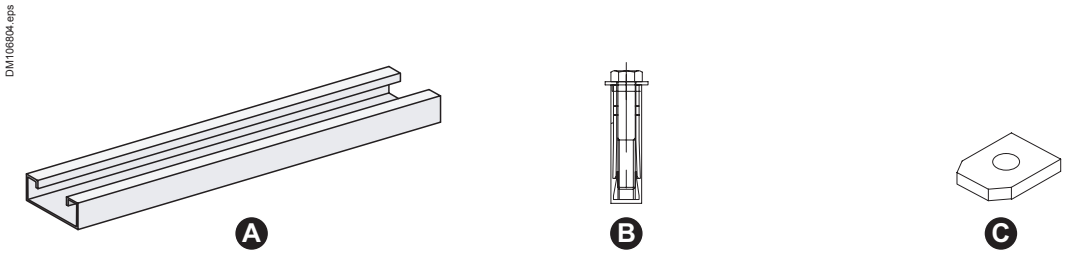
Floor flatness is such that a 2 meter rule moved over all surfaces and in all directions, does not display a difference of more than 5 mm.

6.2 Floor Quality

The floor should have a compression withstand ⩾ 33 MPa to roll the extraction tool on it without any damage.

6.3 Description of Installation Rails and Accessories

For the cubicle fastening, take this equipment from the civil engineering package of the switchboard packaging.



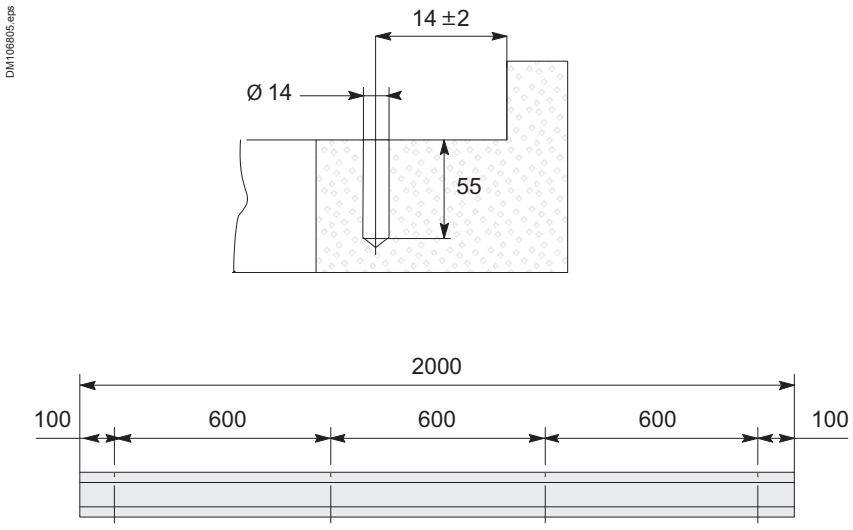
Standard civil engineering:
- 1 rail section **A** (length 2 m)
- 4 expansion pins **B**
- 2 fastening shims **C**.

Earthquake resistant civil engineering:
- 2 rails sections **A** (length 2 m)
- 8 expansion pins **B**
- 4 fastening shims **C**.

6.4 Placing and Adjusting on Non-Earthquake Resistant Civil Engineering Works

6.4.1 Preparation

Drill a hole in the floor and installation rails.



6.4.2 Placing the installation rails

Place and fix the rails to the floor using the supplied expansion pins, screws, and washers.
Cut the last rail to the required length.

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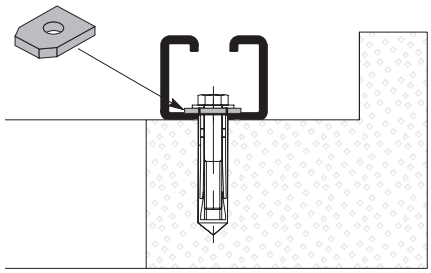

6.4.3 Individual condition to respect for each rail

NOTICE

HAZARD OF INCORRECT INSTALLATION

Do not bend the rail on installation.

Failure to follow these instructions can result in equipment damage.

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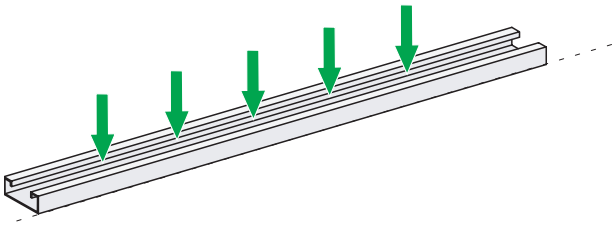


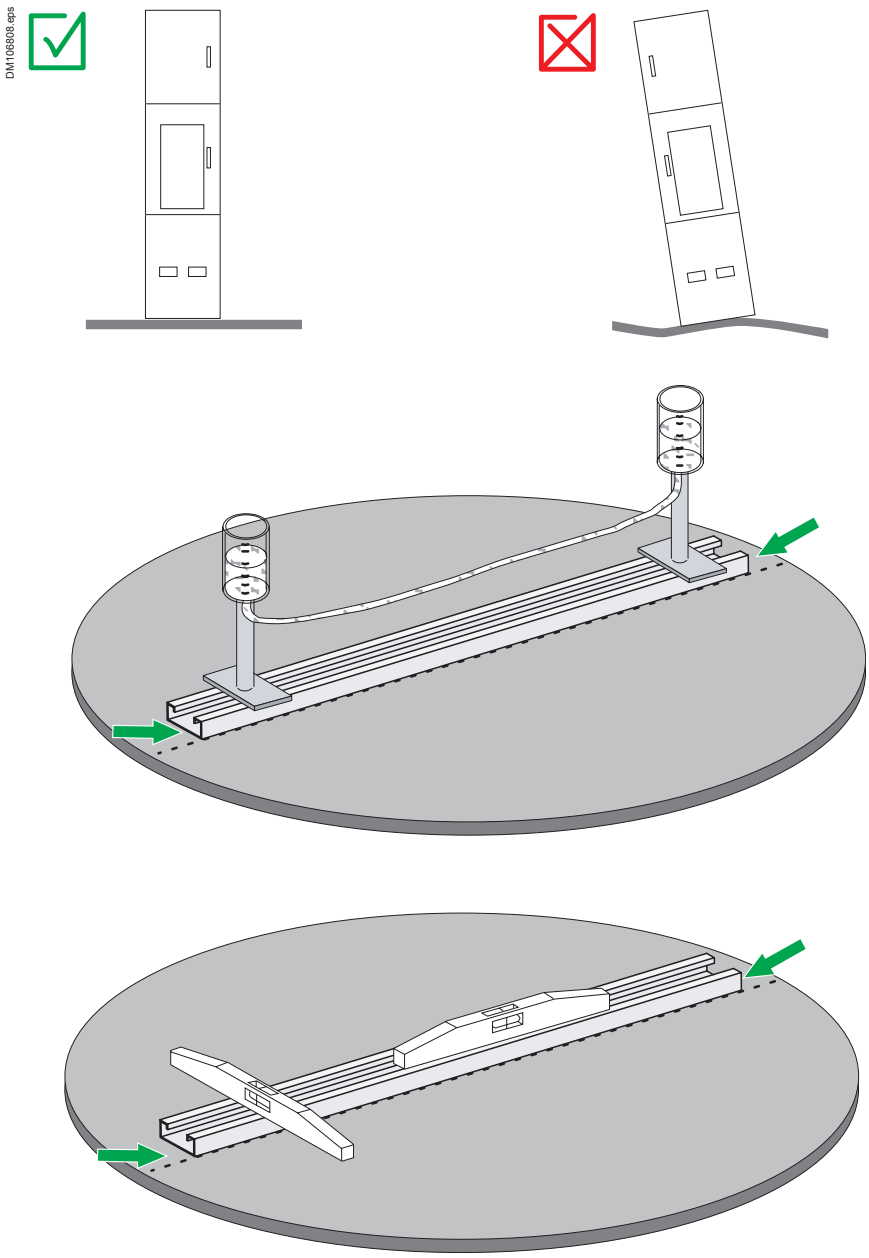
⚠ CAUTION

HAZARD OF INCORRECT EQUIPMENT OPERATING

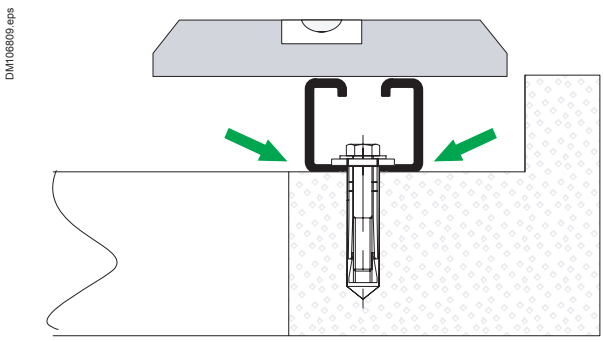
For the correct installation of cubicles, it must comply with a tolerance of ±0.2 cm/m and a maximum gap of ±10 mm/10 m on the length of the switchboard.

Failure to follow these instructions can result in injury or equipment damage.

Longitudinal adjustment: using a water or bubble level and using shims before tightening the screws.



Transversal adjustment: using a bubble level and using shims before tightening the screws.



6.5 Placing and Adjusting on Earthquake Resistant Civil Engineering Works

6.5.1 Preparation

⚠ CAUTION

HAZARD OF INTERNAL ARC
Follow the anchorage instructions.
Failure to follow these instructions can result in injury or equipment damage.

This preparation remains an example of anchoring.
For seismic applications, the anchorage should be designed and sized for the given installation taking into account the site loads, the floor material and dimensions and the anchorage type. Also, a slab space reserved at the Functional Unit is better than a slab space over all civil engineering.

Drill a hole in the floor and rails.

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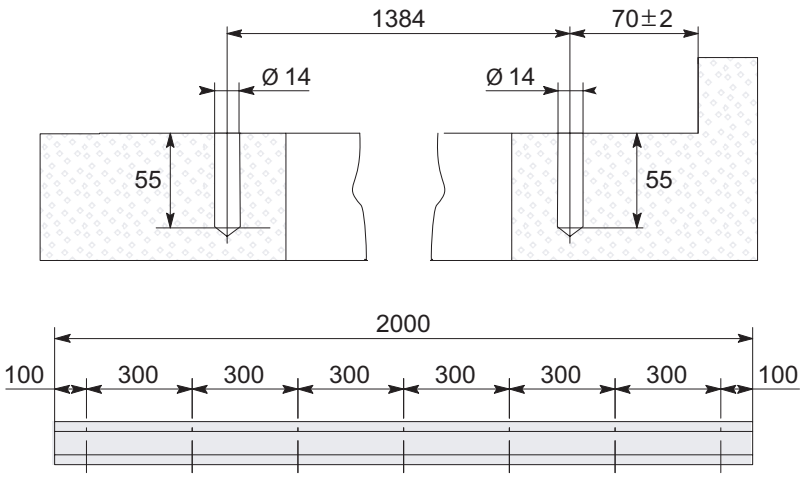

6.5.2 Placing the installation rails

Place and fix the rails to the floor using the supplied expansion, screws and washers.
Cut the last rail to the required length.

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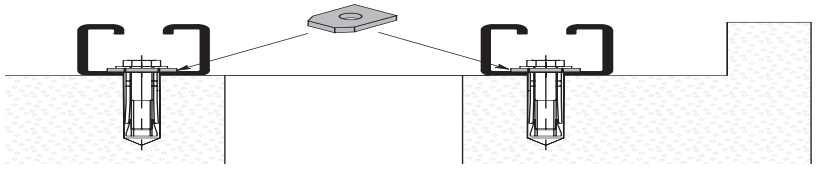


Individual condition to respect between installation rails.

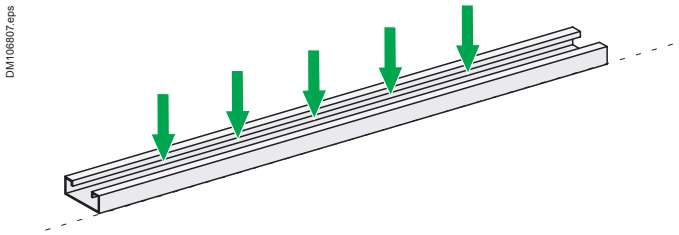
6.5.3 Individual condition to respect for both rails

NOTICE

HAZARD OF INCORRECT INSTALLATION

- Do not bend the rail on installation.
- The rails need to be leveled well because there is no level adjustment at the back in this case.

Failure to follow these instructions can result in equipment damage.



⚠ CAUTION

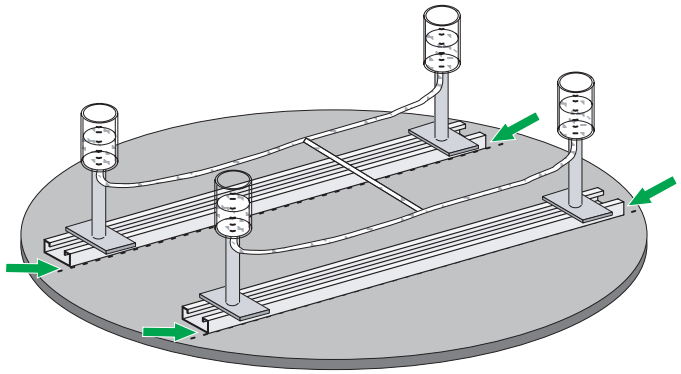
HAZARD OF INCORRECT EQUIPMENT OPERATING

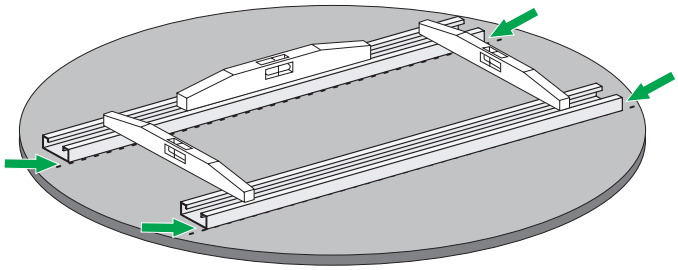
For the correct installation of cubicles, it must comply with a tolerance of ±0.2 cm/m and a max. gap of ±10 mm/10 m on the length of the switchboard.

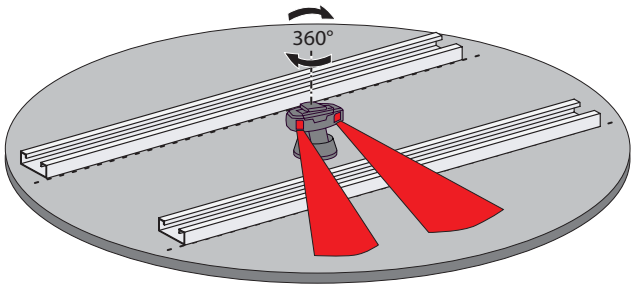
Failure to follow these instructions can result in injury or equipment damage.

Carry out longitudinal and transversal adjustments

There are several methods for flatness adjustment and checking; the accuracy depends on the level tool (water or bubble level, or a high precision device such as a laser).





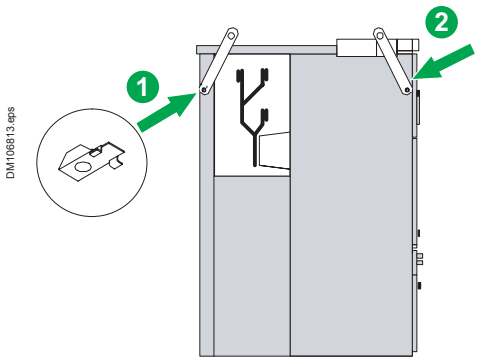


7. Installation Instructions

7.1 Unpacking Cubicles

NOTICE
HAZARD OF FUNCTIONAL UNIT DAMAGE To avoid damaging the functional unit front panel components, leave the protection foam in place until the switchboard is in the operation phase. **Failure to follow these instructions can result in equipment damage.**

The preparation of cubicles should be carried out on the premises where they will be installed.
Remove the 4 handling lugs (1 and 2).
The vacuum contactor CVX is delivered in cubicles in a racked-out position.
Unpack the functional unit by removing the wooden columns (8 screws), then the plastic cover.
Remove the cubicle packaging.



7.2 Placing Cubicles in a Switchboard

7.2.1 Assembling, adjusting, and fastening

Note: Place switchboard cubicles according to front panel drawings and the single-line diagram.

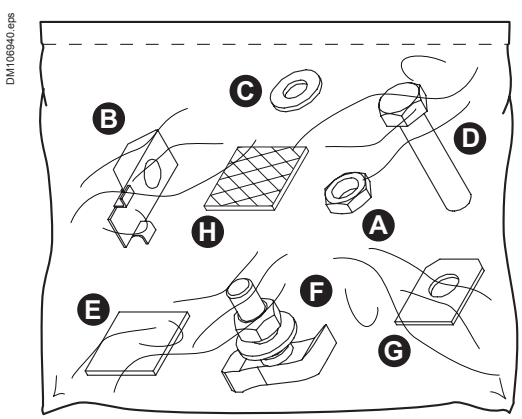
Start by placing the cubicle located in the middle of the switchboard (except in the case of an extension of the existing switchboard) then place the cubicles on either side of it, according to the Civil Engineering Guide indications.

1 bag of non-earthquake resistant civil engineering screws and bolts n° 51236072F0:

Depending on the type of civil engineering, take the following from the hardware bags.

Rear adjustment accessories:
- **A.** 4 x HM12 nuts
- **B.** 2 quick cage nuts
- **C.** 5 flat washers
- **D.** 4 x (HM12x70) screws
- **E.** 2 support rails

Front fastening accessories:
- **F.** 2 hook head bolts
- **G.** 2 fastening shims
- **H.** Rubber anti-vibration plate.



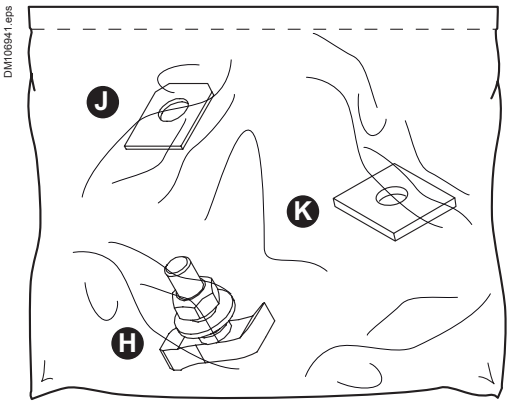
1 bag of earthquake resistant civil engineering screws and bolts n° 51236075F0:

NOTICE
HAZARD OF INCORRECT INSTALLATION Cubicle «X» must not impede cubicle "X+1" and vice versa with respect to overall dimensions. **Failure to follow these instructions can result in equipment damage.**

Depending on the electrical load, if a cubicle is found to be raised after the next one is installed, there is a possibility of vibrations.

Rear fastening accessories:
H. 2 hook head bolts
K. 2 fastening shims.

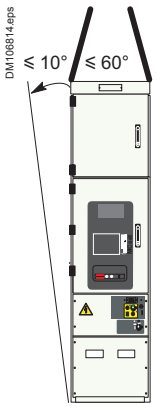
Front fastening accessories:
H. 2 hook head bolts
J. 2 fastening shims.



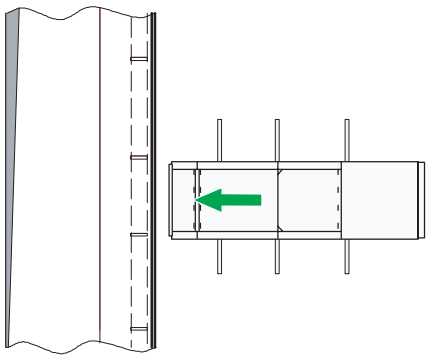
7.2.2 Placing above the maintenance space

NOTICE
HAZARD OF INCORRECT INSTALLATION Do not remove any part of the cubicle. **Failure to follow these instructions can result in equipment damage.**

Note: Placing can be carried out by lifting or rolling.



Placement of the cubicle by lifting.



Placement of the cubicle by rolling.

7.2.3 Adjusting cubicles on standard civil engineering works

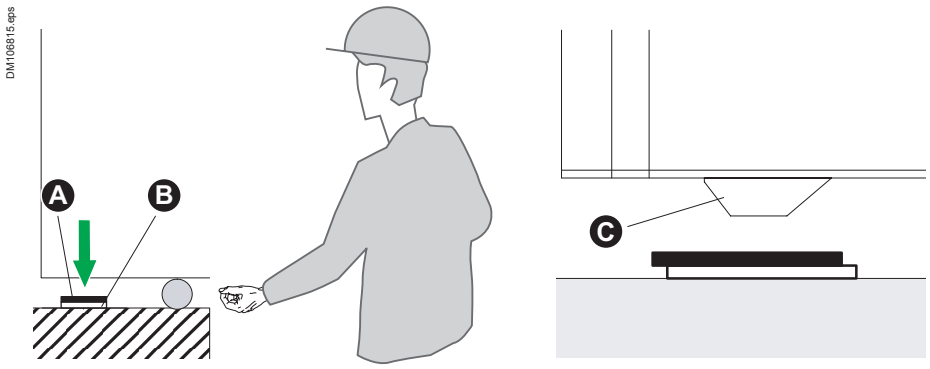
NOTICE

HAZARD OF INCORRECT INSTALLATION

- Cubicle «X» must not impede cubicle "X+1" and vice versa with respect to overall dimensions.
- The operations described here after, should only be carried out once the cubicle is positioned on civil engineering works.

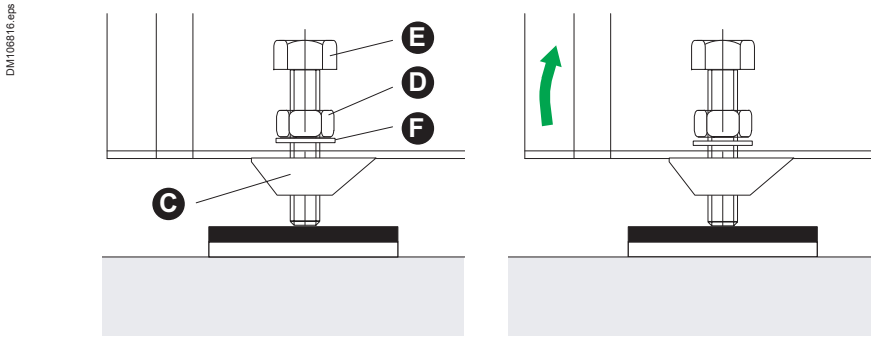
Failure to follow these instructions can result in equipment damage.

1. Position the support steel shim **A** and the rubber anti-vibration shim **B** at the rear of the cubicle from the maintenance space.
2. Place the 2 quick cage nuts **C** at the rear of the cubicle, from underneath the cubicle.



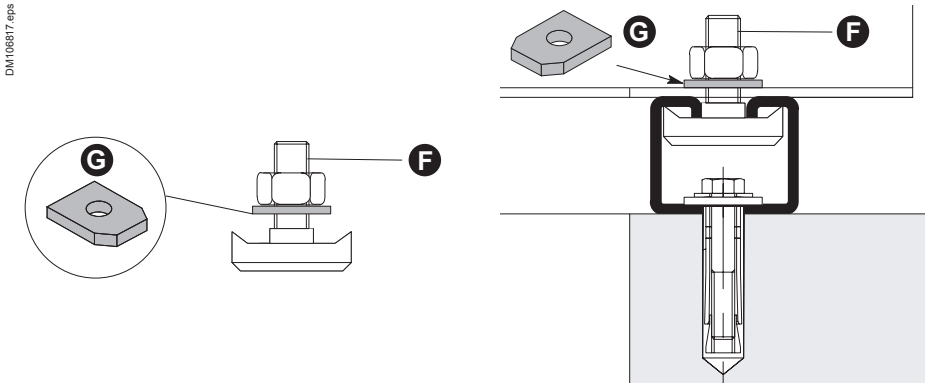
Depending on the load, if a cubicle is found to be raised after the next one is installed, there is a possibility of vibrations.

3. Place the lock nut **D** on each screw **E**, place washer **F**, then screw the actuators in the quick cage nuts **C**.
4. Lift the rear of the cubicle by screwing the 2 screws to level the cubicle.



7.2.4 Fastening to the floor on standard civil engineering works

Note: If the cubicle is provided with VT's, they should be removed, refer to the operating manual (MFR 6119301), the chapter on **Access to the main circuit compartments**.



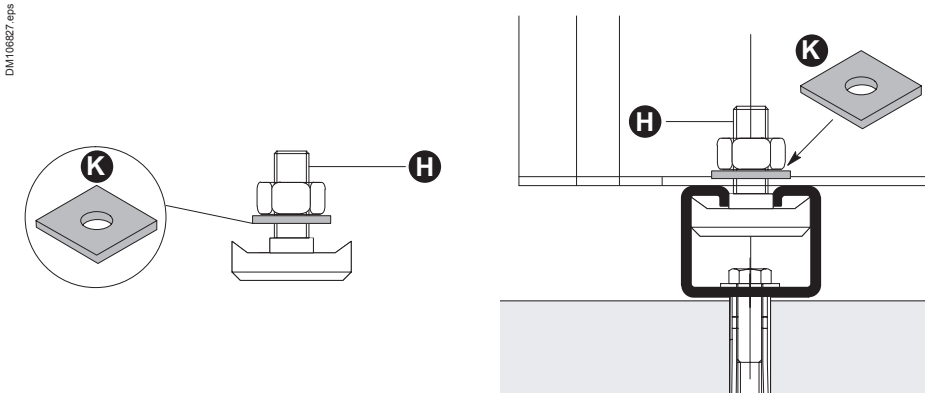
Pick from the hardware bag.
Place the screws at the front of the cubicle and tighten them.

7.2.5 Fastening to the floor one earthquake resistant civil engineering works

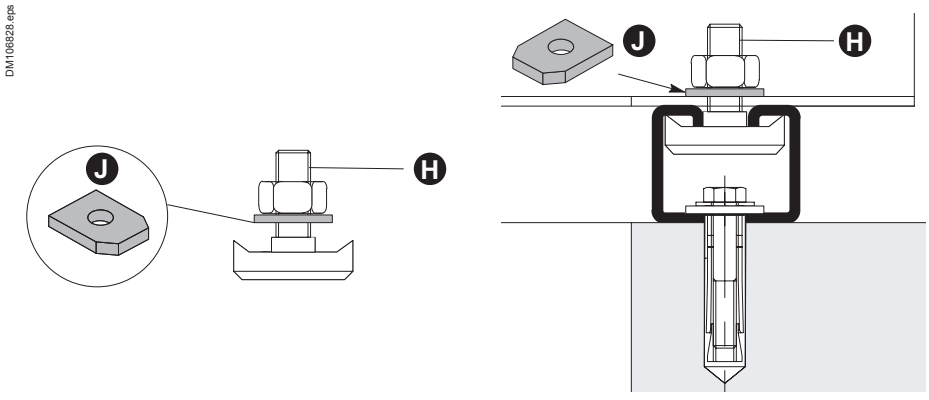
NOTICE
HAZARD OF INCORRECT INSTALLATION Cubicle «X» must not impede cubicle "X+1" and vice versa with respect to overall dimensions. **Failure to follow these instructions can result in equipment damage.**

Depending on the load, if a cubicle is found to be raised after the next one is installed, there is a possibility of vibrations.

Note: If the cubicle is provided with VT's, they should be removed, refer to the operating manual (MFR 6119301), the chapter on **Access to the main circuit compartments**.



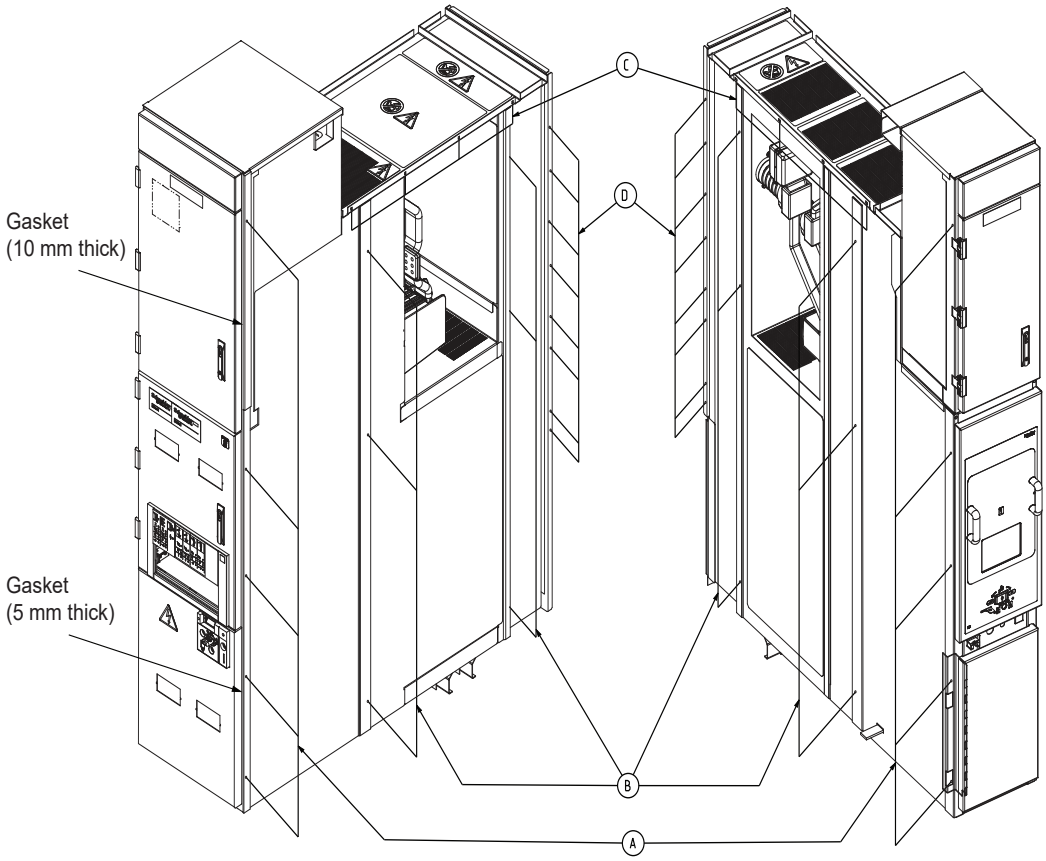
Pick from the two hardware bags.
Place the screws at the rear of the cubicle and tighten them.



Pick from the two hardware bags.
Place the screws at the front of the cubicle and tighten them.

7.3 Coupling of Cubicles

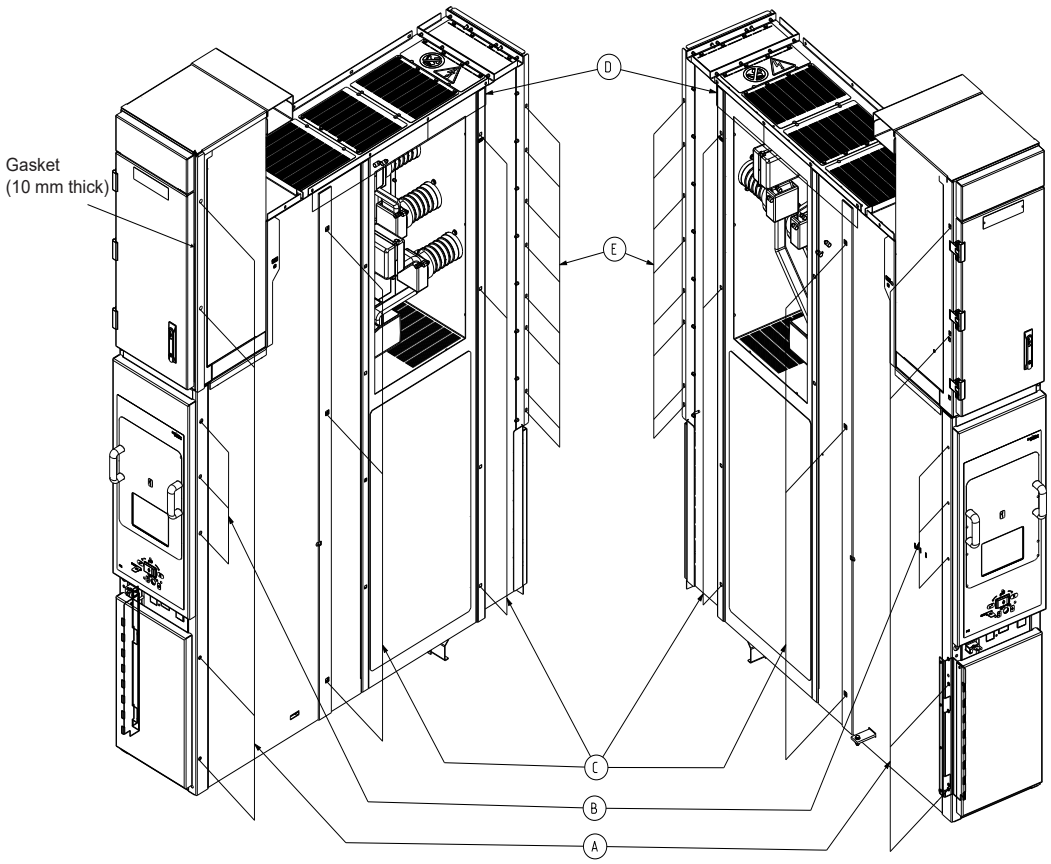
7.3.1 Assembly of MCSet 1 to MCSet M located on the right side



A. Assembly of M8x30 bolt + M8 washers
B. Assembly of M8x30 bolt + M8 washers and M8 cage nuts
C. Assembly of M6x16 bolt + M6 washers + M6 washers + M6 nuts
D. Assembly of M8x16 bolt + M8 washers + M8 washers + M8 nuts

7.3.2 Assembly of two MCSet M cubicles

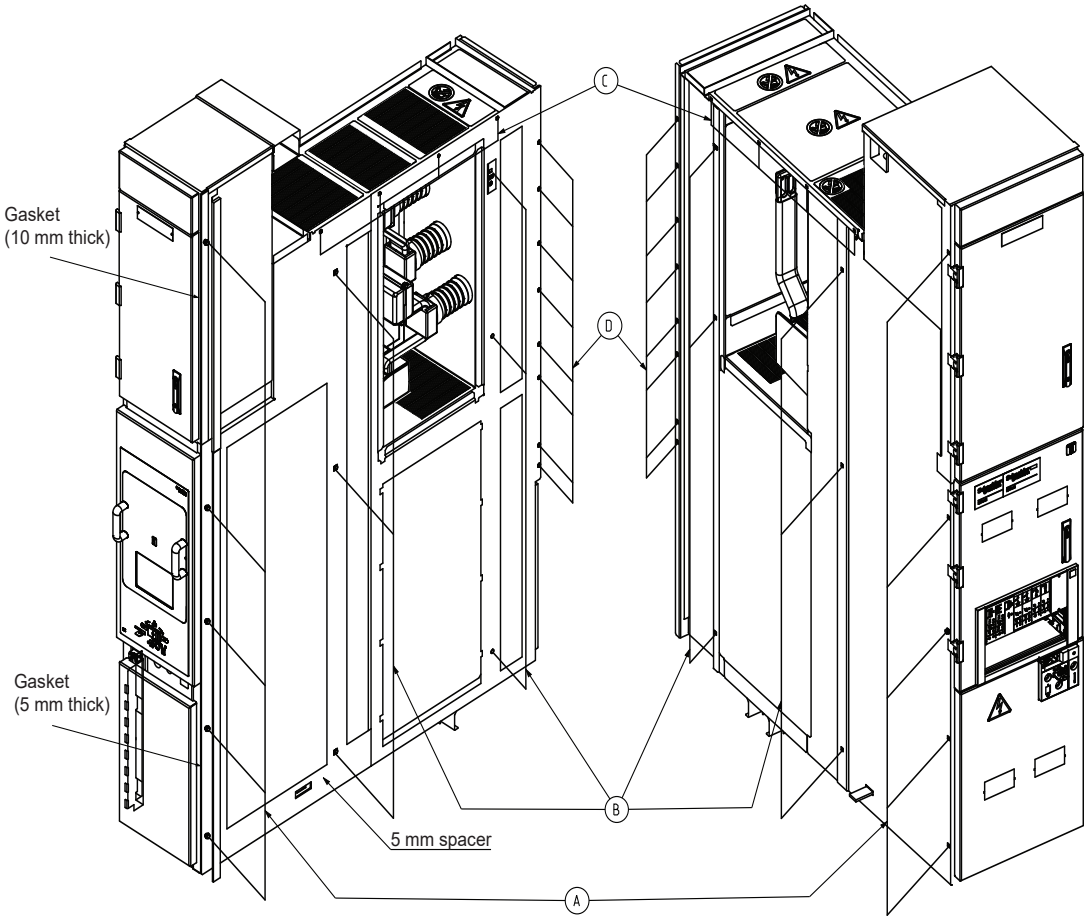
NOTICE
HAZARD OF INCORRECT INSTALLATION Remove the lifting rings and its associated cage nuts before assembly. **Failure to follow these instructions can result in equipment damage.**



A. Assembly of M8x30 bolt + M8 washers
B. Assembly of M8x20 bolt + M8 washers + M8 washers + M8 nuts
C. Assembly of M8x30 bolt + M8 washers and M8 cage nuts
D. Assembly of M6x20 bolt + M6 washers + M6 washers + M6 nuts
E. Assembly of M8x25 bolt + M8 washers + M8 washers + M8 nuts

Note: Holes without cage nut can be used for the coupling of the cubicles.

7.3.3 Assembly of MCSet M with interface sheet to MCSet 1 cubicle located on the right side



A. Assembly of M8x30 bolt + M8 washers
B. Assembly of M8x30 bolt + M8 washers and M8 cage nuts
C. Assembly of M6x16 bolt + M6 washers + M6 washers + M6 nuts
D. Assembly of M8x16 bolt + M8 washers + M8 washers + M8 nuts

7.3.4 Gasket for coupling cubicles

Refer the table for verification of the gaskets during the coupling of the respective cubicles.

Reference table for Gasket		
Cubicle coupling	Gasket	
	Cubicle	LV box
MCSet M to MCSet-M	–	10 mm
MCSet 1,2,3 to MCSet-M	5 mm	10 mm
MCSet M to MCSet 1,2,3	5 mm	10 mm

7.4 Removing the Mobile Part Transport Fixations

7.4.1 Opening and closing the cover of the switching device compartment

Opening the cover

1. To unlock the door, insert the appropriate double-bit key (Fig. 1, item A) in the door lock (item B) and turn it counter-clockwise to its stop. The cover is unlocked.
2. Lift the cover of the switching device compartment (item C) using the two handles (item D) and remove it.
3. Remove the double-bit key and keep it in a designated place.

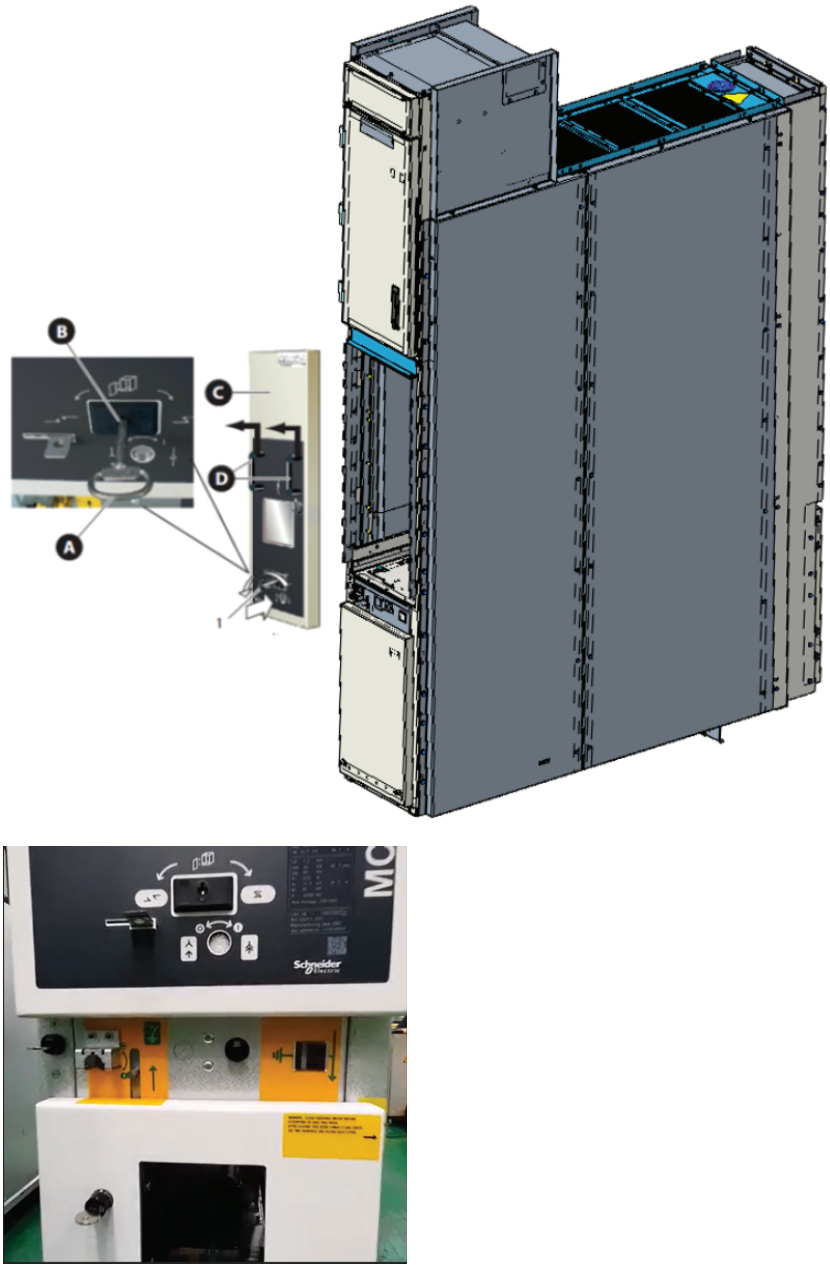


Fig. 1
A Double-bit key
B. Door lock
C. Switching device compartment cover
D. Handles

Closing the cover

1. Pick up the switching device compartment cover (Fig 1, item C) using the two handles (item D), place it in the cutout on the panel and lower it.
2. Insert the double-bit key (item A) used to unlock the door into the lock (item B) on the switching device compartment cover and turn it clockwise to its stop. The cover is locked.
3. Remove the double-bit key and keep it in a designated place.

Removing the transport tightened device of the truck

1. Remove the cable compartment cover and the switching device compartment cover.
2. Remove the locking mechanism of the vacuum contactor CVX in the switch compartment (Fig. 2):
   a. Release the 4 front screws of the CVX (item A).
   b. Release the 2 lateral tightened bolts M 8 x 25 (item B).
   c. Remove both assembly fixing brackets (item C).
   d. Re-fasten the 4 screws (item A) to the CVX.
3. Remove the vacuum contactor CVX from the panel.

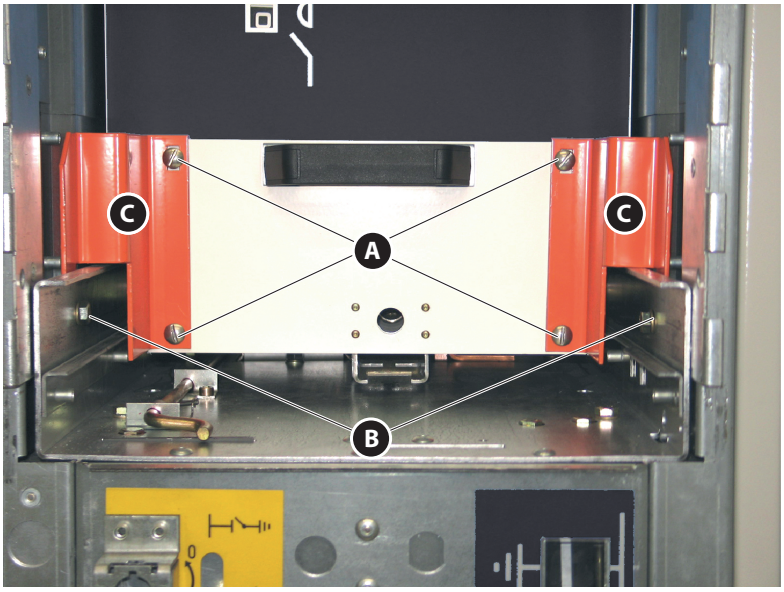


Fig. 2
Transport catch of the vacuum contactor CVX in the panel

Mechanical trolley can be used for:
- To transport the vacuum contactor CVX
- Placing the CVX inside the cubicle
- Taking out the CVX from the cubicle

Refer chapter 2.4 **Contactor mobile part handling trolley**.

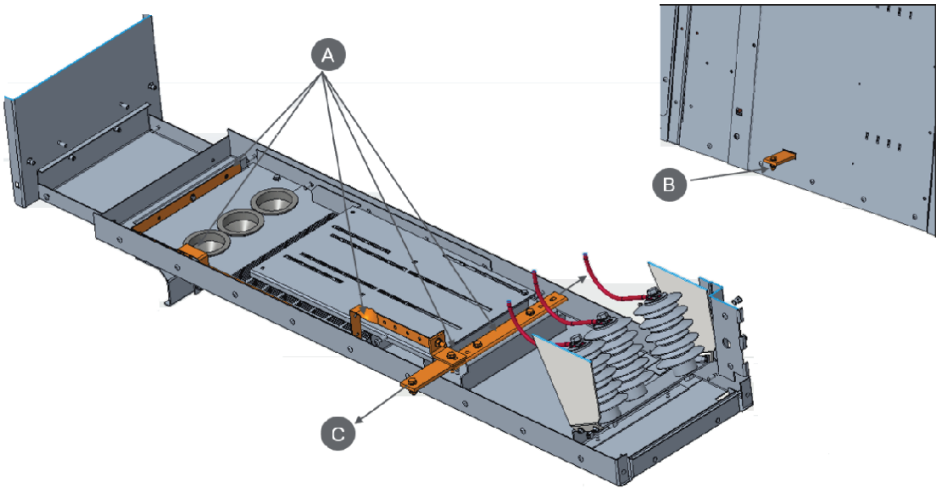
Interlocks between door and CVX unit

- Padlock arrangement provision is provided on the MV door.
- MV cable door be locked with the help of key.
- Racking of the CVX inside the cubicle is blocked when earthing switch is closed condition.
- Earthing switch cannot be closed when CVX is in the service position.
- Opening of the MV door is blocked when CVX is in the service condition.
- CVX cannot be racked-in unless LV plug is connected to CVX.

7.5 Installing the Main Earth System Connection

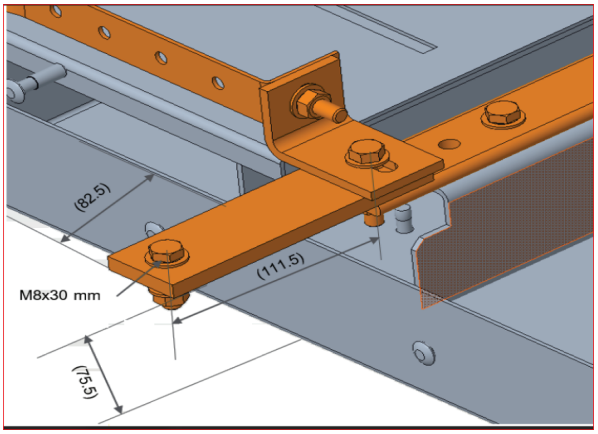
7.5.1 From the switchboard to the building's earth system

Note: During the installation of the end sheets, punch the knock outs from the sheets. For the switchboard with MCSet M and MCSet 1 cubicle at the end, refer to the MCSet installation guide.

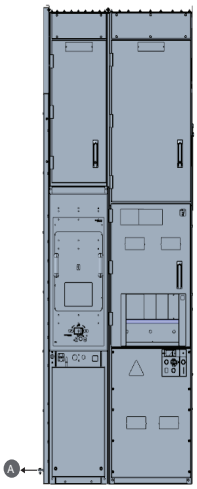


A. Earthing copper connections
B. Copper earth pass to another coupled panel for solid earthing.
C. Adjacent panel copper connection for earthing

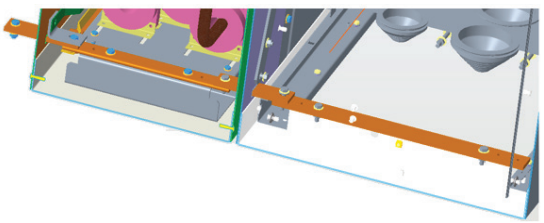
Connect the earth bar to building's earth at each end of the switchboard. On the right and on the left, place the specific link with the oblong hole inside the cubicle. Tighten the copper connections with tightening torque of 28 N.m.
Note: Hexagonal head screw Grade 8.8 steel hardware. All the dimensions are in mm.



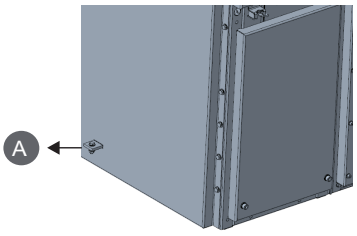
Dimensions of earth system for MCSet M



Front view of the coupled cubicles



View showing the passing of the copper earth connection from MCSet M cubicle to adjacent panels both sides



A Earthing bar outside the cubicle to connect with ground

7.6 Installing the Electric Connections of the Busbars and MV Cables

7.6.1 General information

Assemblies with bolts for MV and LV internal equipment.

Screws and bolts to be used:

Class 8.8 according to standard NF E 27 005, i.e. an elastic limit, Re 630 MPa.

Connection maintenance:

During downtime, check the connection torque **with a torque wrench**.
In the case of disassembly, change the elastic washers.

Note: To carry out the following preliminary switchboard operations refer to the operating manual (MFR 6119301) the chapter on **Access to the main circuit compartments**.

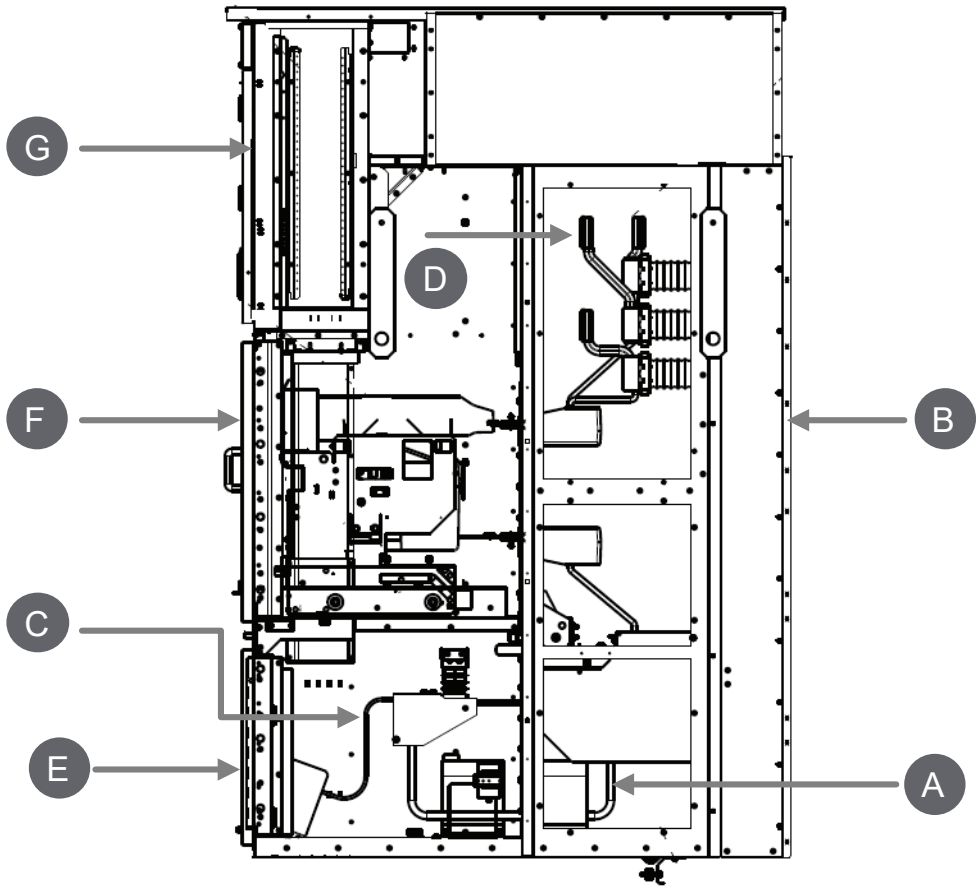
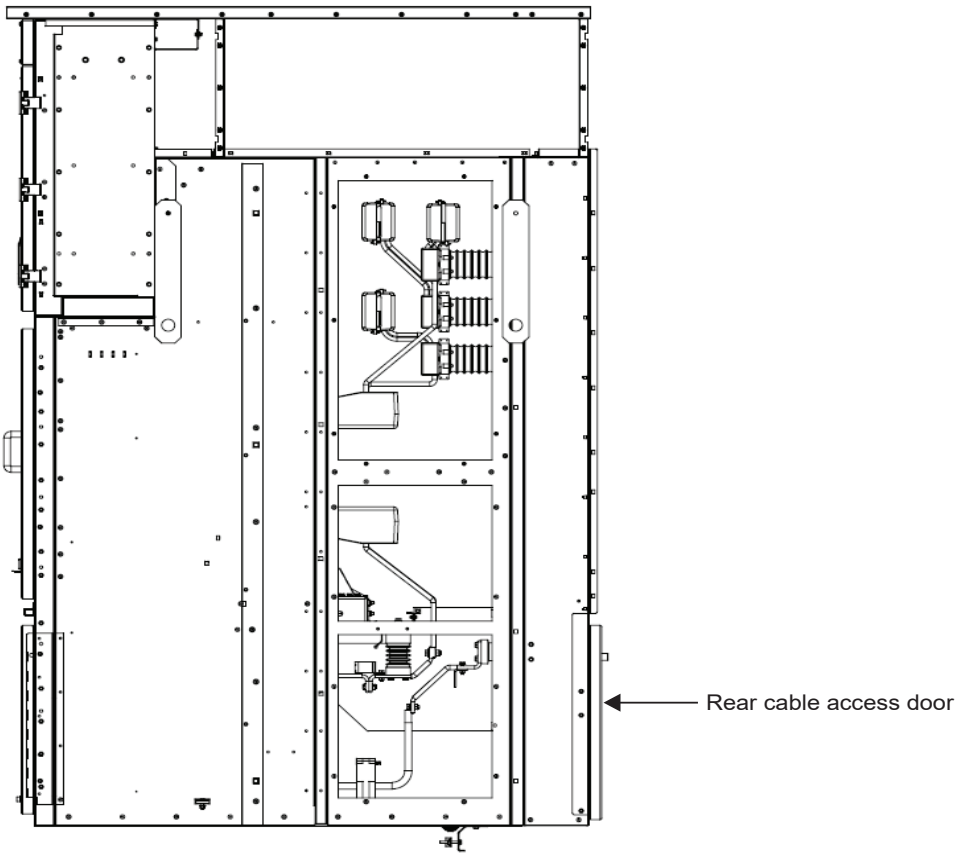


Fig. 3
Access to the main circuit compartments of a feeder MCSet M cubicle

A. Access to the lower compartment (connection of MV cables) through the maintenance space or duct (access to CT's also)
B. Access rear door exist and it can be open and closed. It is secured by interlock with key arrangement
C. Access facilitates access to cables (AD cubicle), through the front (access to CT's also)
D. Access to the busbars
E. Access to the lower compartment through the front (access to CT's)
F. Access to the withdrawable part
G. Access to the low voltage cabinet

MCSet M rear door for cable access



For the operation of the rear cable access door, refer chapter 7.8.5 **Single-pole or three-pole cable, Access to the cable compartment** on page 39.

7.7 Installing Busbars

This connection is done during the installation of each cubicle.
Access the busbars through the cubicle side. If this is not possible, access through the interior of the cubicle (refer to the operating manual (MFR 6119301) the chapter on **Access to the main circuit compartments**).

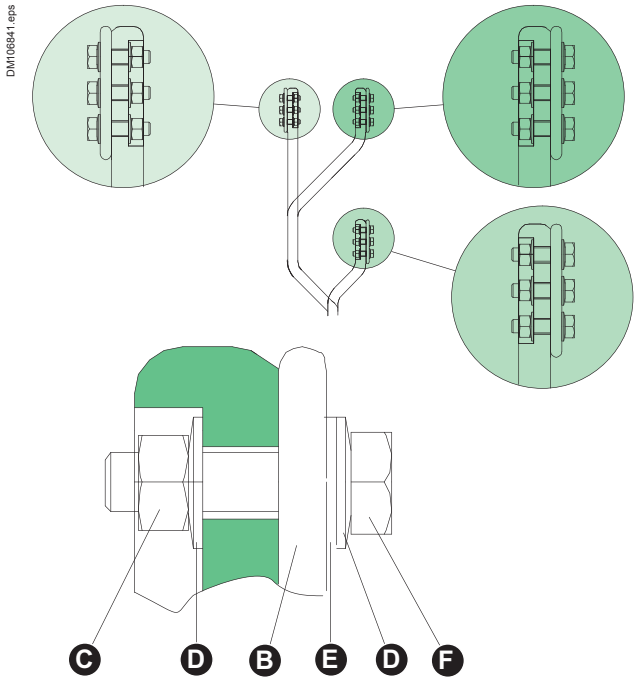
Retrieve:
- The main busbar in the cubicle packaging
- The busbar shims and hardware bag in the cubicle packaging.

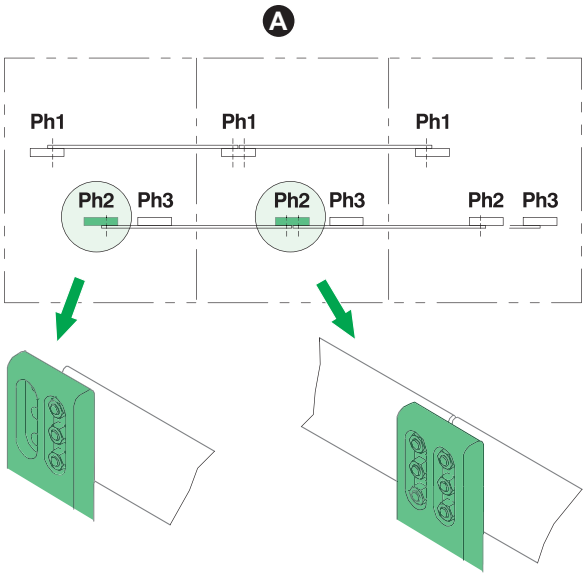
Place the busbar between the 2 previously assembled cubicles (refer to chapter on **Principle of assembling busbars**).
Tighten the fixation screws from the head side: **tightening torque 50 N.m**.
Repeat these operations each time a switchboard cubicle is placed.

7.7.1 Principle of assembling busbars

1250 A busbars

Bag of 1250 A busbars: 03407033F0.

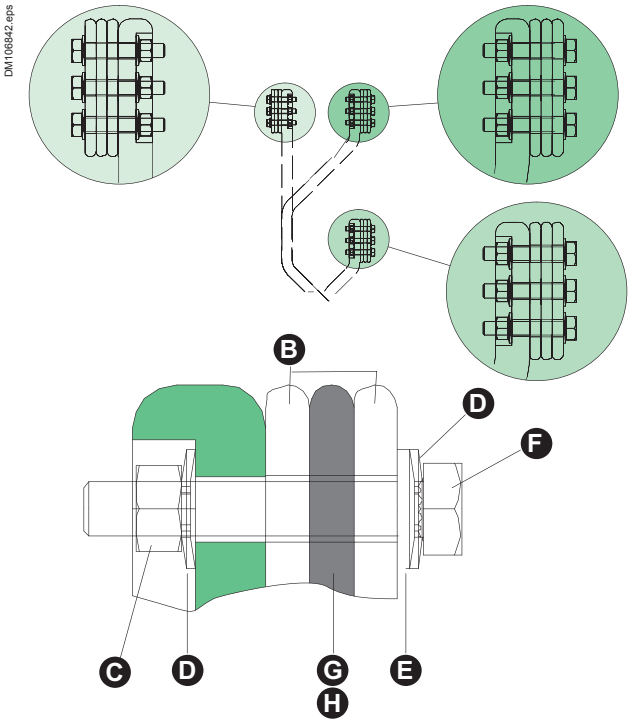


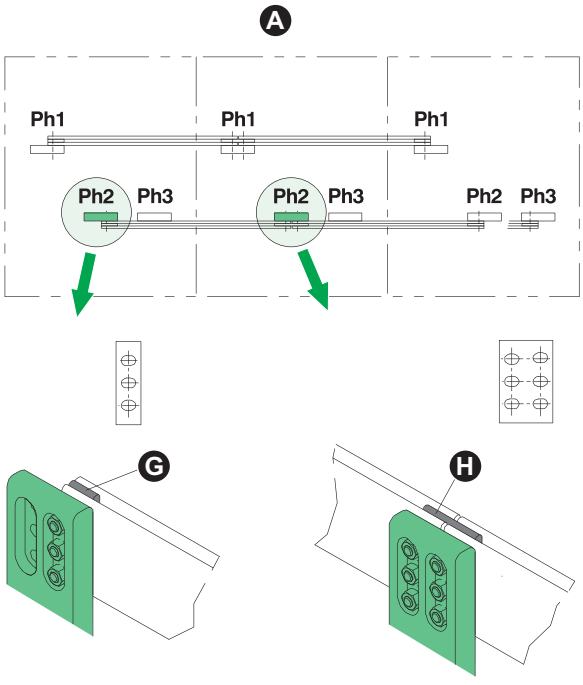


A. Top view of busbars
B. 1 x (100 x 8) bar per phase
C. Nut
D. Conical contact washer
E. Flat washer
F. M10 x 40 screws.

2500 A busbars

Bag of 2500 A busbars: 03407034F0.





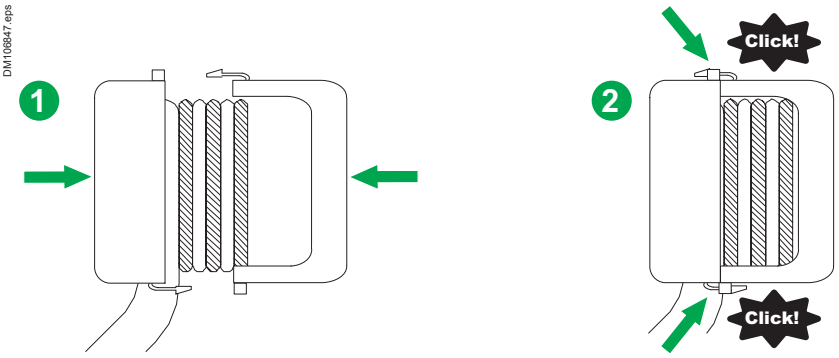
A. Top view of busbars
B. 2 x (100 x 8) per phase
C. Nut
D. Conical contact washer
E. Flat washer
F. M10 x 55 screws
G. 3 holes shim
H. 6 holes shim.

7.7.2 Cover assembly principle (depending on needs)

Assembly the covers with clips

Retrieve: From the cubicle packaging, the covers.

1. Place the half-covers on the main busbar connections.
2. Close the covers on the bars.

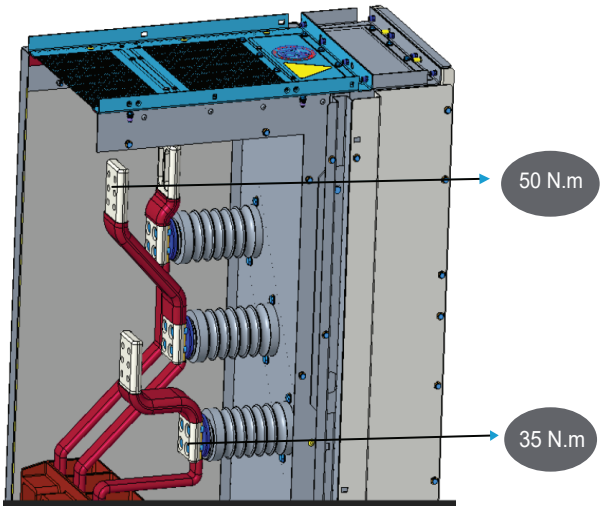


Note: For mounting the covers with wire ties, refer **Assembly of the covers with wire ties** (MFR6119201-00).

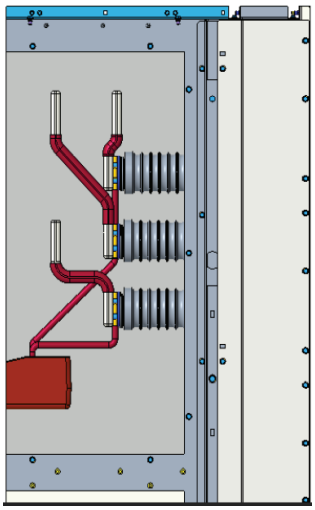
MCSet M cubicle bus bar compartment

NOTICE
HAZARD OF OVERHEATING Use specified tightening torque values for cubicle bus bar compartment. **Failure to follow these instructions can result in equipment damage.**

For spout to epoxy insulator connection 35 N.m tightening torque should be used. For riser connection to main bus bar 50 N.m tightening torque should be used.



Isometric view of bus bar compartment



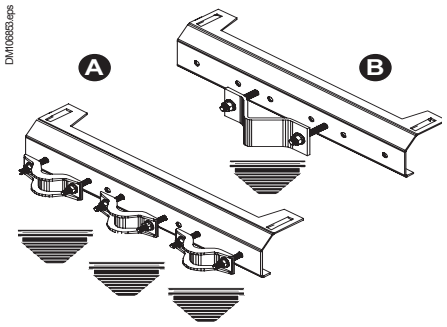
Front view of bus bar compartment

7.8 Placing MV Cables on MCSet M Cubicle

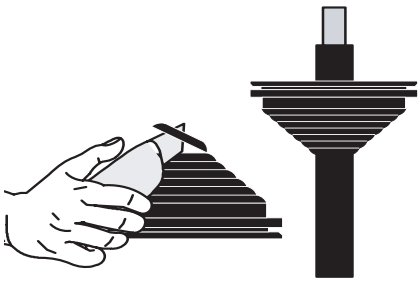
7.8.1 General information

An explanation is given for all types of cables.
Retrieve: From the cubicle packaging, floor plates, cable support and hardware bag.

To access the interior of a cubicle, refer to the operating manual (MFR 6119301) the chapter on **Access to the main circuit compartments**.



Cut cable glands according to the number and diameter of cables.
A. 3 single-pole cables
B. 1 three-pole cable.



Install them around the cables.
Refer to manufacturer instructions for cable termination.

⚠ CAUTION

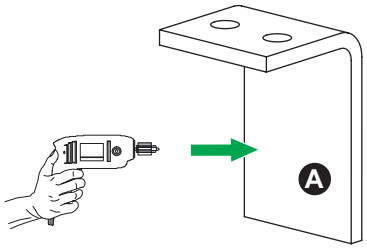
HAZARD OF INTERNAL ARC

Do not remove grommets from their respective position.

Failure to follow these instructions can result in injury or equipment damage.

Grommets are flared or collared on each side to keep them in place and it is made by rubber. A grommet is attached to the base sheet of the cubicle in the cable compartment. Cut at edge top as shown to facilitate or pass the high voltage cable.

MCSet M 1 and 2 cables per phase (optional)



An explanation is given for one phase.
Do the same for two phase.
Retrieve: in the cubicle packaging, the bracket and the hardware.

- Drill a hole in bracket **A** according to the cable head to be connected.
- Place and fix bracket **A**.

7.8.2 MV cable maintenance on MCSet M cubicle

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Make sure that the cable dielectric insulation does not contact any grounded metal parts or other phases.
- The grounded metallic support must be in contact with the external protective cable sheath.
- Only qualified personnel are to perform cable terminations and cable installation. Workers must be aware and understand the hazards involved in working with medium voltage circuits. Neglecting fundamental installation requirements may lead to personal injury, as well as damage to electrical equipment or other property.

Failure to follow these instructions will result in death or serious injury.

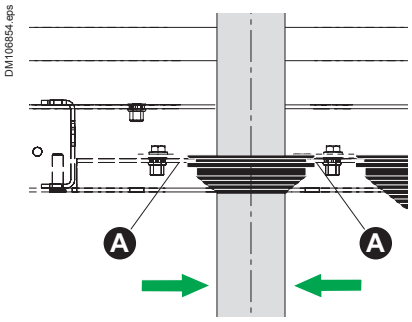
Successively assemble, after having installed a row of cables:

- Cable support
- Flanges
- Floor plates.

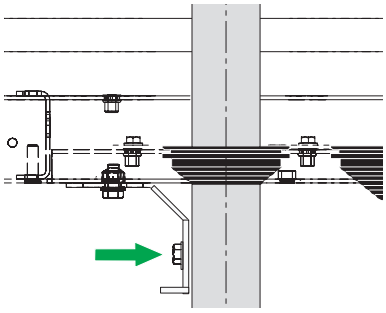
Fix the flange support under the floor, after placing the cables vertical to their attachment bracket.

Only qualified personnel can perform cable terminations and cable installation.

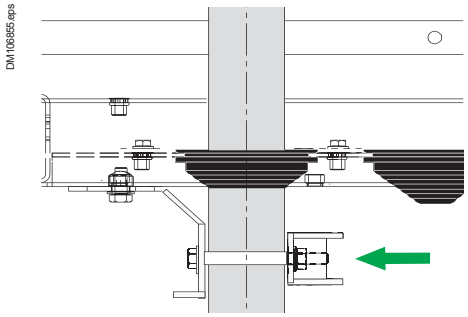
1. Position the cable and its grommet correctly between the sheets **A**.



2. Fix and press the flange support against the cable under the cubicle floor.

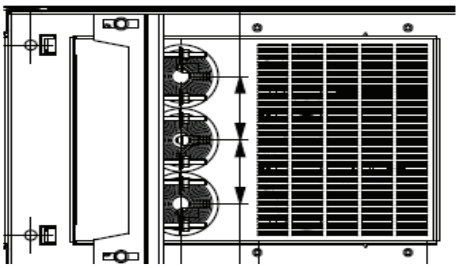


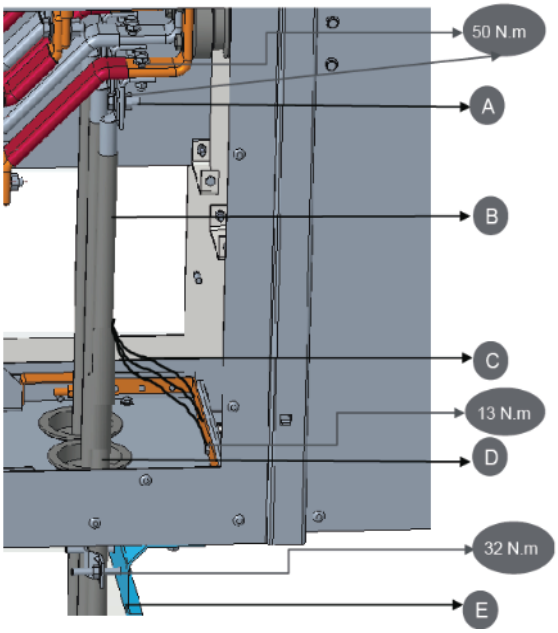
3. Block the cables with half-flanges.



4. Reassemble bottom plates.

5. Fill in the openings that have not been used with uncut cable glands.





Cable compartment with the high-voltage cables connected (plastic screen not shown)

A. Cable lug of High-voltage connection
B. Incoming cable from ground
C. Earthing connection of the cable screen
D. Openings for high-voltage cables
E. Incoming cable support

Cable termination depends on the size of the cable, cable lug, and orientation of cables. Here cable termination height should be maintained as per given in this manual.

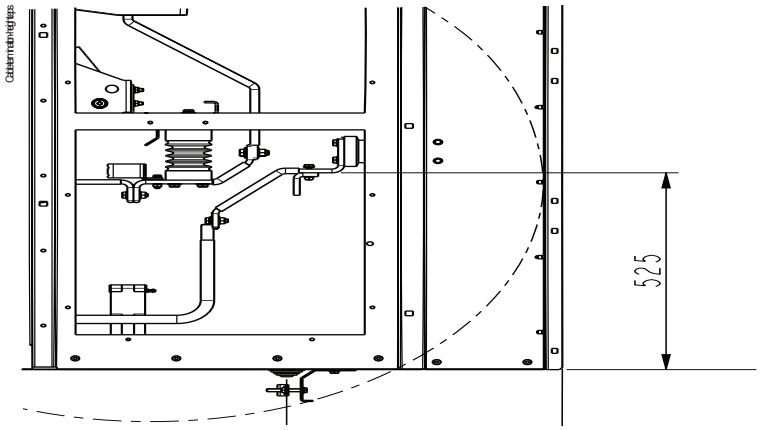
Equidistant to be maintained between three phases of the cable so that correct separation distance is maintained.

High voltage power cable external sheath should be stripped such that right cable earthing can be made with secondary earth system of the MCSet M cubicle.

Note: If splicing is involved in the cabling system, follow the below steps to build a splice.

1. Prepare the surface.
2. Join conductors with connector(s).
3. Re insulate.
4. Re shield.
5. Re jacket.

7.8.3 Cable termination height



Type of cubicle	Rating	Height
M1	400 A	525 mm

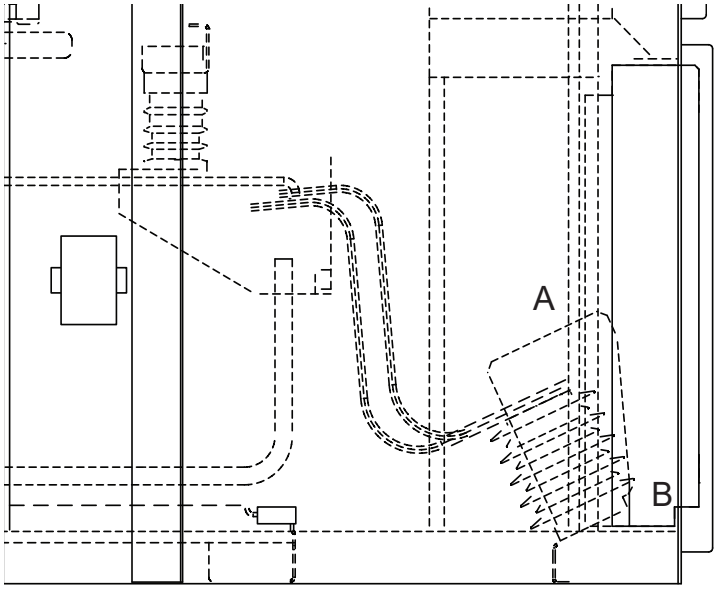
7.8.4 Surge arrester

⚠ CAUTION

HAZARD OF OF INSULATION MALFUNCTION

Use specified tightening torque values to install the surge arrester's bolt.

Failure to follow these instructions can result in injury or equipment damage.



To install the surge arresters bolt the parts located in index (A) and (B)

Tightening torque (A) : 30 N.m
Tightening torque (B) : 50 N.m

7.8.5 Single-pole or three-pole cable

Access to the cable compartment

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Check for zero voltage in the cubicle.
- CVX should be in test condition and OFF position.
- Switch ON the earthing switch before opening the cable compartment.

Failure to follow these instructions will result in death or serious injury.

Access of the cable compartment during pre-commissioning. At this situation cubicle is in uncharged condition.

Turn the earthing switch ON

1. Push the slide (Fig. 4, item A) upwards and insert the control lever of the earthing switch with the lever rod pointing up (Fig. 4, item B).
2. Turn the lever clockwise by approx. 95° (Fig. 4, item C).
3. Check position indicator. It should indicate that the earthing switch is ON (Fig. 5, item D).
4. Remove crank.

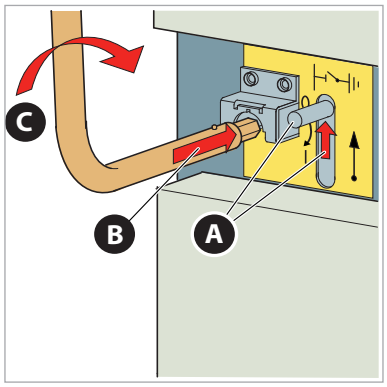


Fig. 4
Turn the earthing switch ON

A. Press slide upwards
B. Insert control lever
C. Turn control lever clockwise

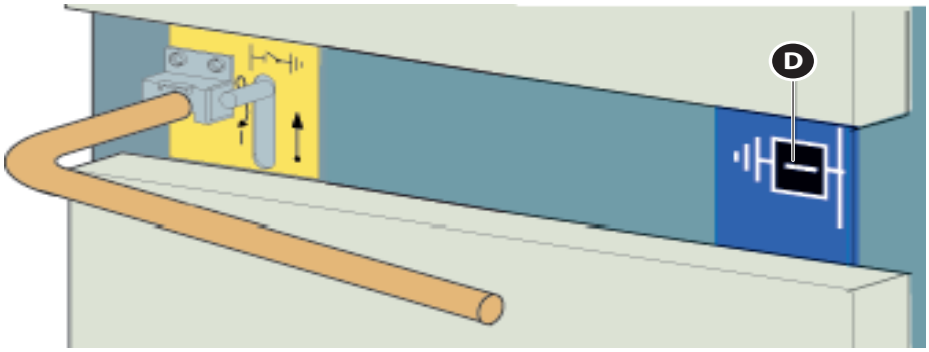


Fig. 5
D. Position indicator indicates: Earthing switch is ON

The panels can be equipped with additional cylinder locks to lock the cable compartment cover and the front door.

Interlocks by means of cylinder locks (optional)

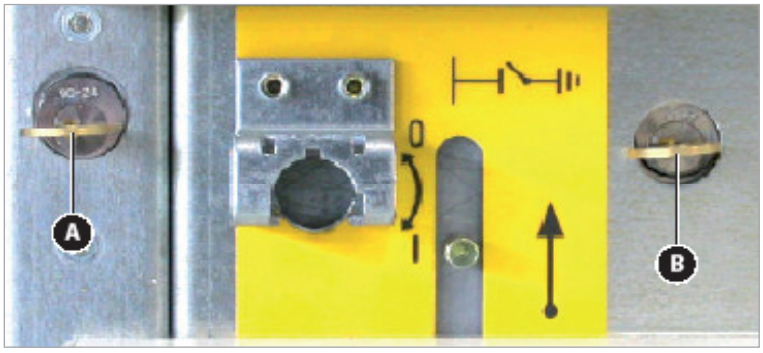


Fig. 6
A. Interlocking of earthing switch in closed condition
B. Interlocking of earthing switch in open condition

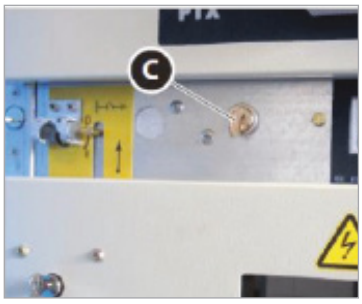


Fig. 7
C. Truck interlock

Fig. 8
D. Interlock of the switching device compartment cover

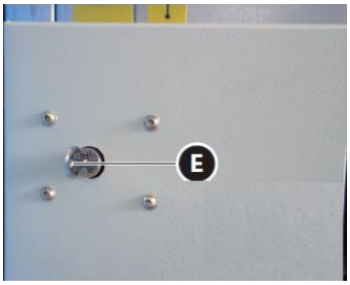
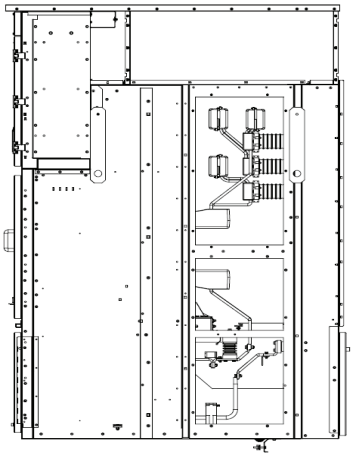
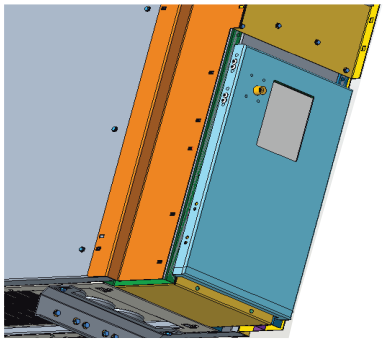


Fig. 9
E. Interlock of the cable compartment cover

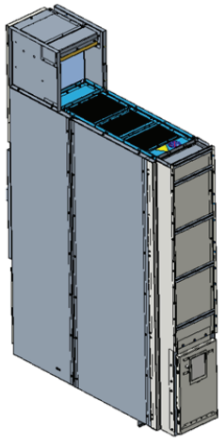
Rear cable access of MCSet M cubicle



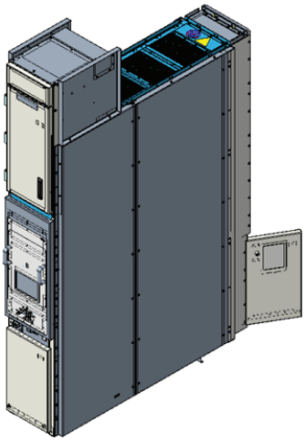
MCSet M cubicle with rear cable access arrangement



Rear cable access door secured with interlock option (key operated)



MCSet M cubicle rear cable access door closed



MCSet M cubicle rear cable access door opened

Follow the below steps to open the rear cable access door:

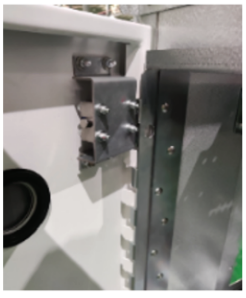
1. Check the CVX should be in test position or racked-out position inside the cubicle.
2. Earthing switch should be in close or earthed condition.
3. Take the left key (earthing switch close key) to rear cable access door.
4. Using earthing switch close key, open the rear cable access door.
5. Unless rear cable access door is closed, the earthing switch close key will be blocked.
6. Close the rear cable access door and lock it and then take out the key. Which can be again used as an earthing switch close key.

Earthing switch close key can be used for opening the rear cable access door

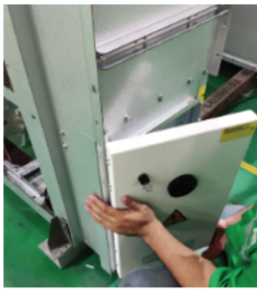
Opened rear cable access door inside view

Rear cable access door secured cable access arrangement

1



2



3

1. Door opening key **2.** Door lock and locking plate **3.** Door closing mechanism

7.8.6 High-voltage connection

Connection of high-voltage cables

Clamp fasteners for high-voltage cables, screws, bolts, and plastic sleeves are included in the accessories.

Access to the cable compartment

For more information, refer chapter 7.8.5 *Single-pole or three-pole cable, Access to the cable compartment* on page 39.

NOTICE

HAZARD OF ELECTROCUTION
- Unless otherwise specified by the cable manufacturer; comply with tightening torques as per this manual.
- Pre-coat contact area.
- Observe the phase grouping of the switchgear panel.

Failure to follow these instructions can result in equipment damage.

Follow the below steps to prepare the cable compartment and mounting the cable box:

1. Remove cable clamps and take out rubber sleeves.
2. If necessary, remove the base plates.
3. Route the individual cables outwards through the cable compartment of the panel to enable assembly of the cable ends.
4. Cut the rubber sleeves to fit the cable diameter, and push them onto the cables.
5. Strip cable ends and assemble as indicated in the manual.

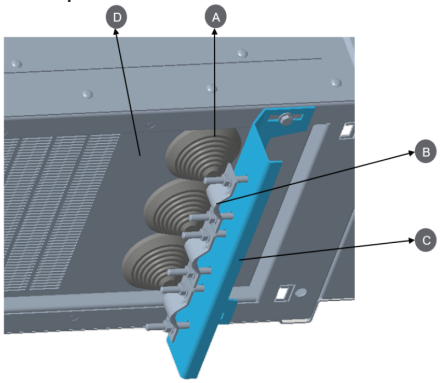


Fig. 10
Floor opening for high-voltage cables in the floor of the cable compartment

A. Cone support
B. Incoming cable clamp
C. Incoming cable clamp support
D. Bottom cover plate front IP3X

Fig. 11
Cut rubber sleeves to size and slip them onto the cables

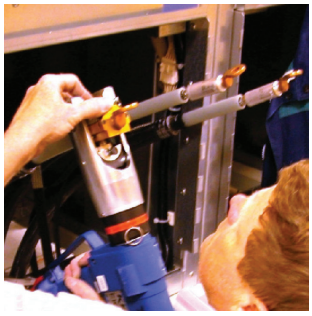


Fig. 12
Mount cable lug

Tolerance range: ±10% is applicable.

6. Fasten the individual cables to the appropriate connection areas.
7. Re-mount the base plates.
8. Fasten high-voltage cable to the floor opening using clamping assemblies (Fig. 13, item A).
9. Connect earth system screens of the cables (Fig. 13, item C) to the panel.

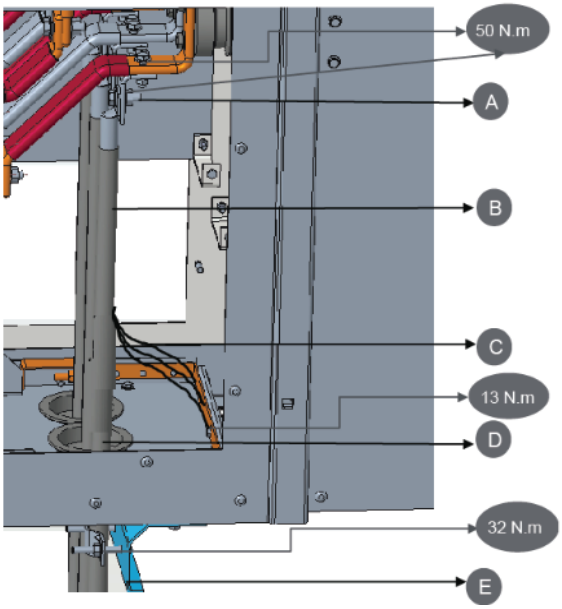
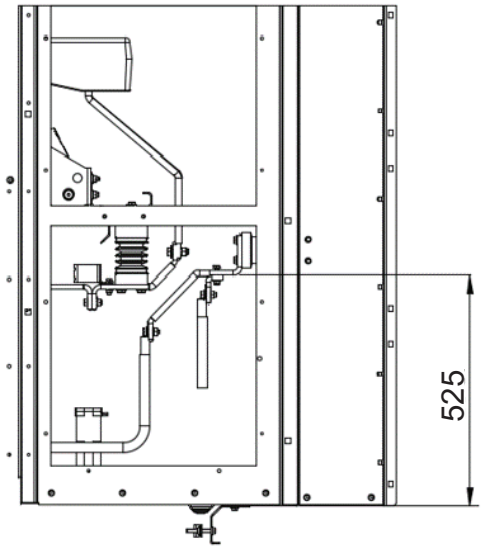
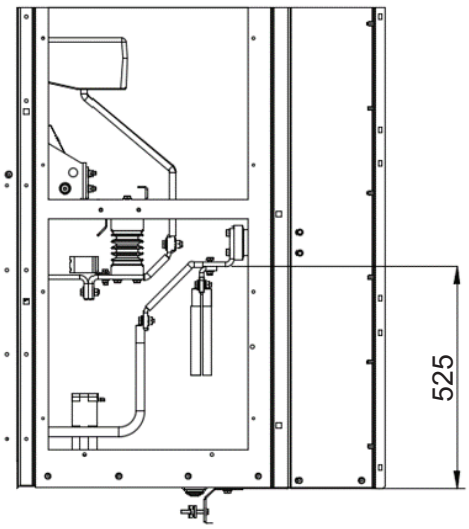


Fig. 13
Cable compartment with the high-voltage cables connected (plastic screen not shown)

A. Cable lug of High-voltage connection
B. Incoming cable from ground
C. Earthing connection of the cable screen
D. Openings for high-voltage cables
E. Incoming cable support

Overview of connecting brackets available for cable connection	
One cable per phase and cable diameter is 95 mm	Two cables per phase and cable diameter is 95 mm
 MCSet M single cabling arrangement	 MCSet M double cabling arrangement

7.9 MV Cable Screen Earthing

⚠ WARNING

HAZARD OF IMPROPER CONNECTION OF THE BRAIDS

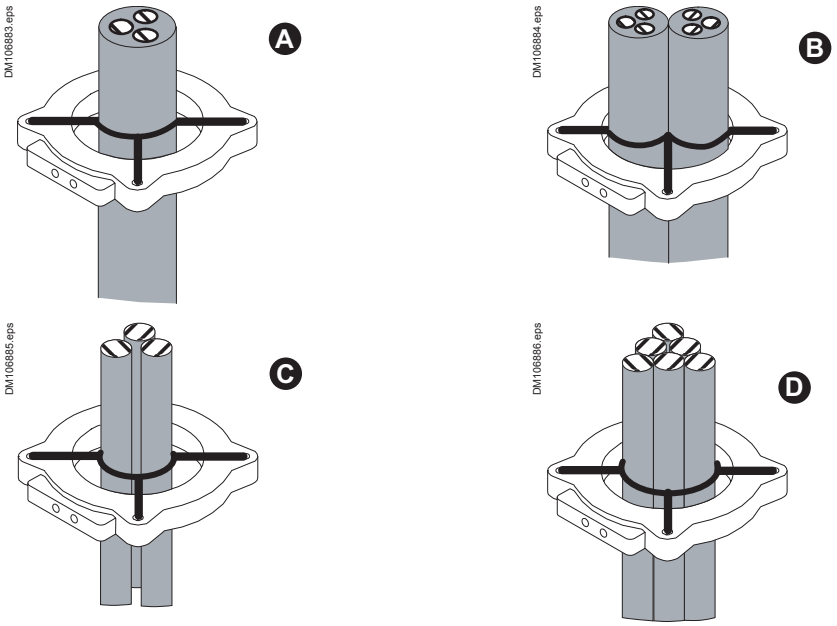
Insulated MV cable screen braids must go through the zero sequence toroid before connection to the switchboard earth system bar.

Failure to follow these instructions can result in death or serious injury.

7.9.1 For single-pole or two-pole toroid CT

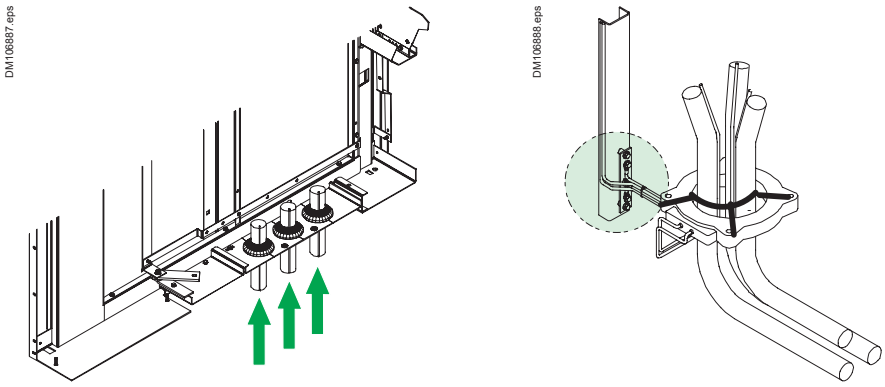
The braid connection is done inside the cubicle.

7.9.2 For zero frequency toroid



Example of cable installation:

A. three-pole cable 1 cable per phase 3 earthing braids
B. three-pole cables 2 cables per phase 6 earthing braids
C. single-pole cables 1 cable per phase 3 earthing braids
D. single-pole cables 2 cables per phase 6 earthing braids.

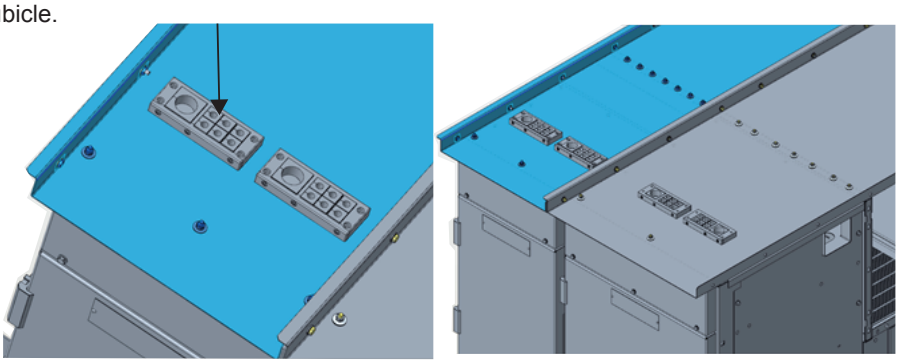


The braid earth connection is done on the switchboard earth bars inside the maintenance space. Example: one cable per phase, 3 braids to be connected. Two cables per phase, 6 braids to be connected.

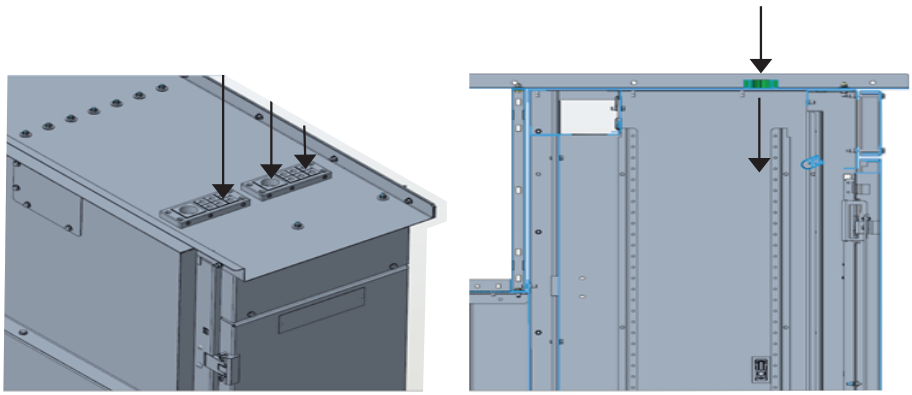
7.10 LV Cable Routing and Connection

7.10.1 Incoming cables through the top, each cubicle

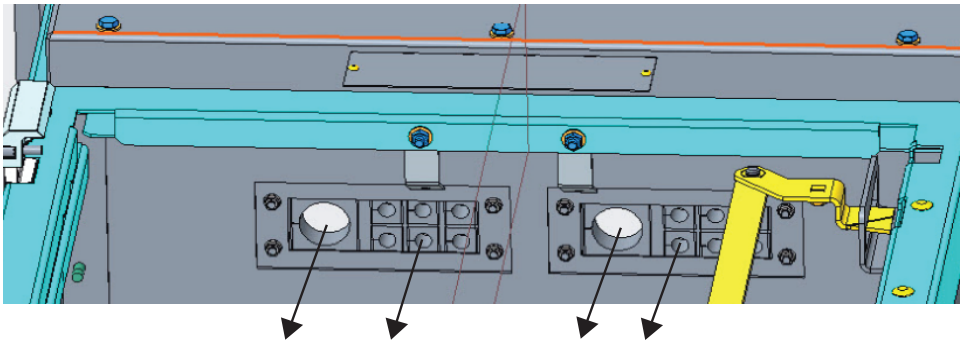
1. Remove the cover sheet to prepare the cable gland assembly on the aperture at the top of the cubicle.



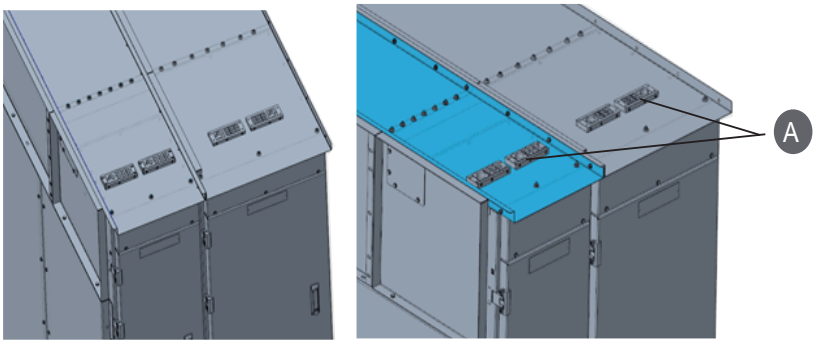
2. Route the cables directly into the LV compartment top sheet through the top IPX1.



3. Connect wires to the internal terminal block of the LV compartment.



4. MCSet 1 and MCSet M cubicles with LV cable gland KEL-U.



A. Low voltage cable gland KEL-U

7.10.2 Wiring passage between cubicles by separate conduit

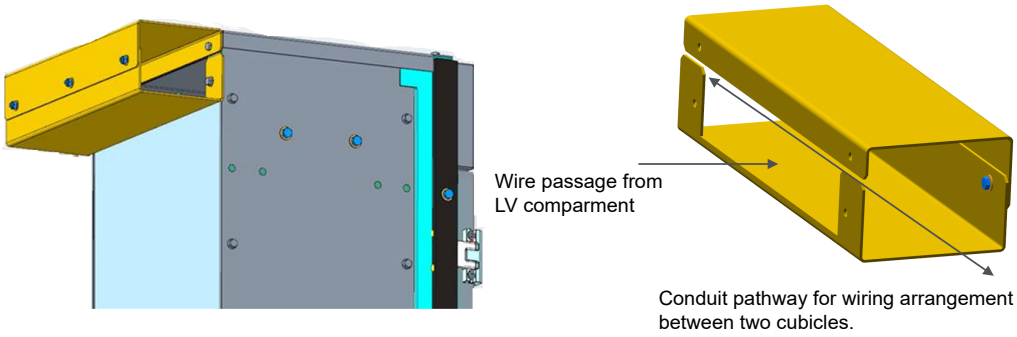
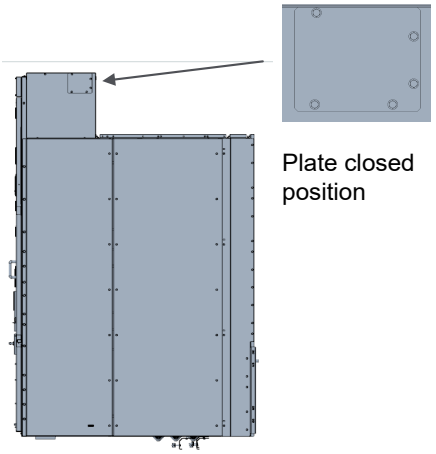
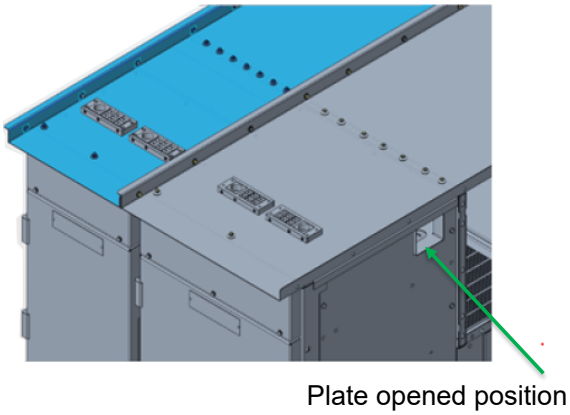


Fig. 14
Wire passage conduit arrangement assembly with MCSet M cubicle in LV compartment

The wire passage conduit has split type design as shown in Fig. 14. It is made of top and bottom part and split type in design. It is attached at the top back side of LV box. Wiring is routed through the back side of the metering box and supported by the wiring conduit.

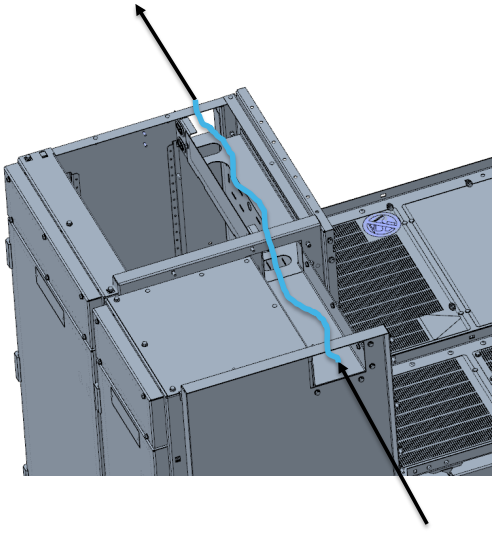


The passage plate is closed for wire conduit arrangement



The passage plate is opened for wire conduit arrangement

End panel's low voltage compartment wiring access plate should be in closed position.

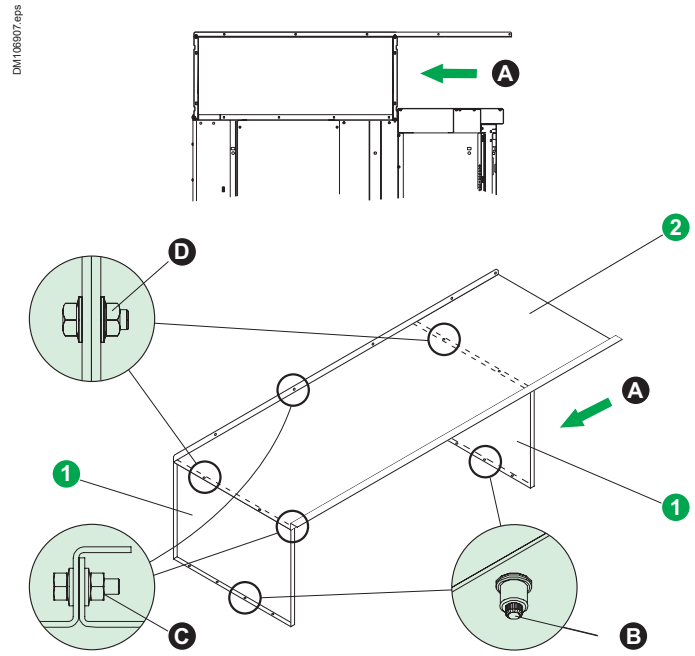


Detailed representation of the wire passage between cubicles.

7.11 Installing a Non Wall-Mounted Tunnel and Roof

Duct parts and associated hardware are supplied to the customer's site in a packaging box. Check and unpack the packaging box and follow the below said steps to assemble the duct on the respective cubicles.

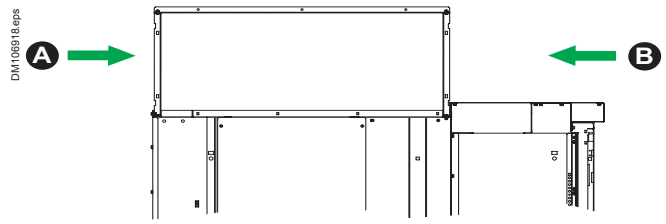
7.11.1 IPX1 roof for version up to 2500 A



A. Front of the cubicle
B. HM6 screws
C. HM6 screws + M6 washers and HM6 nuts.
D. HM6 screws + M6 sealing washers and HM6 nuts.

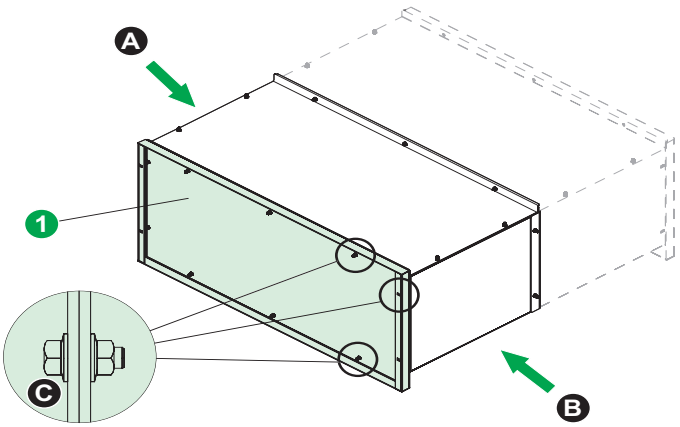
1. First fix the sheets (**1**) onto the cubicle using four screws (**B**) for MCSet 1 and six screws (**B**) for MCSet 2 and MCSet 3 for each sheet.
2. Fix the roof (**2**) onto the sheet (**1**) using two screws (**C**) for MCSet 1 and three screws (**C**) for MCSet 2 and MCSet 3.
3. Fix the tunnels of each cubicle together using five screws (**D**).

7.11.2 Tunnel end sheets for anti-arc tunnels or IPX1 roofs



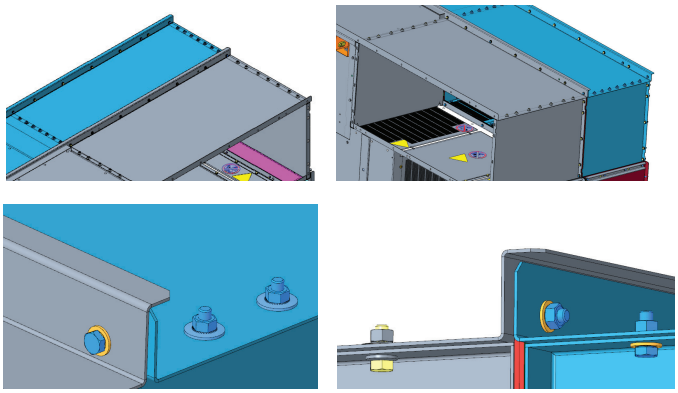
A. Front of the cubicle
B. HM6 screws
C. HM6 screws + M6 washers and HM6 nuts.

1. First fix the sheet (**1**) onto the cubicle with the screws (**C**).
2. Fix the sheet (**1**) onto the tunnel with the screws (**C**).

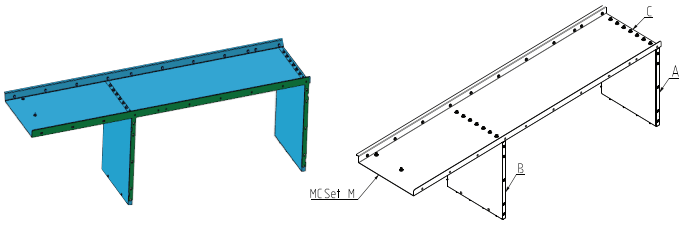


Assembly of duct to be carried out at installation site for cubicles

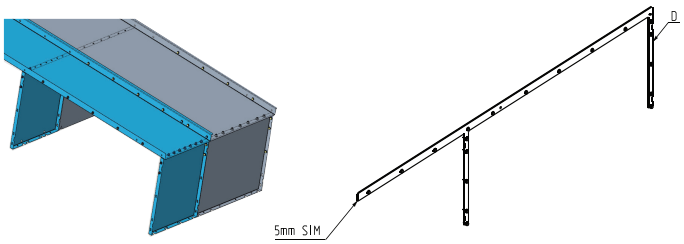
1) Refer the duct assembly top roof of the MCSet M with MCSet 1 cubicle.



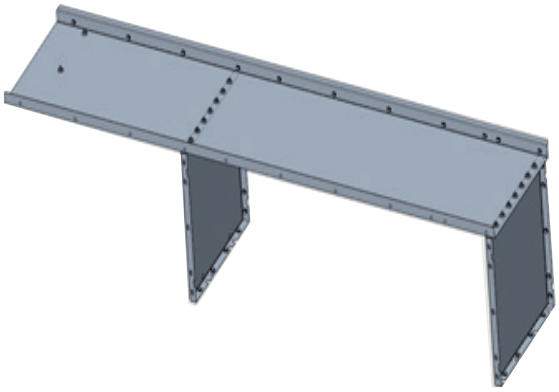
2) Assemble tunnel rear vertical support (A), assemble tunnel front vertical support (B), and assemble tunnel roof cover IPX1 AFLR 1725 (C) on tunnel rear & front vertical support (A/B).



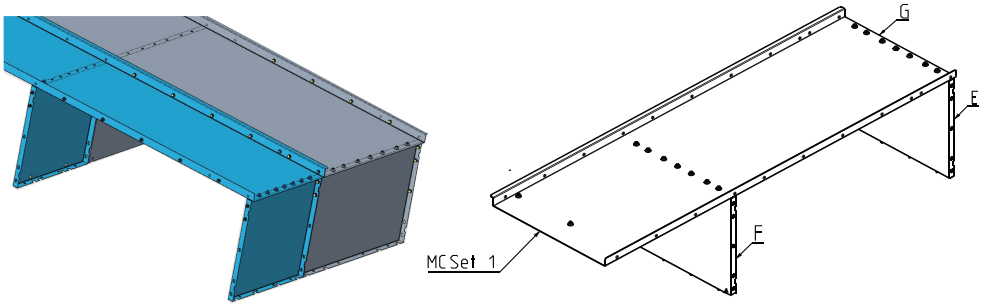
3) Two quantities of components (D) with 5 mm sim to couple in between MCSet M and MCSet 1. Assemble components (D) with tunnel rear & front vertical support (A/B).



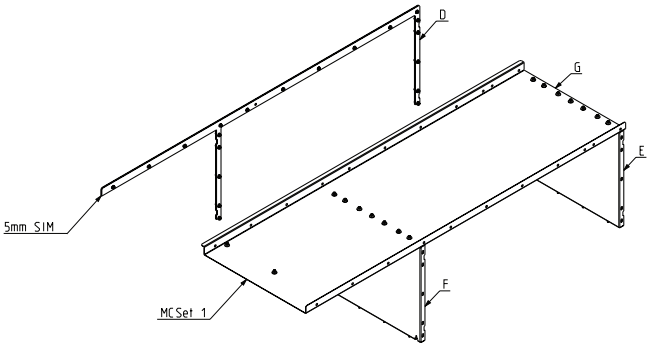
4) Refer top roof of MCSet 1 cubicle.



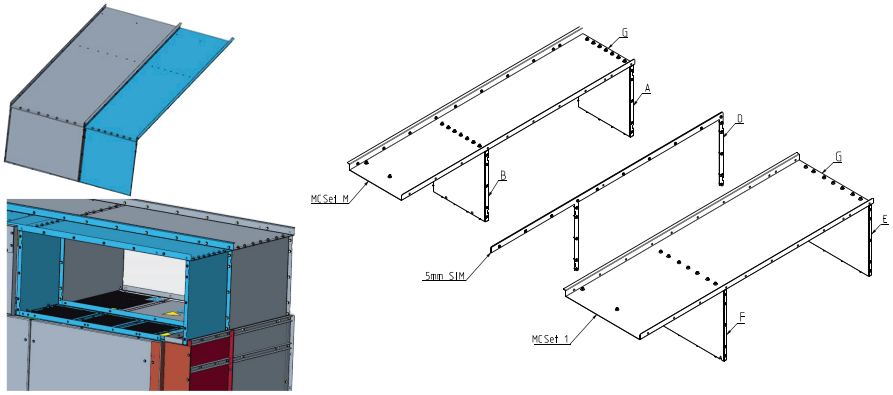
5) Assemble tunnel rear vertical support (E), assemble tunnel front vertical support (F), and assemble tunnel roof cover IPX1 AFLR 1725 (G) on tunnel rear & front vertical support (E/F).

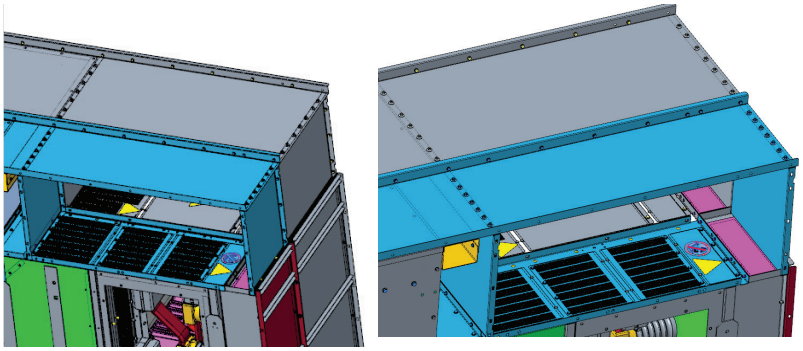


6) Assemble (D) with (G) which is tunnel roof cover IP1X1 AFLR 1725 of MCSet 1 cubicle and put all necessary hardwares as per drawing.



7) Check the complete assembly of ducts and also verify there is no gap in between two cubicles duct assembly.





7.12 Rating Plates and QR Code

User facing the cubicle can find the rating plate attached on the medium voltage door. Rating plate provides the basic essential product details along with QR code (Fig. 15).

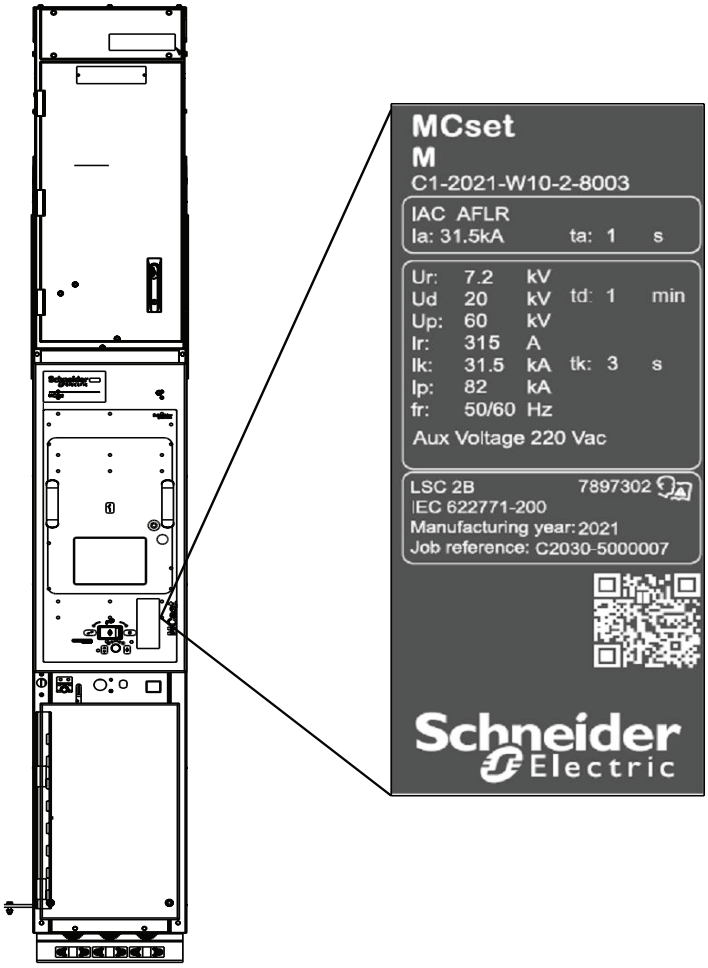


Fig. 15
Front view of the MCset M

7.12.1 QR code

Scan the QR code placed on the MCSet M cubicle.

Follow the steps to scan the QR code on Android phone with built-in camera app.

1. Open the built-in camera app.
2. Point the device at the QR code so the QR code appears on the screen.
3. Android device will recognize that it is a QR code and it will take to Schneider Electric website.
4. Access the updated e-Catalog. Including the data sheet, FAQ, product documentation and brochure.

7.13 Principle of Supply for Easergy TH110

Easergy TH110 is a wireless sensor that enables the continuous thermal condition monitoring of all the critical connections made on the field, such as: cables, withdrawable circuit breakers (CB) and busbar connections.

Continuous thermal monitoring is the most efficient solution that allows users to:
- reduce risks for operators and equipment
- help to prevent connection failures
- minimize unscheduled downtime of critical installations
- optimize maintenance costs

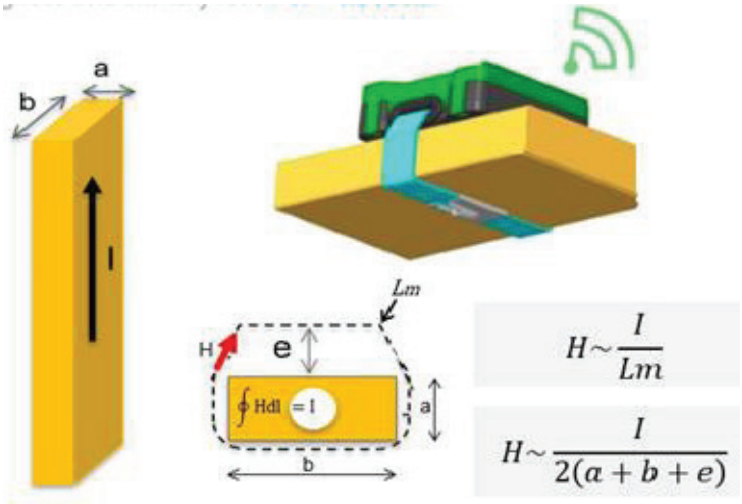
Easergy TH110 is self powered by the network current. Temperature data is sent via Zigbee wireless communication to provide high performance and accurate thermal monitoring. The sensor is secured to the connection point and is in direct contact with the measured point.

Easergy TH110 sensors contribute to EcoStruxure architectures, either on cloud or on premises to deliver a truly intelligent condition-based maintenance advisor for reduced risk, continuity of service and maintenance optimization.

- Based on energy recovery by induction.
- The crossing current generates a magnetic field intensity using the ferromagnetic ribbon (LM).
- Easergy TH110 have been designed to start its power on at H=0.4 A/cm.

Note: Easergy TH110 needs more power during pairing so magnetic field intensity reach.

Description	Input
H - A/cm	0.4
a (bar thickness) - cm	0.5
b (bar width) - cm	4
e (band hight) - cm	0.3
Mini working current in bar-I (A)	3.8
Mini pairing current in bar-I (A)	15.4
Cable or mobil connector diam (cm)	6
Mini working current in cable-I (A)	7.9
Mini pairing current in cable-I (A)	31.7



8. Index

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