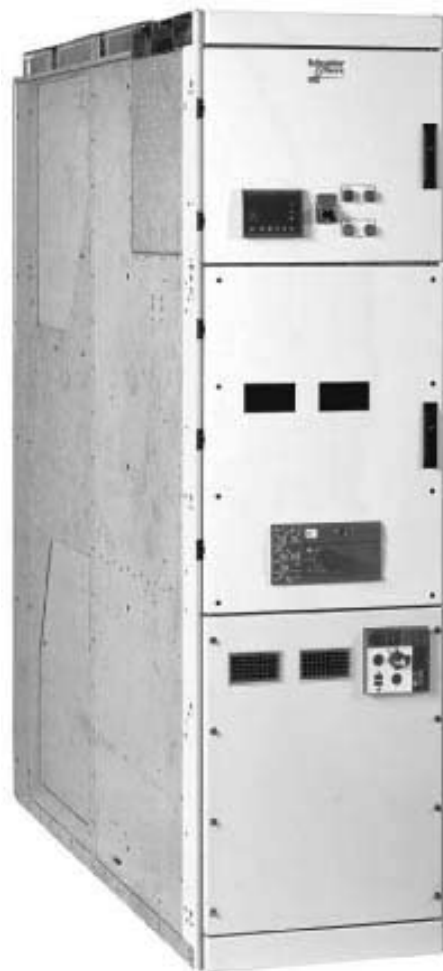


Air Insulated Medium Voltage Equipment

NEX - 24 kV

Withdrawable Circuit Breaker

Installation instruction



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General

Glossary

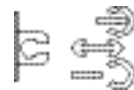
FU	Functional unit (cubicle + mobile part + relay unit)
IF	Incomer/Feeder cubicle
BC	Bus coupler
RF	Bus riser - Fixed type
RW	Bus riser - Withdrawable type
BM	Busbar metering
LB	Fuse switch feeder cubicle
CB	Circuit breaker
VT	Voltage transformer
CT	Current transformer or current sensor
VPIS	Voltage Presence Indicating System
LV	Low voltage
MV	Voltage class 24kV
ES	Earthing switch
ID	Incoming direct to busbar cubicle

Symbols

ES operation



Plug-in prevention position.
Locking possible.



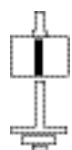
Plug-in or withdrawal position.



Operation position.



Open earthing switch mechanical indicator
light.



Closed earthing switch mechanical indicator
light.



Position can be locked using paslocks.

General

Mobile part operation



Operation position.



"Plugged-in" position.



"Withdrawn" position.



Insertion/extraction position.

Recommendations

Installation above the switchboard

All type of equipment installation such as lamp or light are forbidden.

Marking



It is compulsory forbidden to walk on the parts bearing this marking.



It is compulsory forbidden to remove the parts bearing this marking when the equipment is energised.

Standard tightening torques

(Non greased screws and bolts)

Application methods:

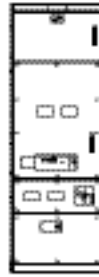
The elastic washers placed on the external sides of the pads and busbars ensure better distribution of stress regarding screws tightened to the recommended torques.

Screw	Torque in Nm
Ø 6	13
Ø 8	28
Ø 10	40
Ø 12	75
Ø 14	120

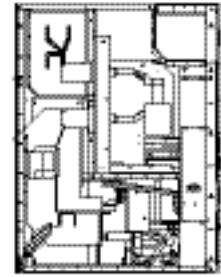
Dimensions and weights

Typical cubicles

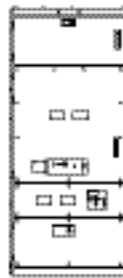
Incomer/feeder
IF1, IF2, IF3



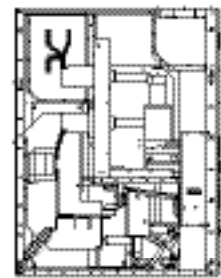
IF1, IF2



IF1, IF2



IF3

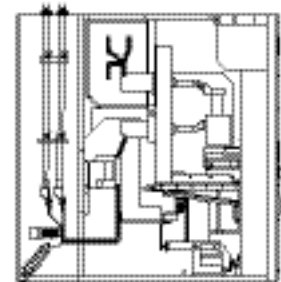


IF3

Incomer/feeder with top entry
IF1C and IF2C (via cables)
IF2B and IF3B (via busbars)



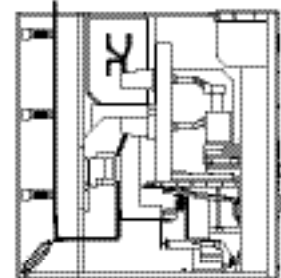
IF1C - IF2C



IF1C - IF2C



IF2B - IF3B



IF2B - IF3B

Overall dimensions and approximate weights of the basic cubicles

(with CB, CT, VT, ES)

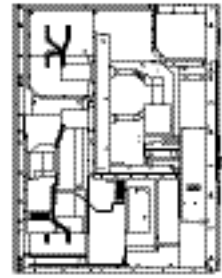
Type	Width (mm)	Height (mm)	Depth (mm)	Weight (kg)
IF1, IF2	800	2300	1750	1200
IF3	1000	2300	1750	1400
IF1C, IF2C, IF2B with top entry	800	2300	2250	1650
IF3B with top entry	1000	2300	2250	1700

Dimensions and weights

Bus coupler BC2, BC3



BC2



BC2



BC3

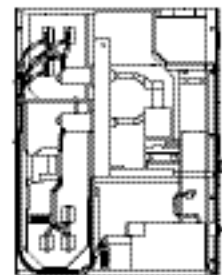


BC3

Bus coupler with VT BC2, BC3



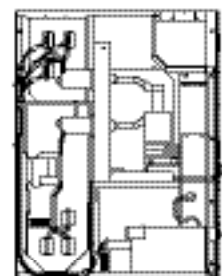
BC2 with VT



BC2 with VT



BC3 with VT



BC3 with VT

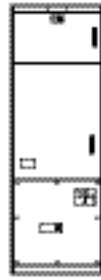
Overall dimensions and approximate weights of the basic cubicles

(with CB, CT, VT, ES)

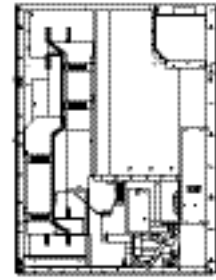
Type	Width (mm)	Height (mm)	Depth (mm)	Weight (kg)
BC2	800	2300	1750	1050
BC3	1000	2300	1750	1200
BC2 with VT	800	2300	1750	1200
BC3 with VT	1000	2300	1750	1350

Dimensions and weights

Bus riser RF2, RF3, RW2, RW3



RF2, RF3



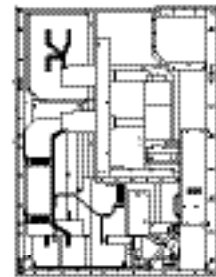
RF2, RF3



RW2



RW3



RW2, RW3

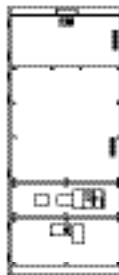
Incoming direct ID2, ID3



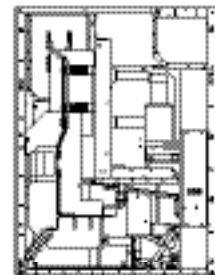
ID2



ID2



ID3



ID3

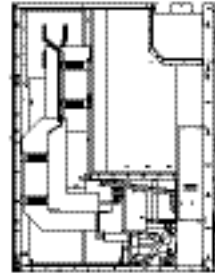
Overall dimensions and approximate weights of the basic cubicles

(with CB, CT, VT, ES)

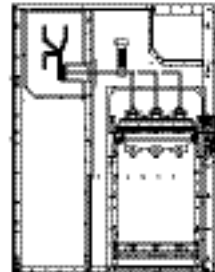
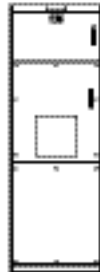
Type	Width (mm)	Height (mm)	Depth (mm)	Weight (kg)
RW2, RF2, RF3	800	2300	1750	850
RW3	1000	2300	1750	1000
ID2	800	2300	1750	900
ID3	1000	2300	1750	950

Dimensions and weights

Busbar metering BM



Fuse switch LB



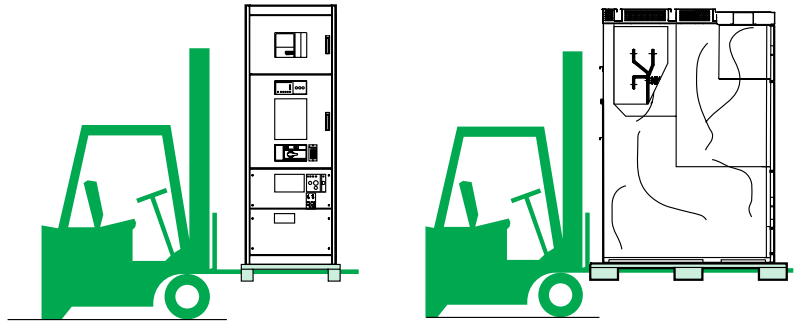
Overall dimensions and approximate weights of the basic cubicles

(with CB, CT, VT, ES)

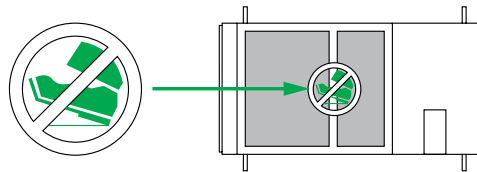
Type	Width (mm)	Height (mm)	Depth (mm)	Weight (kg)
BM	800	2300	1750	880
LB	800	2300	1750	550

Handling instructions

Handling

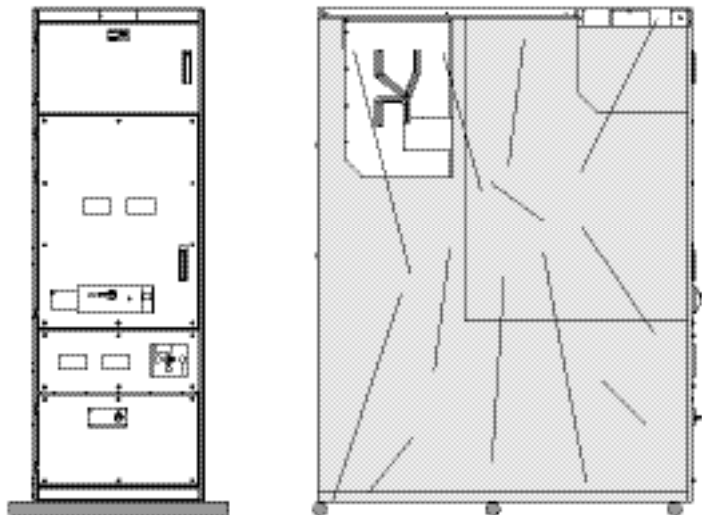


Do not walk on the top of the packaged cubicles



Handling on rollers

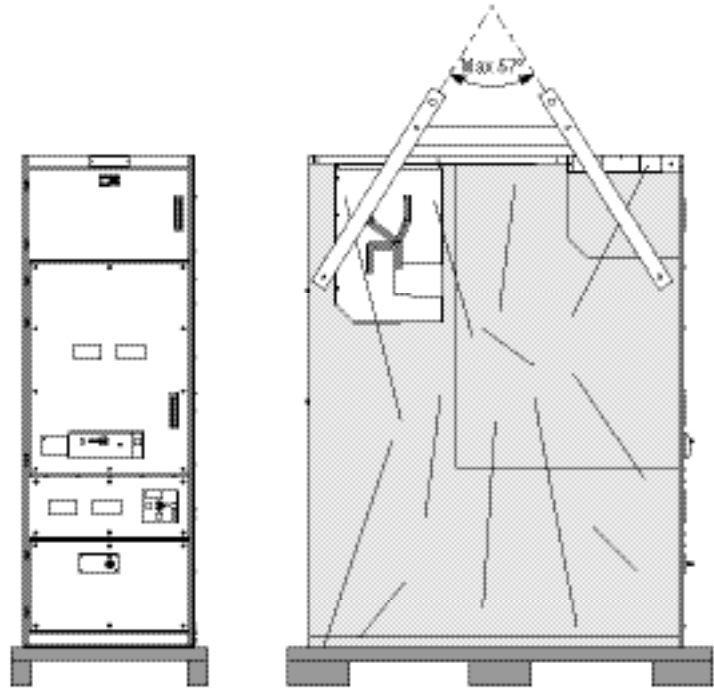
Note: before placing the unit on rollers, remove the pallet.



Handling instructions

Handling with slings

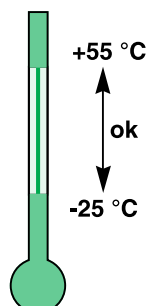
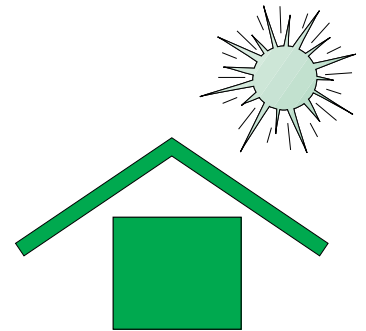
Screw together the pieces of the lifting frame in accordance with the assembly drawing 51303605F0. Put the frame on the cubicle roof and attach to it the four lifting bars by screws. Fix the lifting bars to the cubicle by means of heavy cage nuts that are already mounted in the cubicle uprights. Attach the four slings to the lifting bars. As soon as the cubicle is lifted, remove the pallet.



Storage

Store the equipment in its original packaging, indoor in a dry clean and ventilated place.

The equipment should not undergo high humidity levels or wide thermal variations. If works are in progress, leave an adequate protection against dust, paints, etc.



Installation and operation recommendations

Long term switchgear performance

Long term switchgear performance in an MV substation depends on 3 main factors

The need of proper installation of the MV cables:

The new cold slip-on and retractable technologies offer ease of installation. Their design enables operation in polluted environments with harsh atmospheres.

The influence of the relative humidity factor:

the installation of heating resistors is essential in climates with high humidity and large temperature differences.

Ventilation control:

cubicle ventilation must not be impeded. This is to ensure air circulation within the switchboard cubicles.

Operation

Regular operation:

We strongly recommended that you carry out at regular intervals (at least every year) a few operating cycles on the switching devices.

Outside normal operating conditions (between -5 °C and 40 °C, absence of dust, corrosive atmosphere, etc.) we recommended that you contact our Schneider Electric Service Centre in order to examine the measures to be taken to ensure proper installation and operation.

Specific operation:

After 6 to 12 month operations, we recommend you to check the busbars and MV cableconnection tightening.

It should be done with a calibrated torque spanner, adjust to lower torque compare to values indicated in page 4.

If no problems are detected and if the busbars and cable connections haven't been modified, it will not necessary to do again this check. In case of dismantling, the elastic washers must be change and replace by new ones supplied by Schneider Electric.

Schneider Electric services centres

Our service centre is at your disposal at all times:

- to conduct an installation diagnosis
- to suggest the appropriate maintenance operations
- to offer you maintenance contacts
- to suggest adaptations.

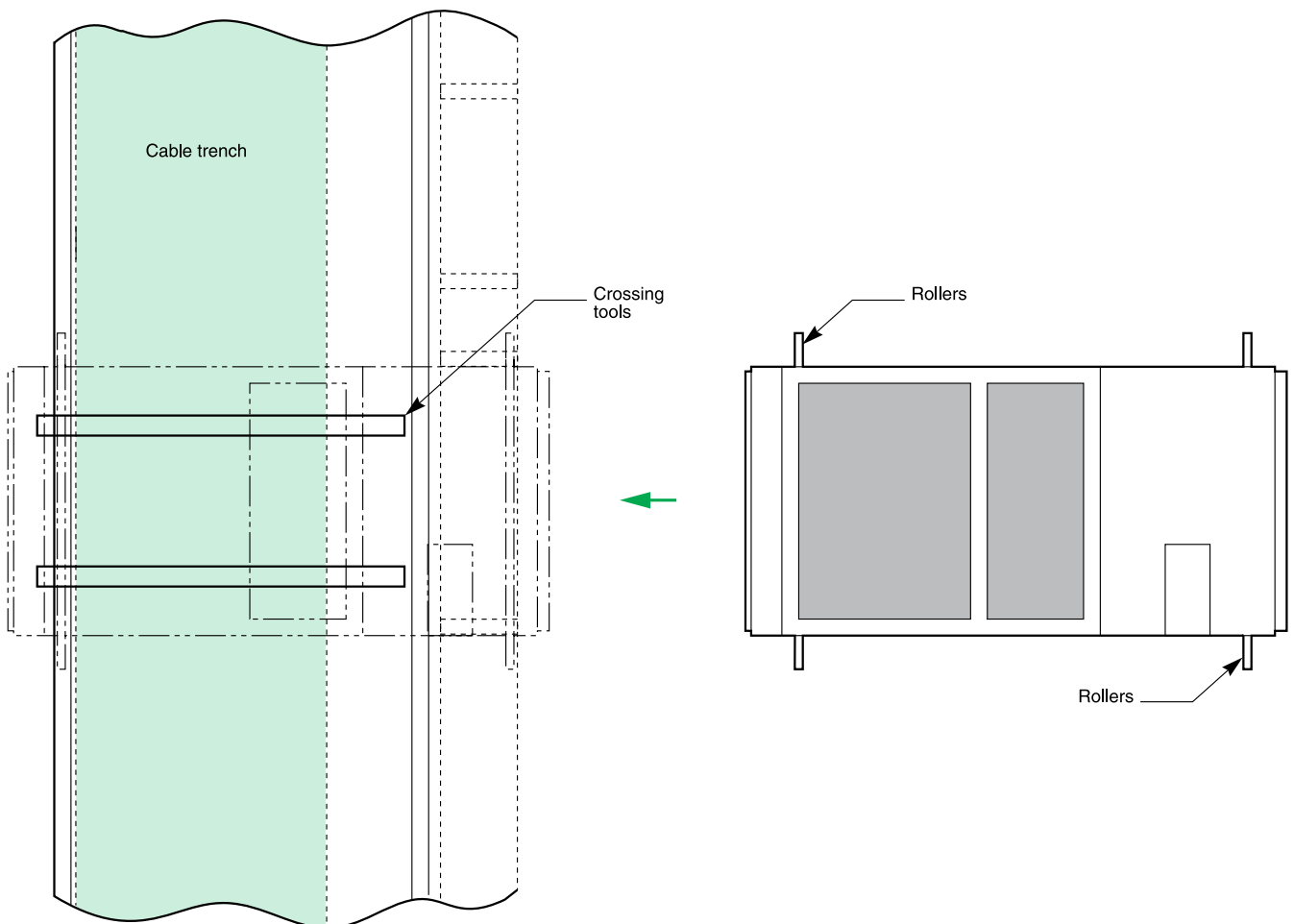
Installation instructions

Unpacking the cubicles

The cubicles should be unpacked close to the erection site.
Remove the plastic wrapping and the pallet. Remove the lifting lugs.

Positioning over the trench

If the cable trench consists of one continuous floor opening, the use of trench crossing tools may be required.
Lay the crossing tools across the trench where the cubicle is to be installed.
Move the cubicle into position in front of the trench with the use of rollers and push into position.
Remove the rollers and crossing tools.
Alternatively, if overhead lifting equipment is available, simply lower the cubicle into position over the trench, with the aid of slings and lifting bars.



Note: it is recommended to set in position first the cubicle in the centre of the switchboard.

Installation instructions

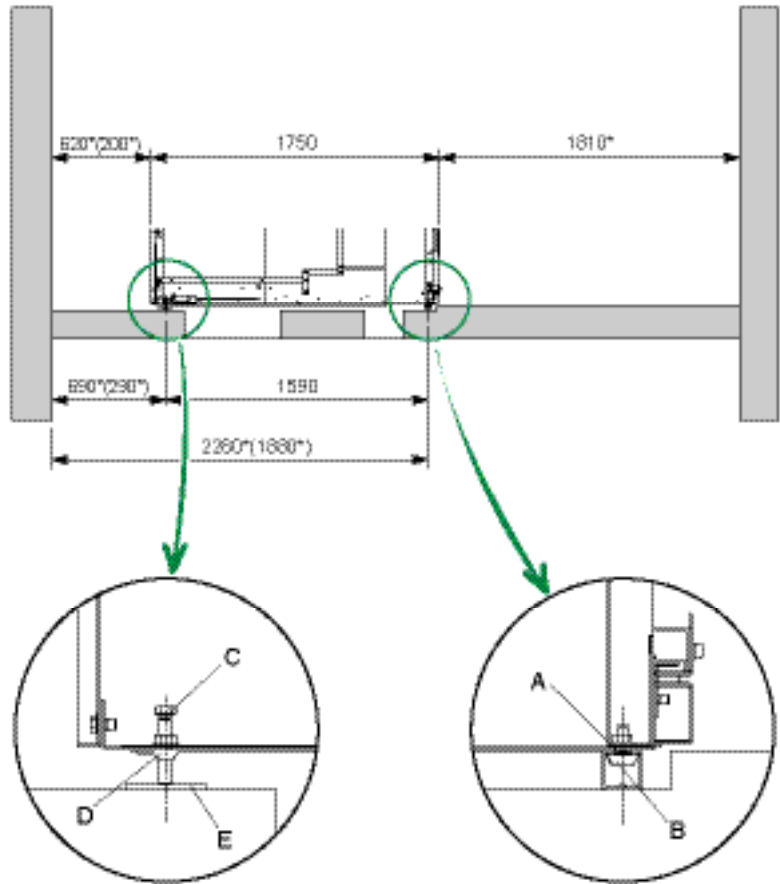
Fastening to the floor

* minimum dimension (in mm).

Dimensions in parentheses:
- cubicles not accessible from rear.

Dimensions out of parentheses:
- cubicles accessible from rear.

- A: 2 x 51304089F0 washer for fixing
- B: 5 x M10x40 hammer head screw + nut + washer
- C: 2 x M12x60 hexagonal screw + nut + washer
- D: 2 x M12 heavy cage nut
- E: 2 x 80x80 steel plate
thickness: mini 5 mm, max 10 mm.



Verify the correct alignment

Starting situation

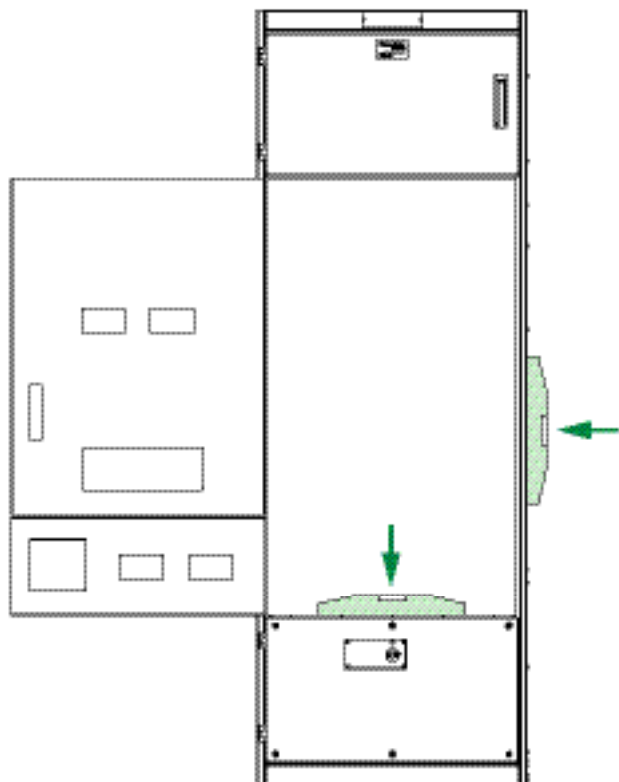
Circuit-breaker and VT truck removed from the cubicle.

Verify that the cubicle is level by means of a spirit level.

Insert the CB and VT truck into the cubicle.

Check that all covers and doors can be closed and are fitted correctly.

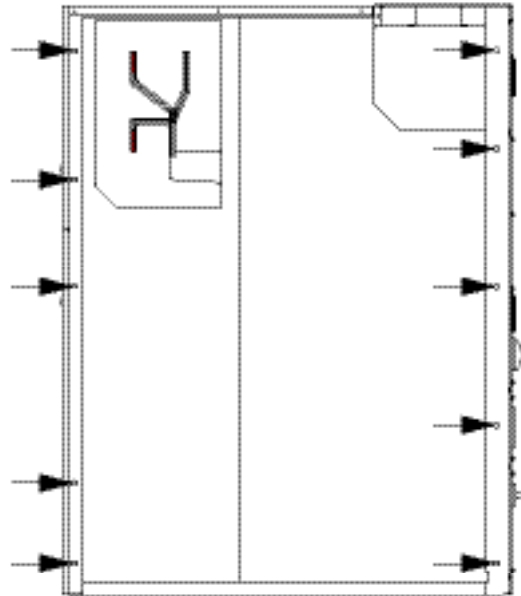
After checking, remove the CB and VT truck.



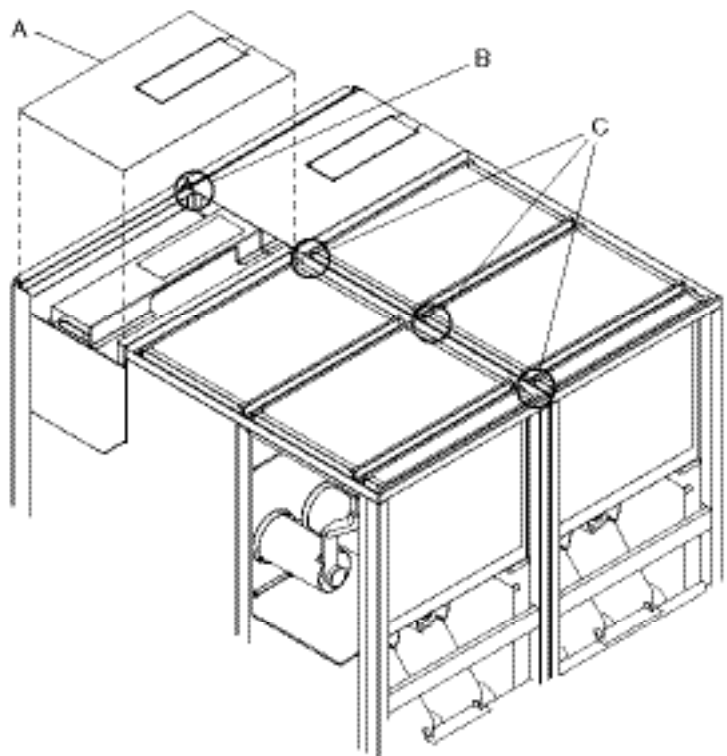
Installation instructions

Inter-cubicle fixings

Place the second cubicle alongside the first and follow the same procedure for installation.
Fasten the two cubicles together at the 10 fixing points indicated.
Screws, nuts and washers are supplied as part of the loose equipment.

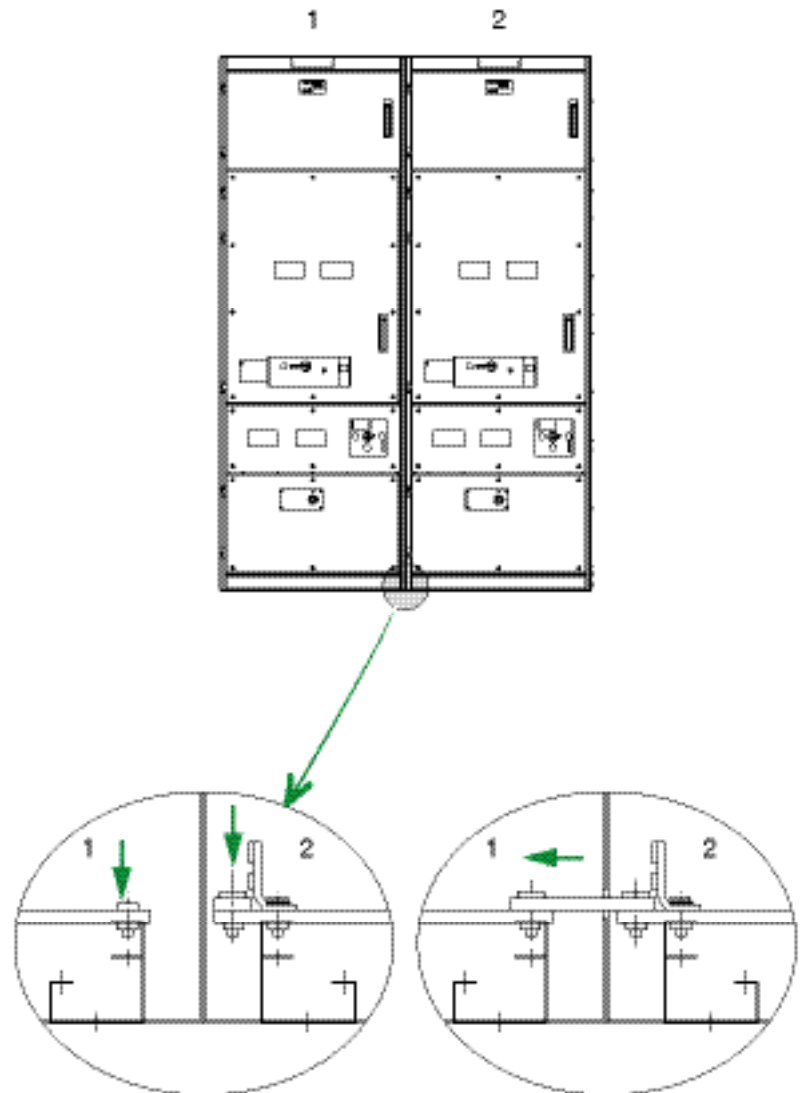


Remove the cover plates (A) of the adjoining LV compartment roofs and screw together the front uprights of the two cubicles at the top on place (B).
Screw together the roof-frame of the two cubicles at three places (C).
Replace the cover plates.



Installation instructions

Inter-cubicle earth-bar connection



Remove the fixing where indicated on both cubicle 1 & 2.

Slide the fishplate from cubicle 2 to cubicle 1 through the sidewall openings.
Replace the fixings and re-tighten them on both cubicle 1 and 2.

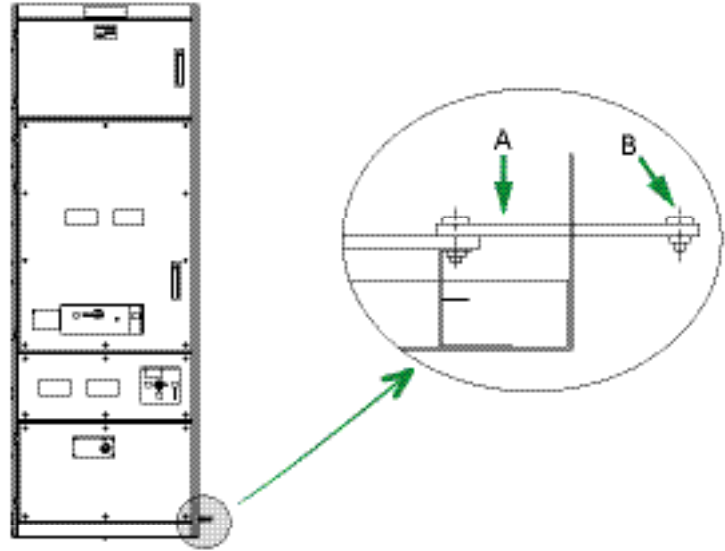
Tightening torque 30 Nm.

Installation instructions

End-cubicle earth-bar connection

Fit a fishplate (A) and an L-shaped earth-bar (B) at right and left hand ends of the switchboard as shown.

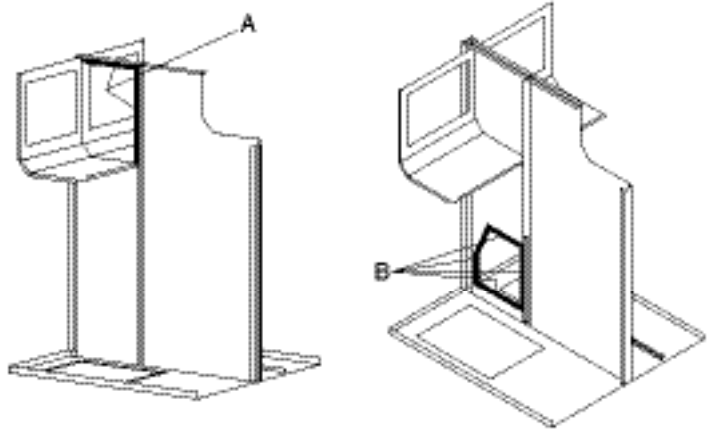
Tightening torque 30 Nm.



Bus chamber field deflectors

Fit a upper bus chamber field deflectors to (A) and fit a lower bus chamber field deflectors to (B).

Refer to drawing 51303785F0 for fixing detail.



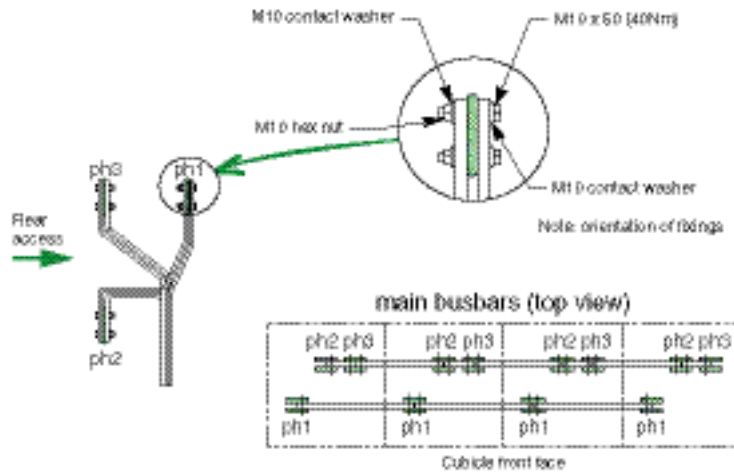
Installation instructions

Fitting the upper main busbars

Fit the main busbars between the two adjoining cubicles.
 Insert the bolts and tighten to **40 Nm**.
 This procedure should be repeated for any cubicle added to the switchboard.

1250 A busbar

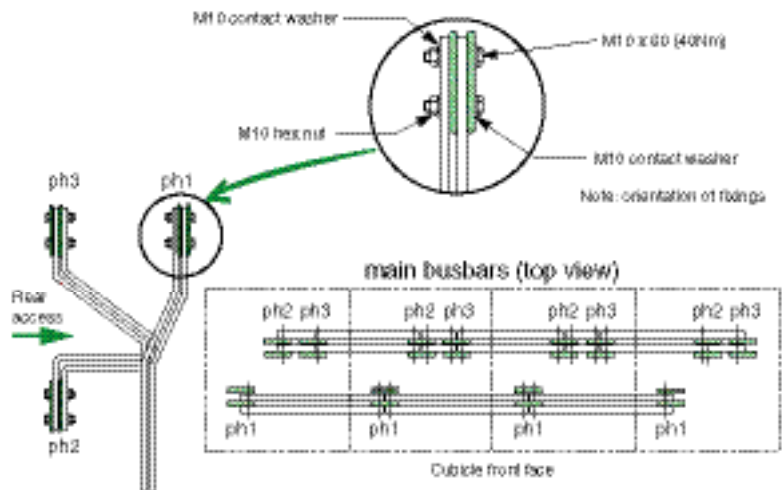
(refer drawing 51303726F0)



Take care of screw orientation.

2000 A busbar

(refer drawing 51190415F0)



Take care of screw orientation.

Installation instructions

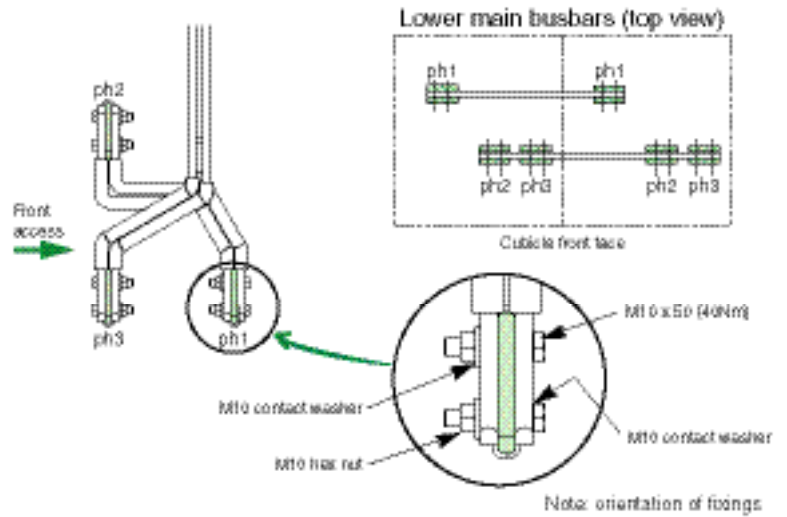
Fitting the lower busbars

Fit the lower busbars between the coupler and riser cubicles.
Insert the bolts and tighten to **40 Nm**.

1250 A busbar

(refer drawing 51303774F0)

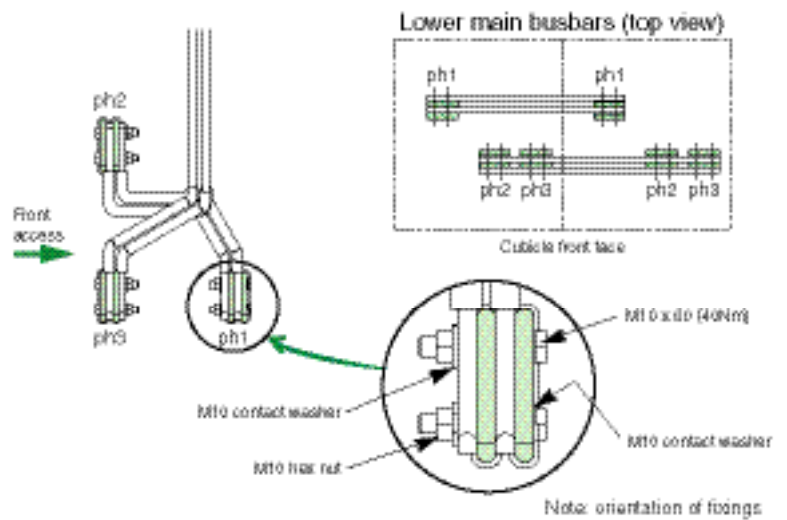
Take care of screw orientation.



2000 A busbar

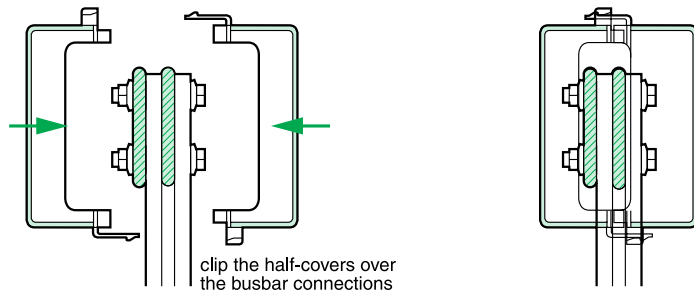
(refer drawing 51190437F0)

Take care of screw orientation.



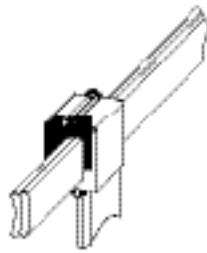
Installation instructions

Fitting the busbar joint covers

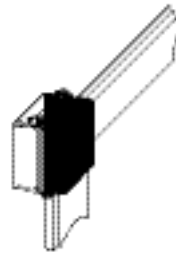


The busbar joint covers should be cut out in the factory to match the rating of busbar and connection required.

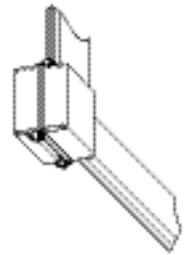
Refer to drawings 51190588F0, 51190589F0 and 51190590F0 for cutting details.



T-connection



Upper busbar
left end

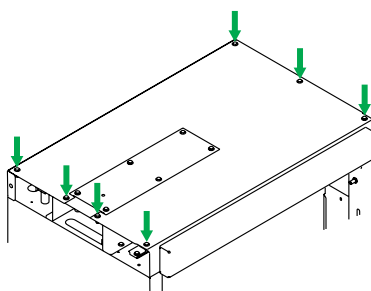
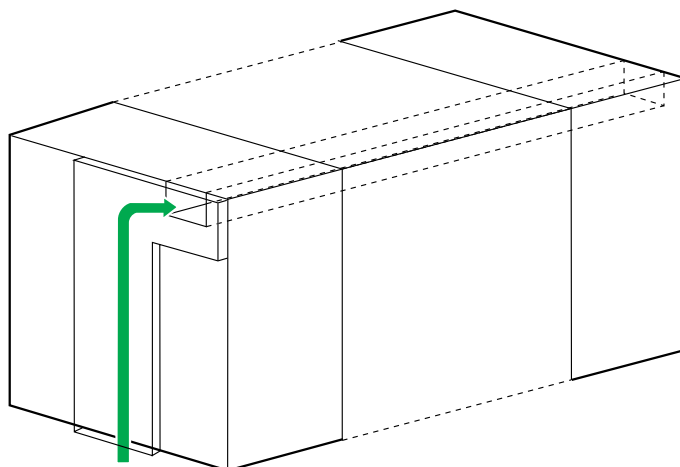


Lower busbar
left end

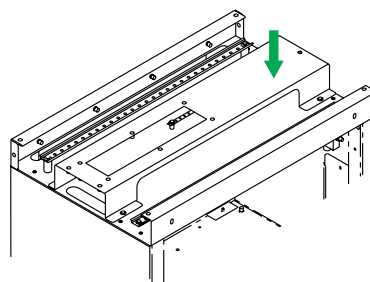
Installation instructions

LV cabling connections

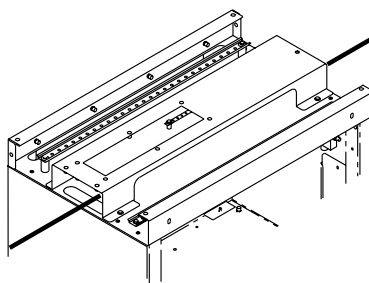
Entry at the end of the switchboard



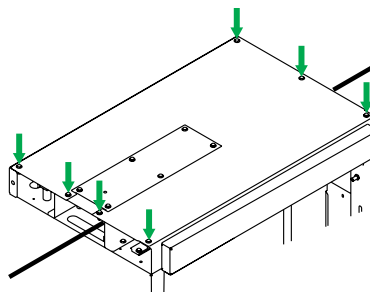
Remove the roof plate from each cubicle.



Remove the cable trough.



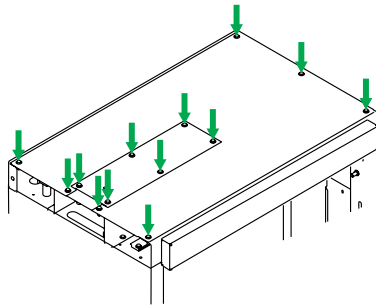
Install the auxiliary power supply wiring.
Replace the cable troughs.



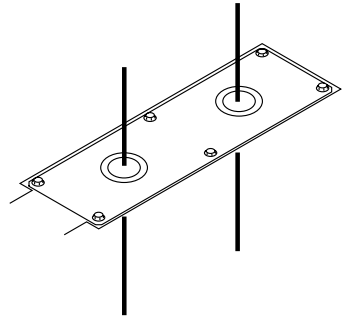
Working one cubicle at a time, feed the wires out through the hole in the cable trough.
Make the cable connections to the terminal blocks and replace the roof plates.

Installation instructions

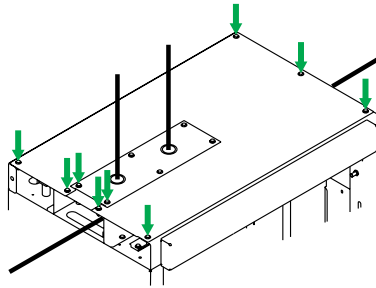
Entry of LV cables from above



Remove the cable entry plate situated on the LV cubicle roof and the roof plate.



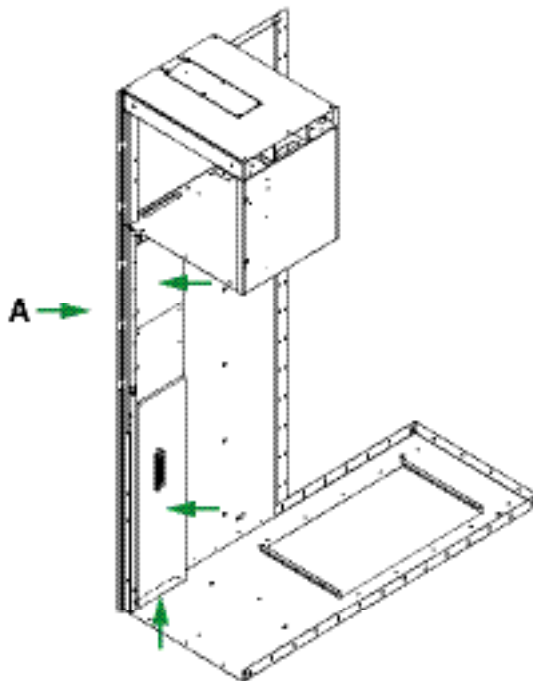
Drill the gland plate to suit the cable glands, fit the glands and feed the cabling through.



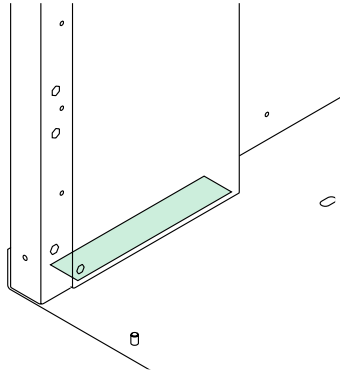
Replace the gland plate and terminate the wires.
Replace the roof plate.

Entry of LV cables from below

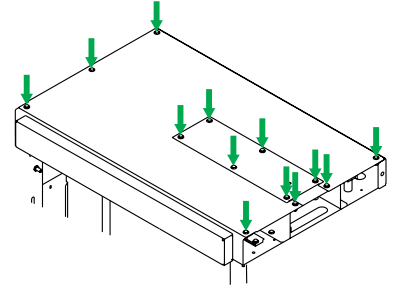
A: front face.



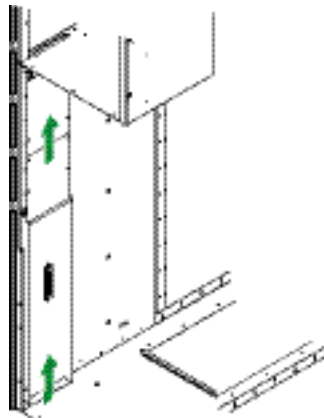
Installation instructions



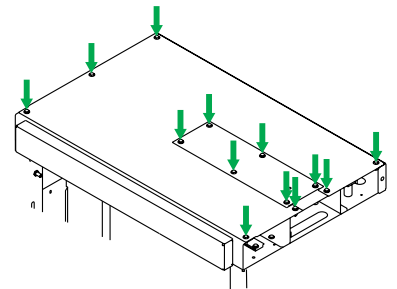
Cable entry is through the slot in the cubicle base plate.



Remove the cover plates and top plates if necessary.



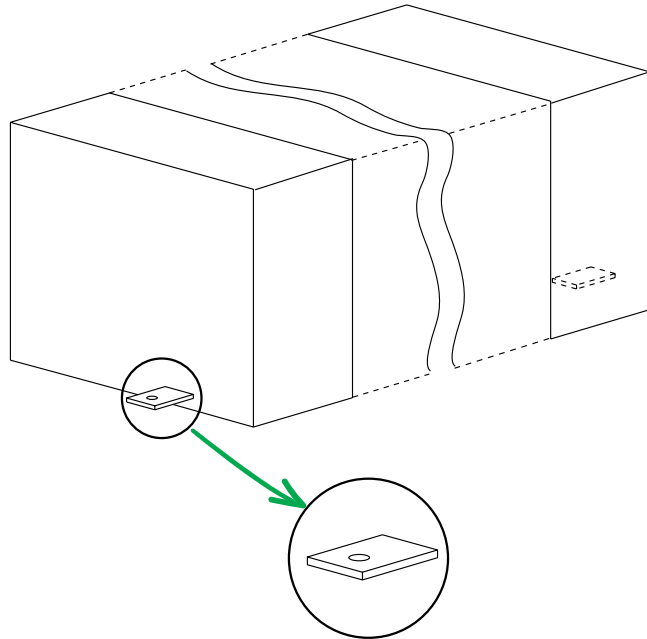
Feed the wires and the power supply cables up to the roof of the LV compartment.
Cables can be cable-tied to the side walls of the cubicle for support at the points provided.



Feed the wires to the terminal blocks and terminate.
Replace the roof plates.

Installation instructions

Connecting the switchboard earth to the station earth

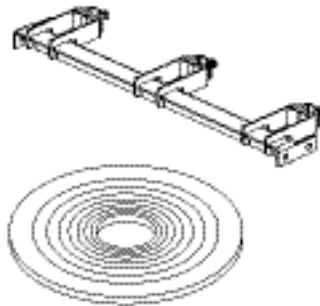


Connect the earth-bar of the switchboard to the substation earth using the pre-drilled earth-bar supplied with the loose equipment.

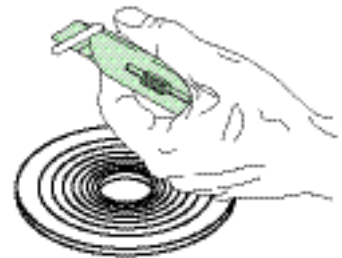
Installation instructions

Connecting the MV cables

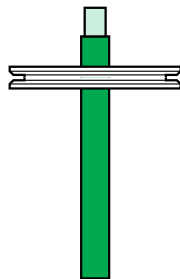
Preparing the cable connections



Remove the cable clamps, gland plates and grommets from the cubicle.



Cut the cable grommet to suit the diameter of the cables.

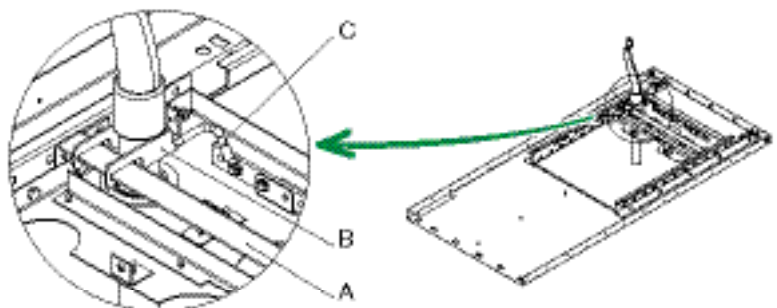


Mount them over the cables.
Refer to the cable manufactures guide for terminating the cable ends.

Fixing the cables

For installing a row of cables, mount the following in succession:

- The cable clamps support.
- The cable clamps.
- The earth braids.
- The gland plate of the next cable row.



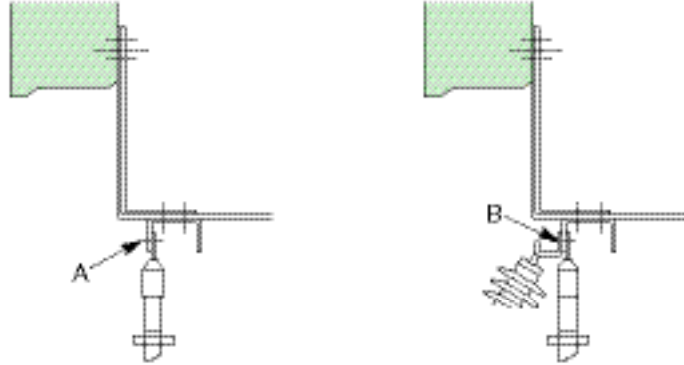
Fix the cable clamp support bar (A) on the top of the gland plate angles. Lock the cables using the cable (C) clamps (B). Connect the earth braids to the cable earth-bar takes place on the front and rear gland plates.

Replace the gland plates.
Fill any unused openings with uncut cable grommets.

Installation instructions

Attaching the cables

One row of cables

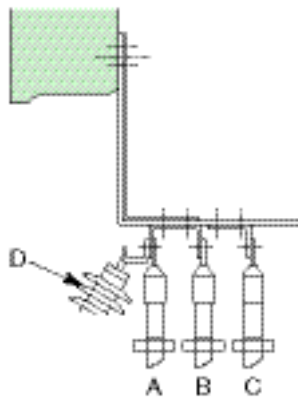


Attach the first cable to part (A) as shown.
If necessary, re-drill to suit cable lug fixing bolt.
Repeat for all phases.

Fix the surge arrester connection (B), if any.

The dielectric tests must be carried out with this connection removed.

Three rows of cables



Attach the first cable in position (A) as shown.
If necessary, re-drill to suit cable lug fixing bolt.
Repeat for positions (B) and (C), if necessary.
Repeat for all phases.
Fix the surge arrester connection (D), if any.

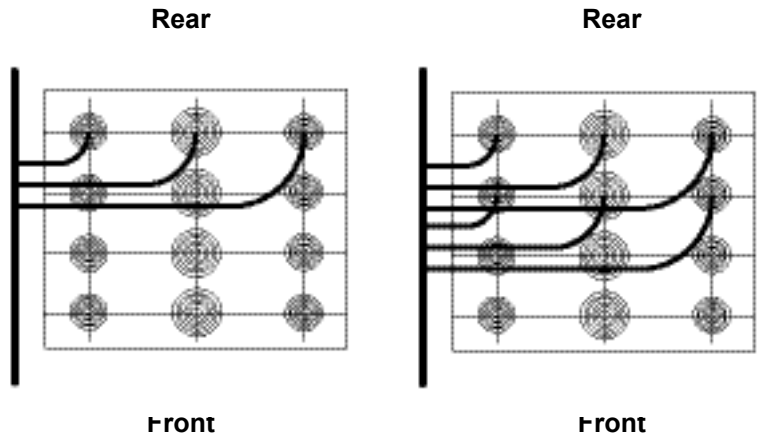
The dielectric tests must be carried out with this connection removed.

Installation instructions

Earthing of MV cable shields

The earth braids or wires shall be connected to the left hand side earth conductor provided in each cable compartment.

In the presence of toroidal CTs, take care to run the earthing connection through the CT before fixing it. Example: one cable per phase, 3 braids or wires to connect.

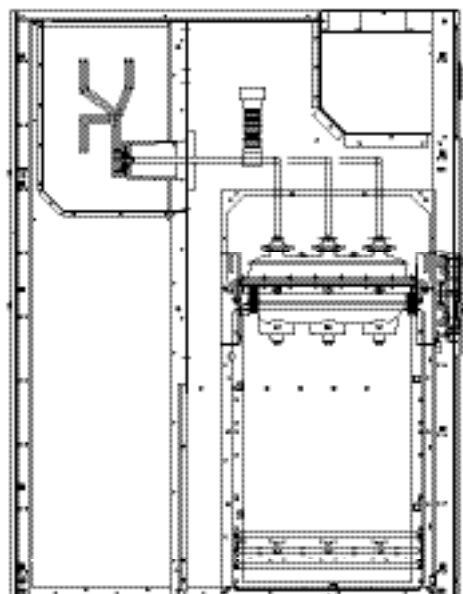
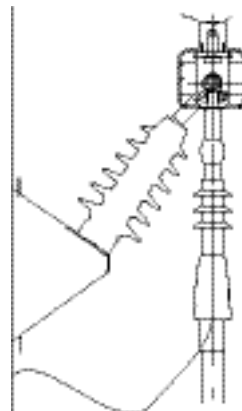


Example: one cable per phase, 3 braids or wires to connect.

Two cables per phase, 6 braids or wires to connect.

Earthing of MV cable shields (FS)

The earth braid shall be connected to the earth-bar on the rear of the switchboard.

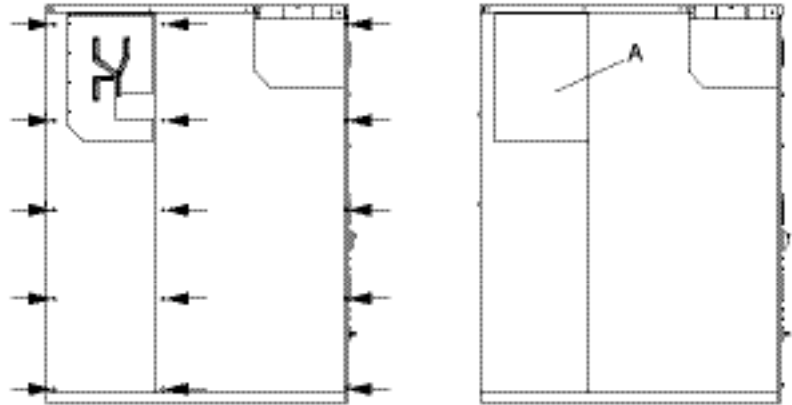


Installation instructions

Installing the end covers

(Refer to assembly drawings 51303727F0, 51303728F0 and 51303923F0.)

A: busbar compartment end plate.

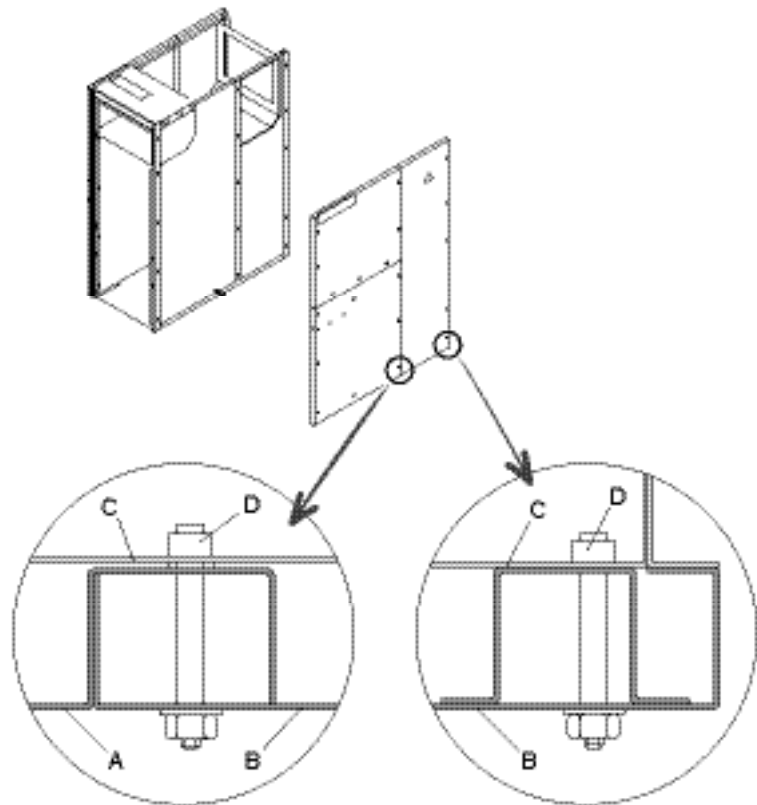


End of switchboard:

Ensure 15 pieces of M10 cage nuts are fitted to the cubicle sides where you see 12.5 mm square holes.

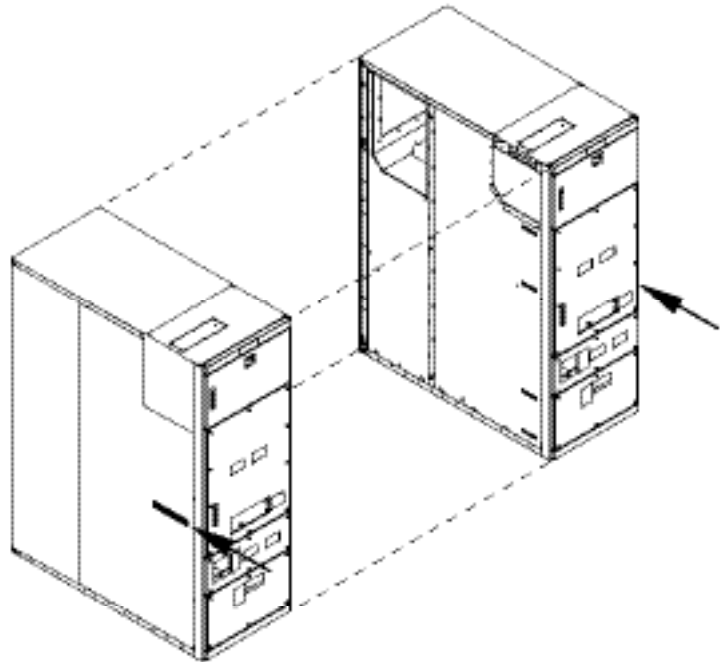
Fit the busbar compartment end-plate (A) and insulation plate to the right and left hand end-cubicles.

A: front end-cover
B: rear end-cover
C: upright
D: cage nut.



Fix the rear part first, then the front part of end cover and fix them to the inserted cage nuts with the M10 screws and washers supplied (On the figure is represented the right end of switchboard. The left end is the mirror view).

Installation instructions



You can find sheaths on both end side-wall for storing racking handles.

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