SM6−36

MV distribution
factory built assemblies
at your service

Anglais

instructions for use

IM and QM cubicles

MERLIN GERIN

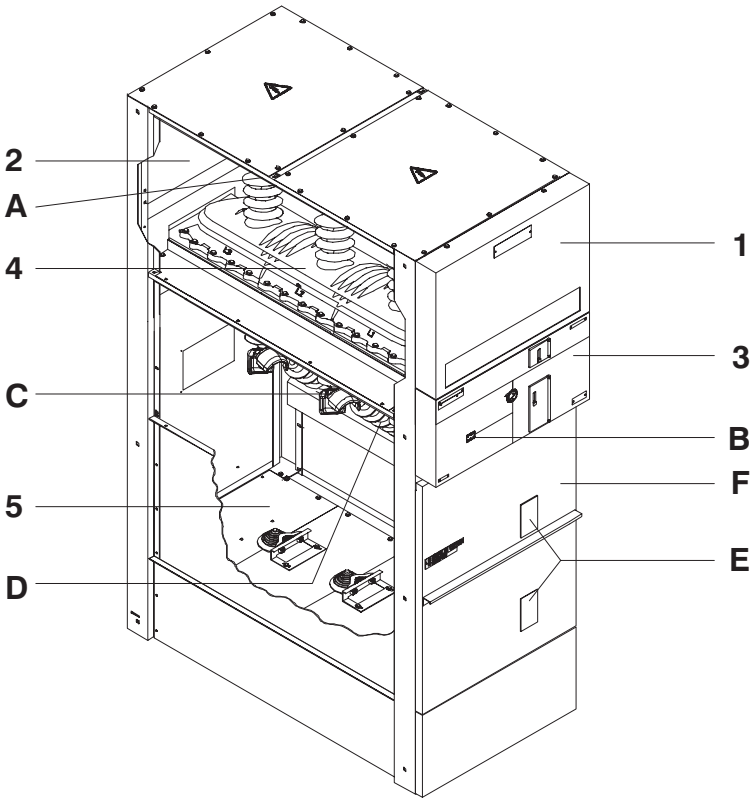
mastering electrical power

GROUPE SCHNEIDER

contents

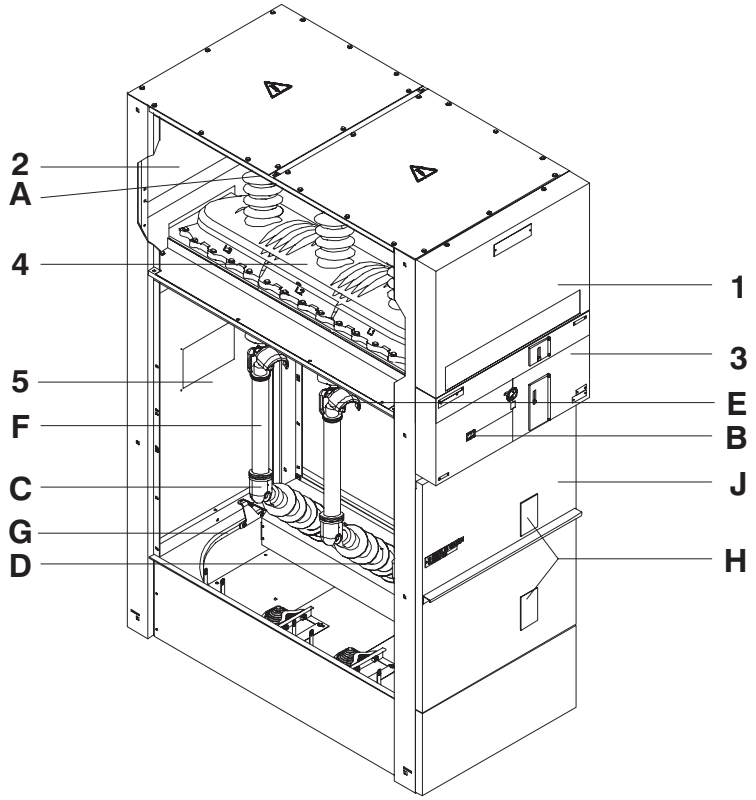
IM : switch cubicle

1 : low voltage compartment
2 : busbar compartment
3 : operating mechanism compartment
4 : switch and earthing switch
5 : cable connection compartment
A : busbar connection pads
B : voltage indicator
C : lower field distributor and cable connection
D : capacitive divider
E : cable connection inspection windows
F : front panel

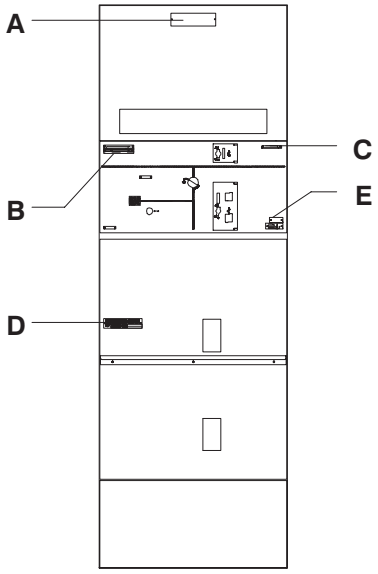


QM : fuse switch combination cubicle

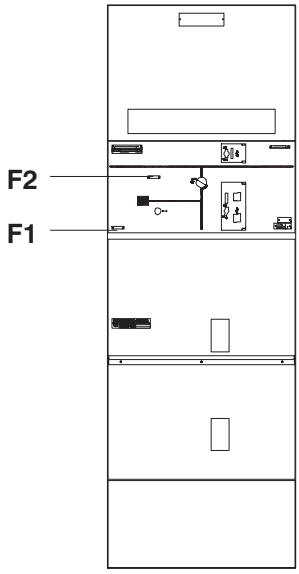
1 : low voltage compartment
2 : busbar compartment
3 : operating mechanism compartment
4 : switch and earthing switch
5 cable connection and fuse compartment
A : busbar connection pads
B : voltage indicator
C : lower field distributor and cable connection
D : capacitive divider
E : mechanism used to open switch when fuse blows
F : fuses
G : downstream earthing switch
H : cable connection inspection windows
J : front panel



cubicle identification



A : indicator plate
(for customer use)
B : characteristics and designation
C : firm plate
D : manufacturer's name plate
E : fuse plate
(only on QM cubicles)



serial number
F1 : riveted to the front plate of the operating mechanism compartment
F2 : riveted onto the operating mechanism cover

accessories list

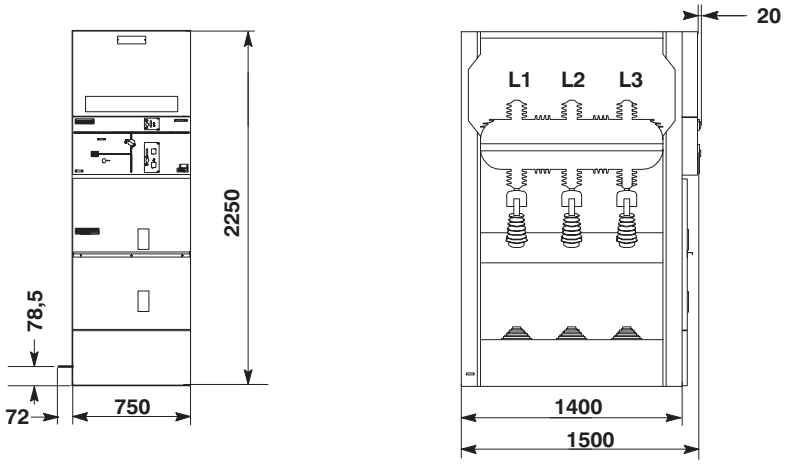
switchboard accessories:
1 operating lever

cubicle accessories :
1 bag of intercubicle connection accessories
1 bag of fastening accessories for busbars and earth bar
1 busbars (for n−1 cubicle)

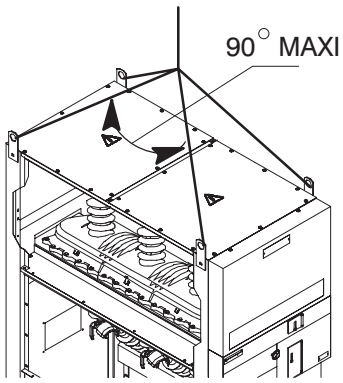
weight

IM : 310 Kg
QM : 330 Kg

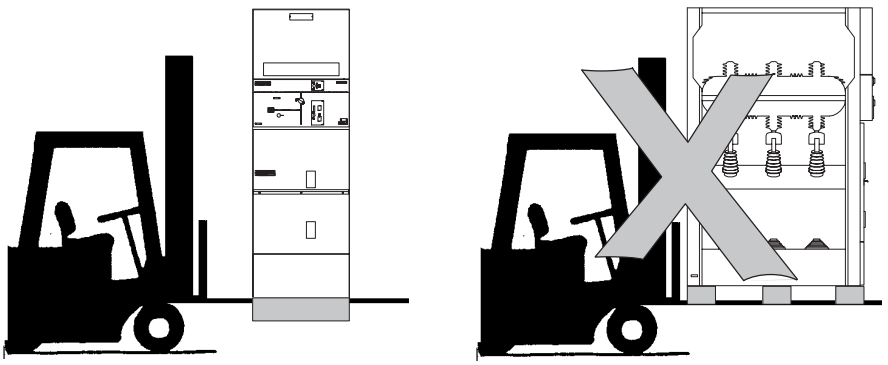
dimensions



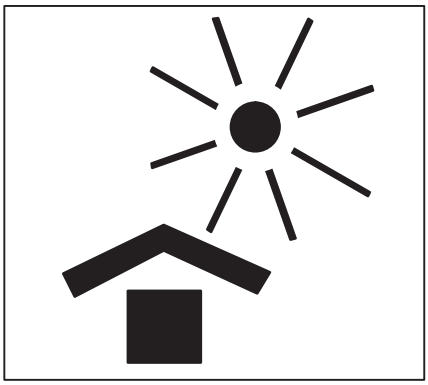
handling using slings

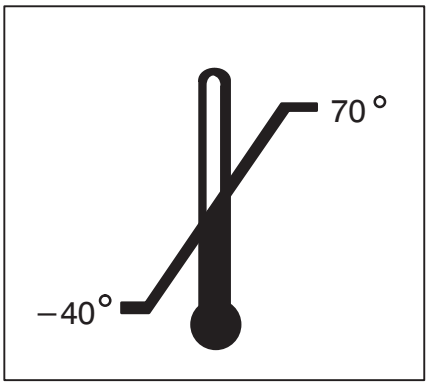


handling using a forklift



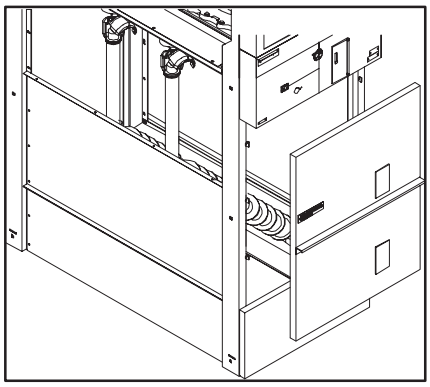
storage



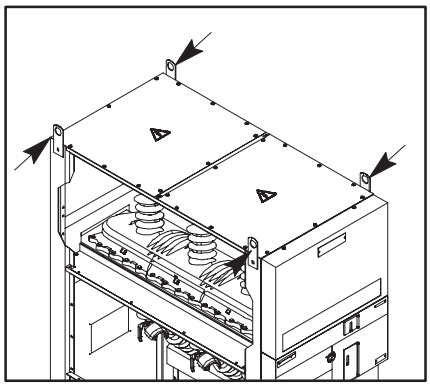


preparing the cubicles for switchboard assembly

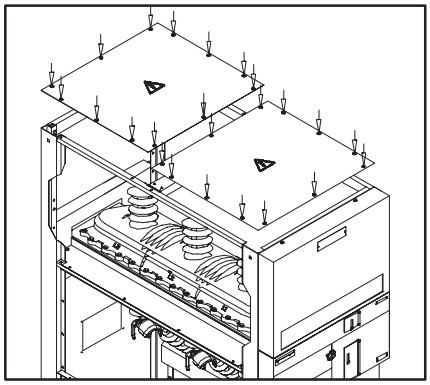
Earthing switch position upon delivery : **closed.**



Remove the front panel and the pallet.



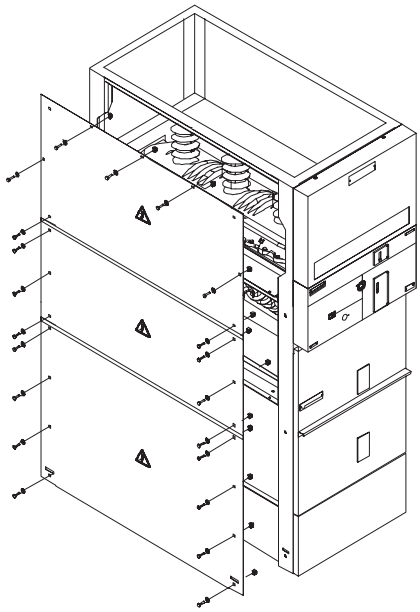
Remove the lifting rings bars.



Remove the two top plates.

fitting the end panels

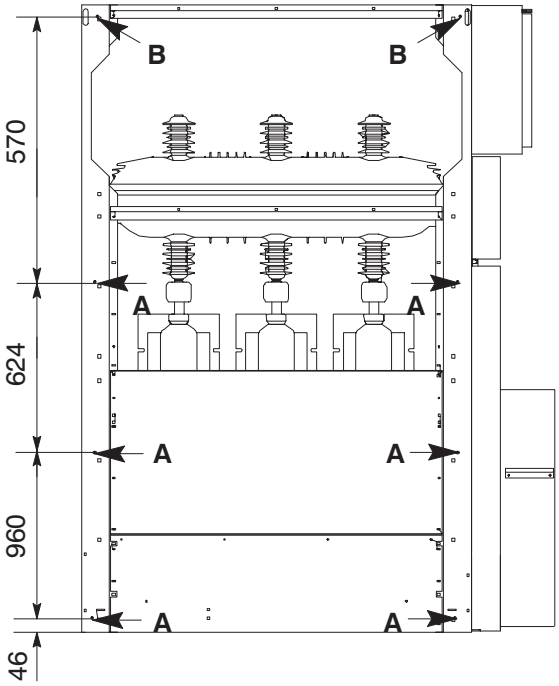
(only if the cubicle is on the end of the switchboard)

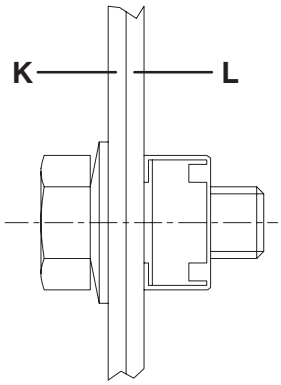


assembling the switchboard

A : With M8x20 bolts and M8 washers in bag of intercubicle connection accessories.

B : With M10x25 bolts and M10 washers remain after removing lifting rings

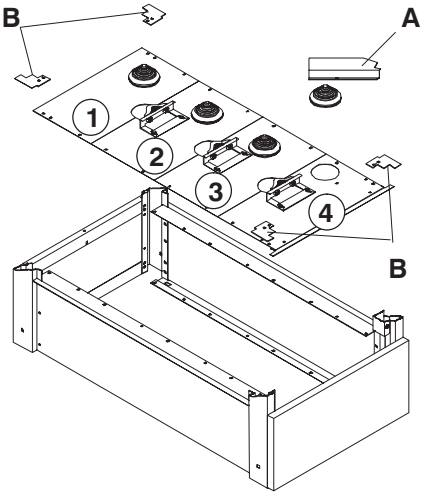




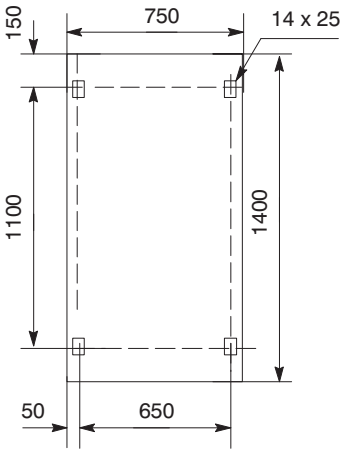
Mounting direction of bolts with nuts
K : right−hand cubicle
L : left−hand cubicle

securing to the floor

(nuts and bolts not included)



For IM cubicle remove first **A** and **B** securing plates then bottom plates.



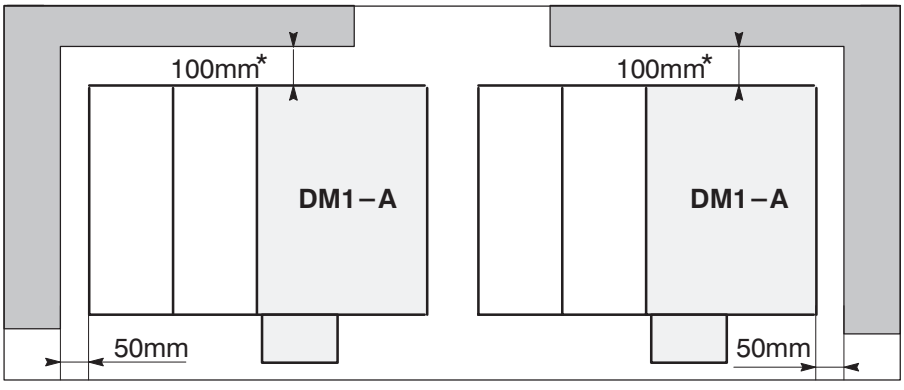
Secure the cubicle to the floor using the fixing holes.

layout in the substation

(top view)

(*) minimum clearance for trouble-free operation.

A : end panel



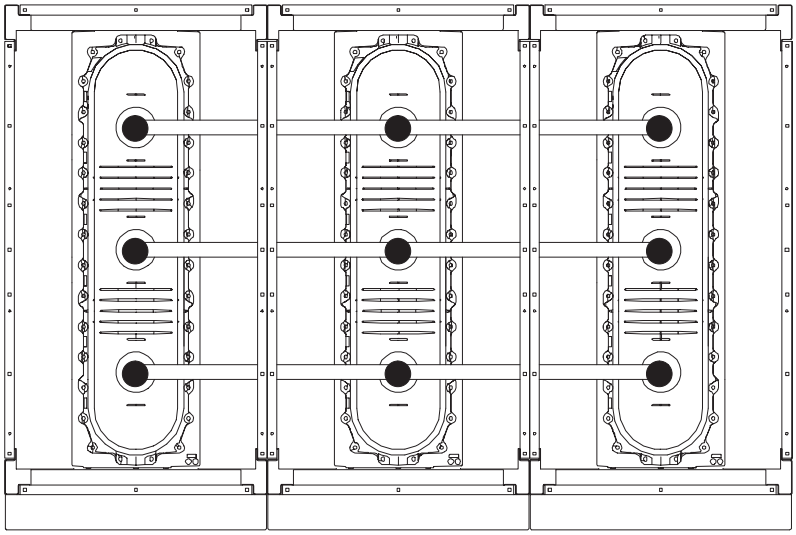
Switchboard installed to the right of a wall.

Switchboard installed to the left of a wall.

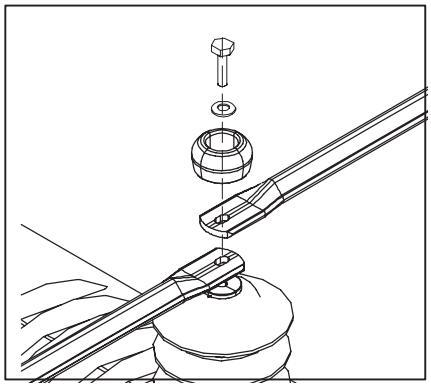
fitting the busbars after installing the cubicles

nuts and bolts included

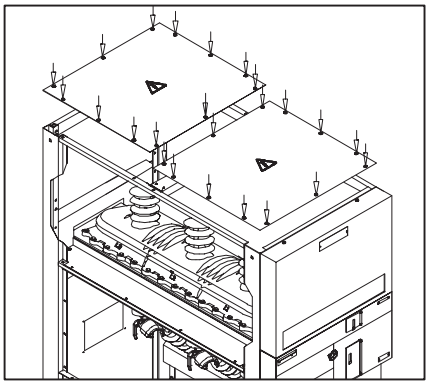
tools :
1 torque wrench 1 à 50 Nm.



Busbar connection.



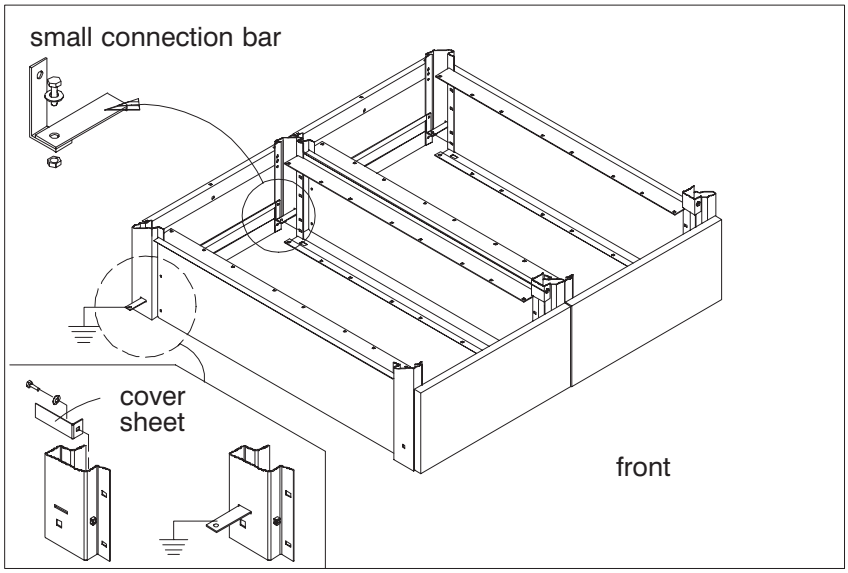
In the bag **3729746** of fastening accessories to connect busbars, use:
– 3 pieces of M8x35 bolts
– 3 pieces of Ø8 contacts washers
Tightening torque : 28 Nm.



Refit the two top plates.

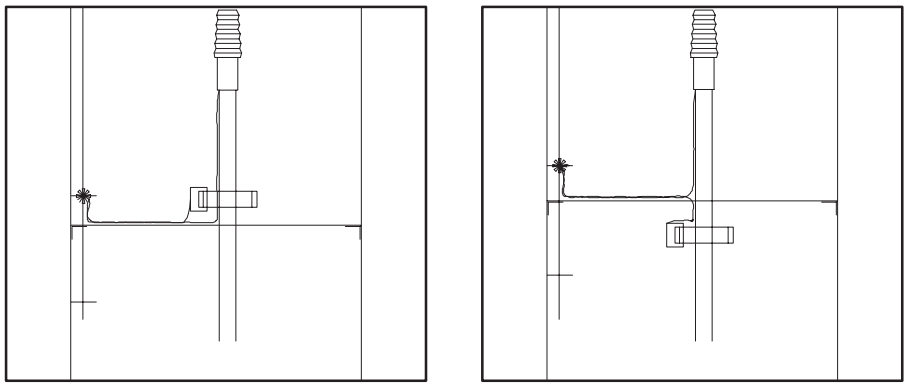
fitting the earth bars

Remove the small connection bar at the left back side of the cubicle and pass it through the appropriate hole to the next cubicle. For fixing use M8x20 bolts and M8 washers in the fastening bag. The switchboard can also be earthed from its right or left side. In order to do this from the right side move the small connection bar of the left cubicle to the right side of the right cubicle. Remove the cover sheet which close the hole at the earthing side of the switchboard.



installing the fault detection toroids

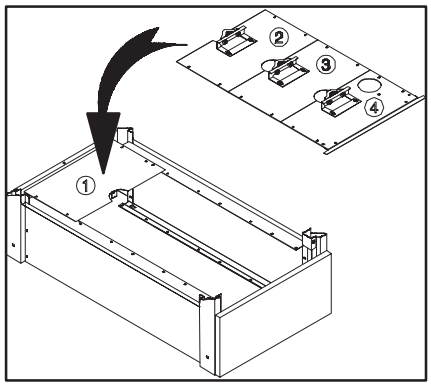
For IM cubicles only.
Follow the instructions of the toroid manufacturer.



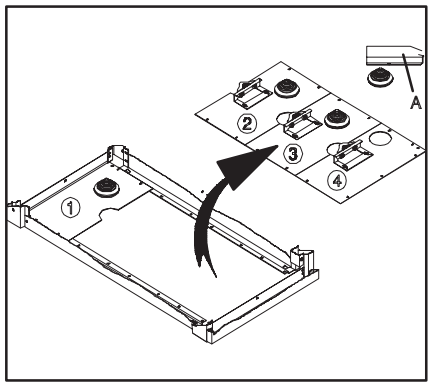
Versions of toroid installing.

MV cable connection

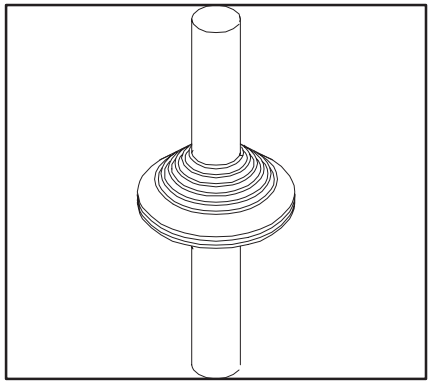
Connect the bottom plates which have been removed to secure IM cubicle to the floor, to the cubicle again.



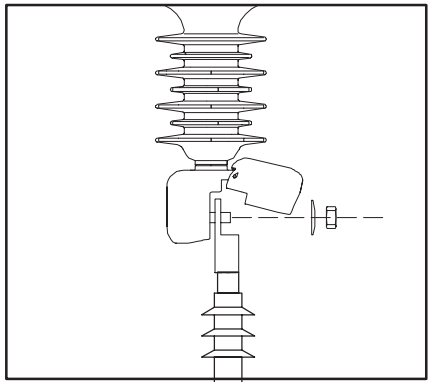
IM cubicle.



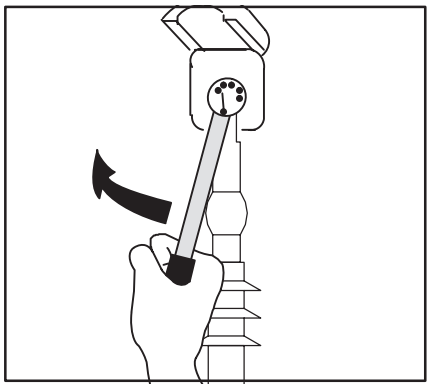
QM cubicle.
Remove the plate **A** and bottom plates **2**, **3** et **4** in QM cubicles.



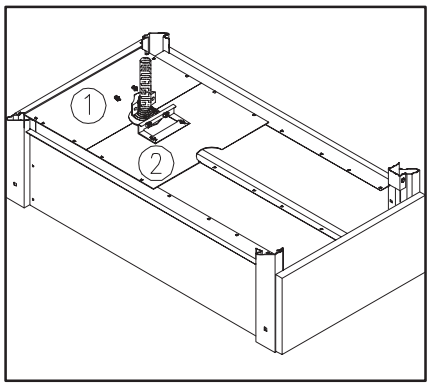
Fit the cable bushing.



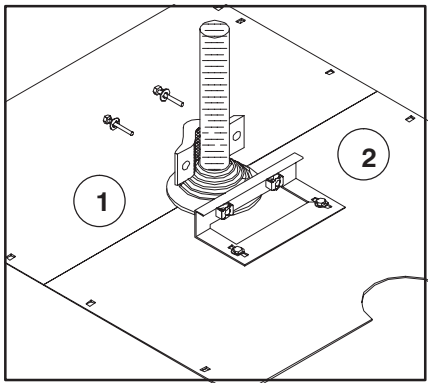
Connect the cable to the bolt provided on the terminal of phase **L1**.



Use a torque wrench to tighten the cable to the bolt.
Tightening torque : 50 Nm.



Mount the bottom plate **2** at the back of the cubicle.

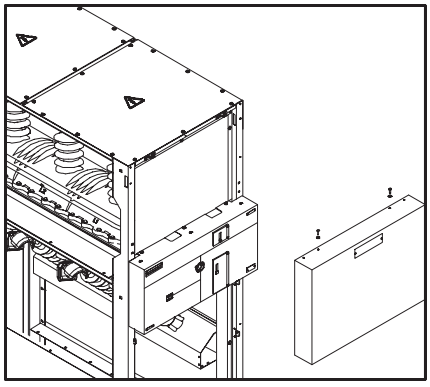


Clamp the cable with M8x50 bolts to the cable support on the bottom plate and connect the earthing of cable to the earth bar of cubicle.

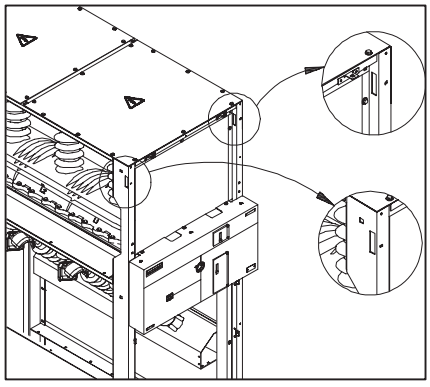
Mount phases **L2** and **L3** using the same procedure as for **L1**. After the assembly of the cable don't forget to fit the 4 securing plates. (only in IM cubicle) and cable protection plate.

cable entry for connection of low voltage auxiliaries

Note : the LV auxiliary wiring diagrams are glued to the inside of the LV compartment.



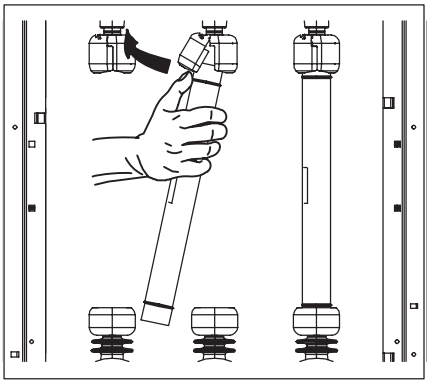
Remove the LV compartment front plate.



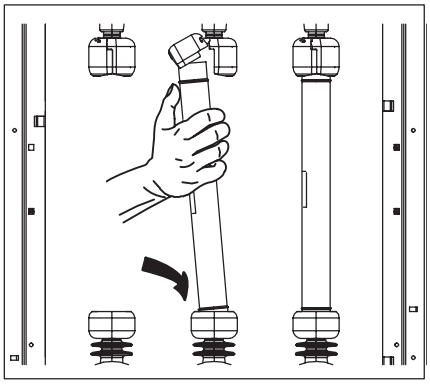
This holes are for the cables of LV auxiliaries.

fitting fuses in a QM cubicle

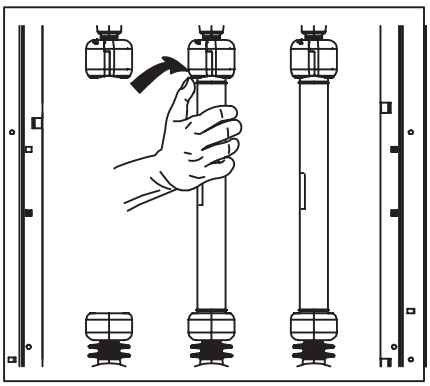
Note : fuses delivered in cubicles.



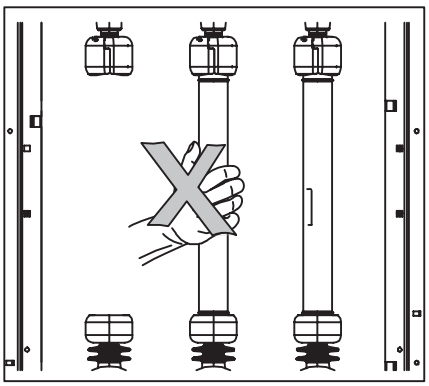
Lift the cover of the upper field distributor with the top of the fuse.



Insert the bottom of the fuse all the way into the lower annular contact.

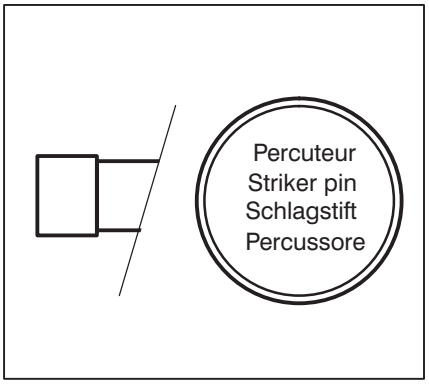


Then fit the top of the fuse in the upper contact and check that the field distributor cover is properly closed.
Turn the fuse so that the label appears in front.

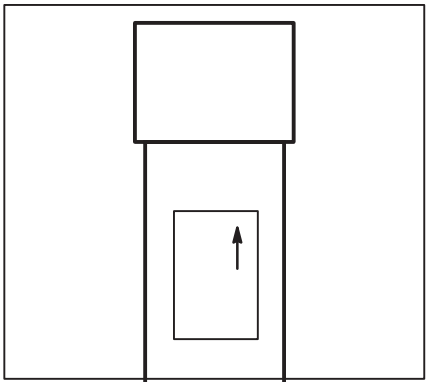


We advise against holding the fuse in the middle.

mounting direction of fuses



The striker end of the fuse is marked.



The fuse characteristics and direction of mounting are printed on the fuse.
Turn the fuse so that the label is in front.
(striker at the top)

transformer protection fuse selection

Fuse ratings for SM6−36 protection units such as the QM depend, among other things, on the following criteria:

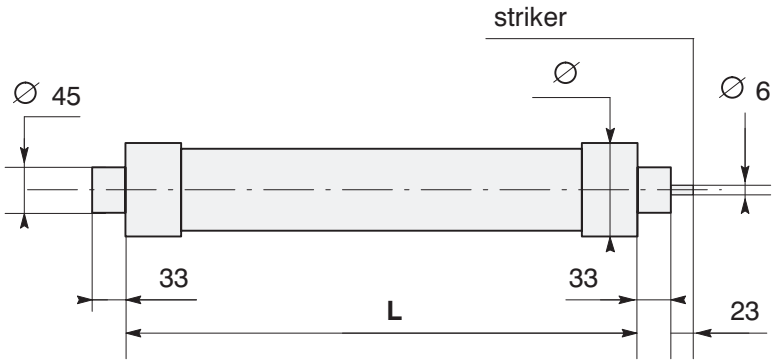
- service voltage.
- transformer rating.
- fuse technology (manufacturer).

Different types of fuses with medium loaded striker may be installed:

−CF Fusarc fuses as per DIN dimensions 43.625.

Example : for the protection of a 400 kVA transformer at 33 kV, select either CF Fusarc fuses rated 25A.

Dimensions of CF Fusarc fuses (DIN standard)



rated voltage (KV)	**rating** (A)	**L** (mm)	∅ (mm)	**Weight** (Kg)
36	10 to 16	537	50.5	1.8
	25	537	57	2.6
	31.5 to 40	537	78.5	4.7
	50 to 63	537	86	6.4

Please consult us on installation.

fuse rating selection table

(rating in A, no overload, $-5^{\circ}C < \theta < 40^{\circ}C$)

Please consult us for overloads and operation over 40˚C.

type of fuse	service voltage (kV)	transformer rating (kVA) 160	250	400	630	1000	1250	1600	**rated voltage** (kV)
CF Fusarc									
	30	10	16	25	40	50	63	(*)	**36**
	31.5	10	16	25	40	50	50	(*)	**36**
	33	10	16	25	31.5	50	50	(*)	**36**
	34.5	10	16	25	31.5	50	50	(*)	**36**

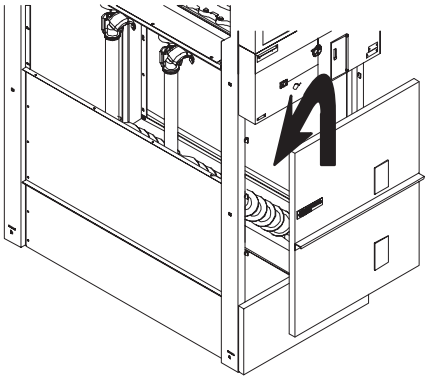
(*) please, consult us.

checks before energizing

Check that nothing has been left in the connection compartment.

For all phases:

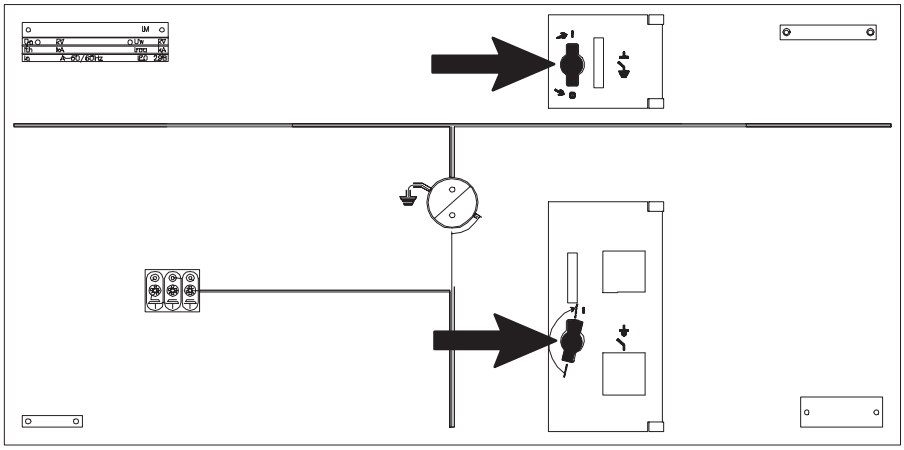
- check that the fuse has been properly fitted.
- check that the field distributor covers have been properly closed on all phases.
- check that the fault detector has been properly connected.



Refit the front panel.

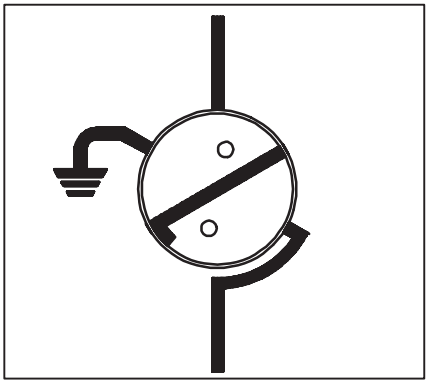
operating test before energizing

(see **operating instructions**)



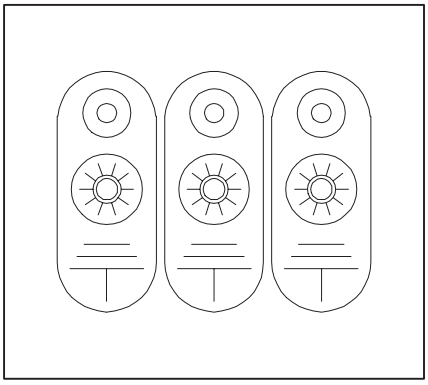
Operate the switch and the earthing switch several times.

energizing the incoming MV cables



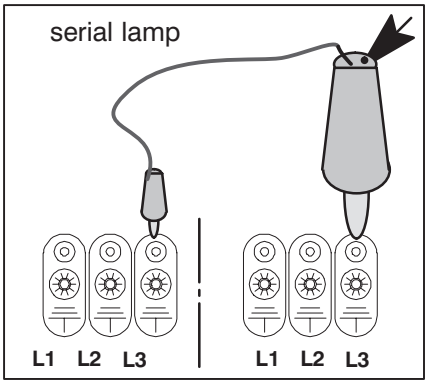
The switchgear must be in open position.
(see : **operating instructions**)

voltage indicators



As soon as the cables have been energized, the voltage indicator lamps should go on.

phase concordance test

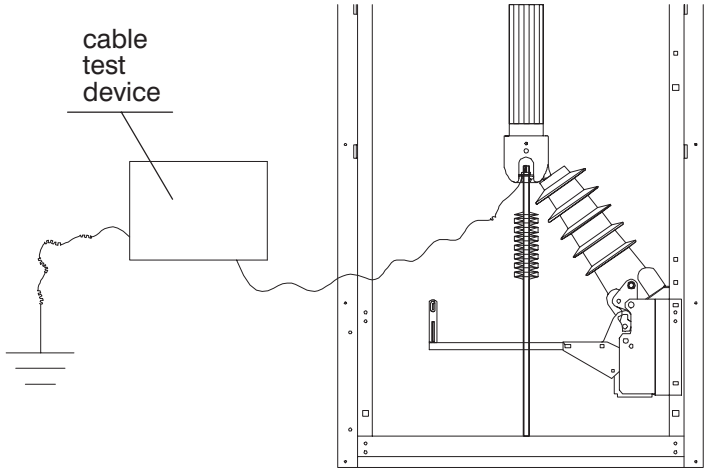


If the phases concord,
the lamp remains off.
If the phases do no concord,
the lamp goes on.

cable testing

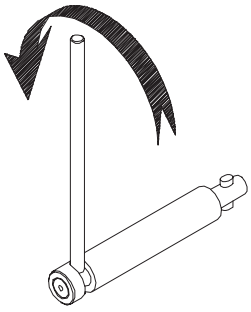
to check the cable :

- close the earthing switch
- open the front panel
- fit the earthing device
- open the earthing switch
- then measure

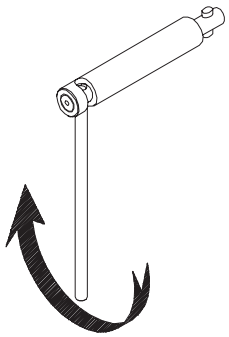


Check of the cable operation
(earthing switch is open)

IM and QM cubicle operation and position indication

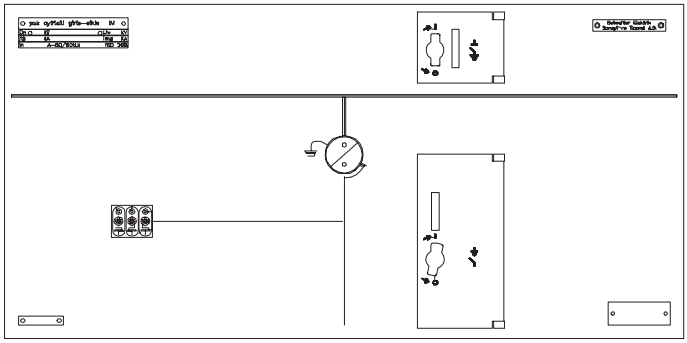


Position the lever as indicated for downward (opening) operations.

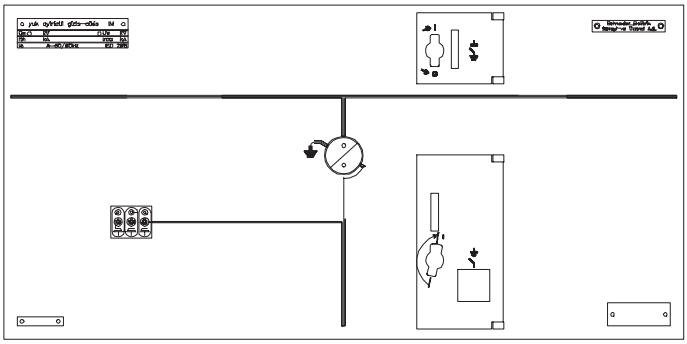


Position the lever as indicated for upward (closing) operations.

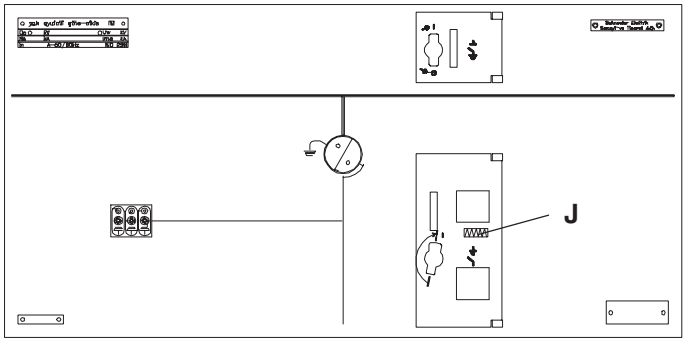
CIT operating mechanism front plate.



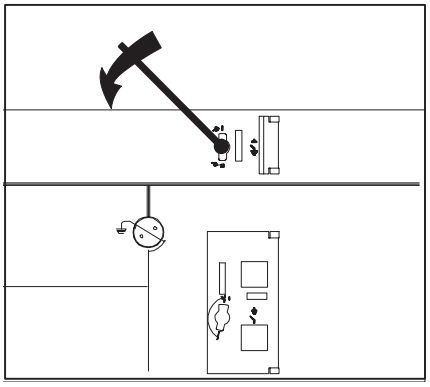
CI1 operating mechanism front plate.



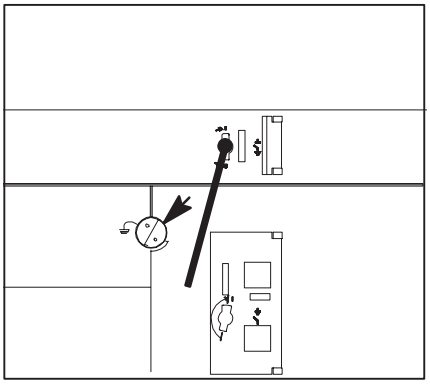
CI2 operating mechanism front plate.
J : charged/uncharged indication.



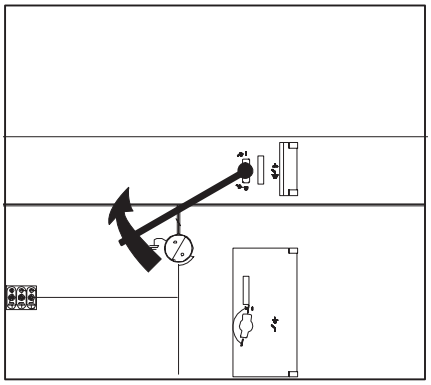
operation of earthing switch



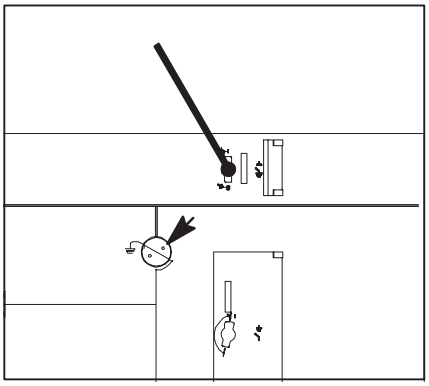
Opening the earthing switch.
(CIT, CI1 and CI2 operating mechanisms)



Earthing switch and switch are open.

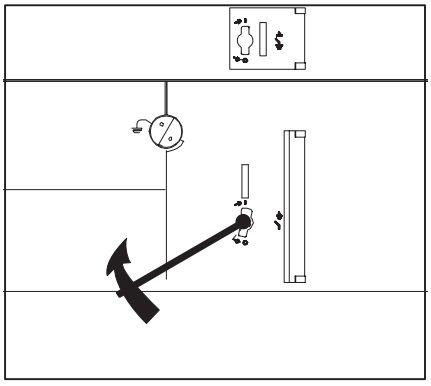


Closing the earthing switch.
(CIT, CI1 and CI2 operating mechanisms)

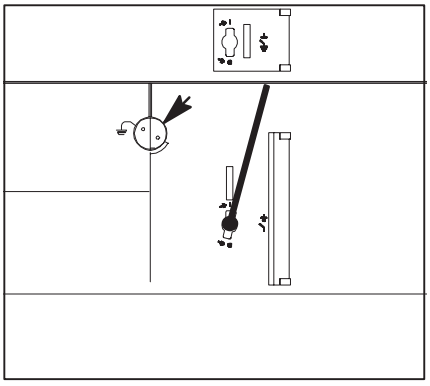


Earthing switch is closed, switch is open.

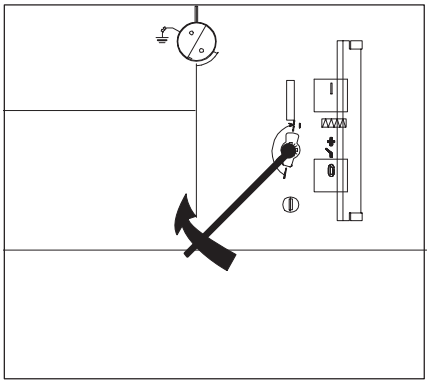
operation of switch



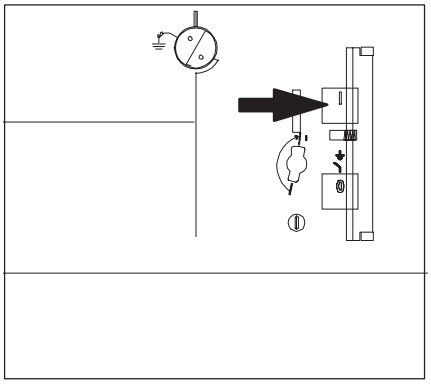
Closing the switch.
(CIT and CI1 operating mechanisms)



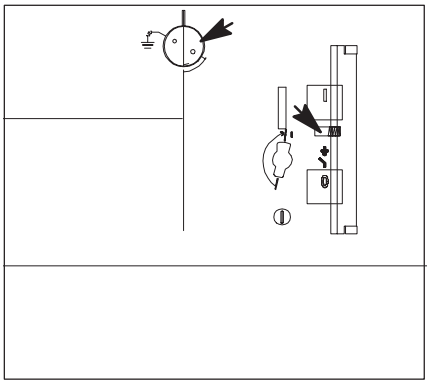
Earthing switch is open, switch is closed.



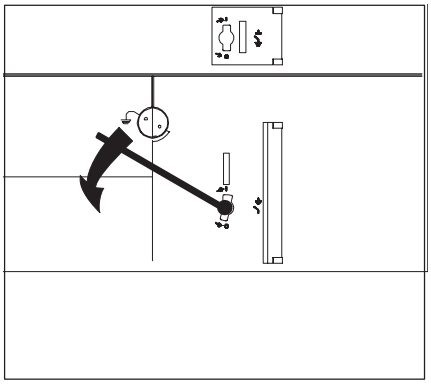
Charging the spring.
(CI2 operating mechanism)



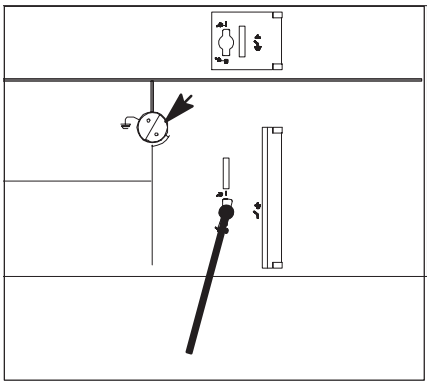
Closing the switch.
(CI2 operating mechanism)



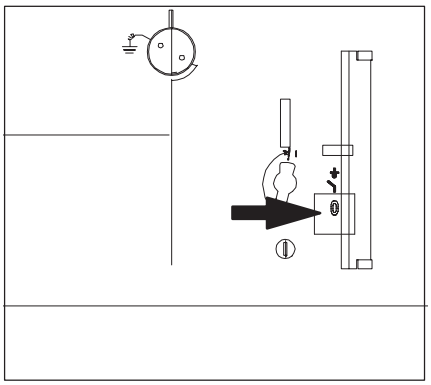
Earthing switch is open, switch is closed.



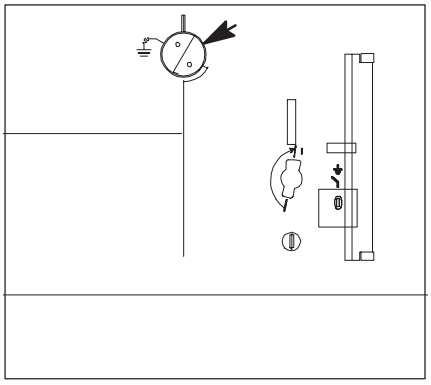
Opening the switch.
(CIT operating mechanism)



Earthing switch is open, switch is open.

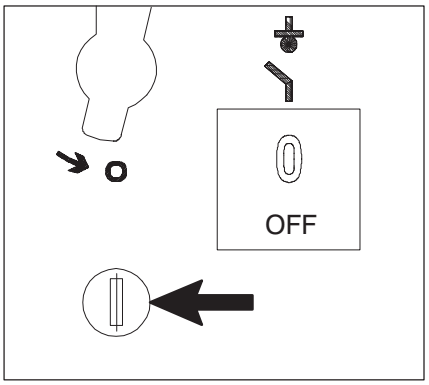


Opening the switch.
(CI1 and CI2 operating mechanisms)

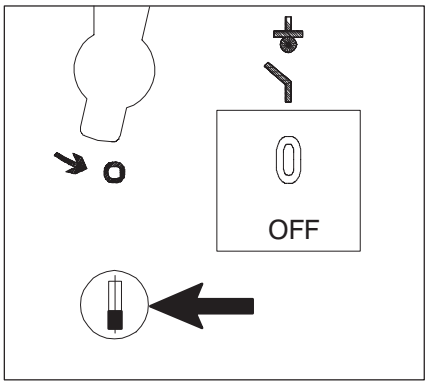


Earthing switch is open, switch is open.

fuse indications on QM cubicles



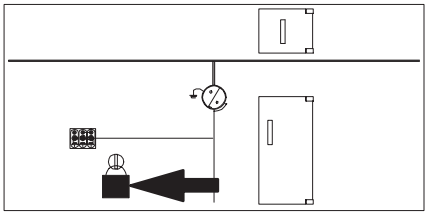
Fuses OK.
(white indicator)



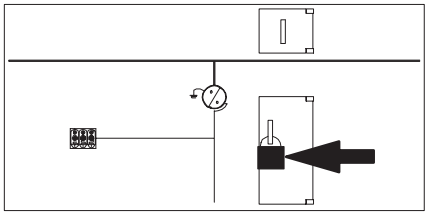
One or more fuses not OK.
(red indicator)

padlocking

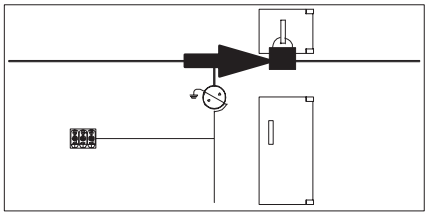
(option)



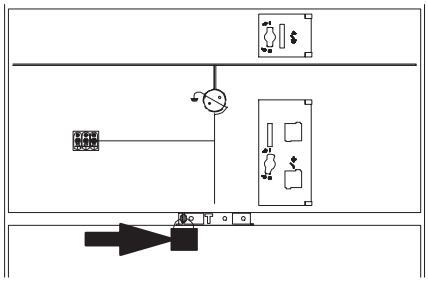
The motor mechanism can be locked in or out using the padlocks.



Padlock the switch in open or closed position using 1, 2 or 3 padlocks. (dia. 8 mm)

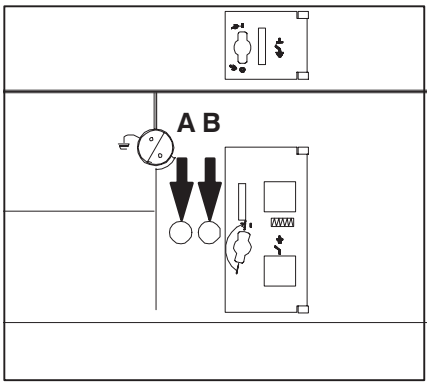


Padlock the earthing switch in open or closed position using 1, 2 or 3 padlocks. (dia. 8 mm)

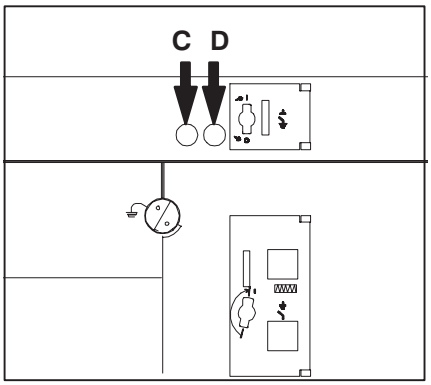


Padlocking the front panel.

keyed interlocks
(option)

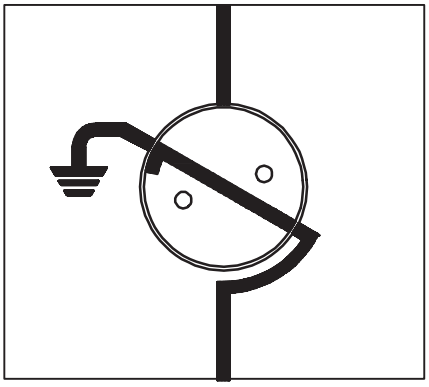


1 or 2 interlocks for the switch in open position.
1 interlock for B.
2 interlocks for B+A.

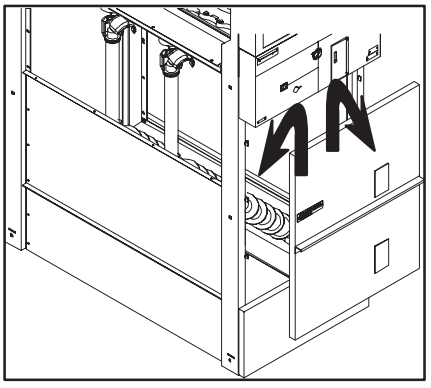


1 or 2 interlocks for the earthing switch.
– interlocking the earthing switch in closed position.
1 interlock for C.
2 interlocks for C+D.
– interlocking the earthing switch in open position.
1 interlock for D.
2 interlocks for D+C.
– interlocking the earthing switch in open / closed position
1 interlock for D.
2 interlocks for C.

operating safety



The front panel can only be removed or fitted if the earthing switch is closed.



preventive maintenance

for problems : see **groupe Schneider service centers**.

Never lubricate the operating mechanism.

No particular maintenance is required under normal operating conditions.
(temperature between −5°C and 40°C)

For severe operating conditions (aggressive environments, dust, temperatures below −5°C or above 40°C, etc.) consult your nearest **groupe Schneider** service centers.

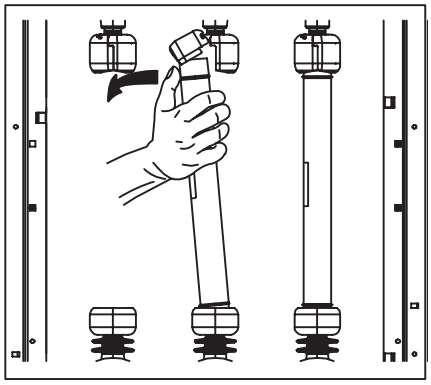
corrective maintenance

Replacing the fuses:

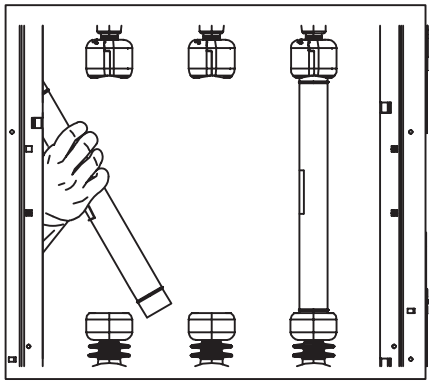
- the cubicle must be de-energized.
- the switch must be open.
- the earthing switch must be closed.

Open the front panel for access to the fuses.

Important:
standard IEC 282.1 § 23.2 states that all three of the MV fuses should be changed whenever one of them blows.

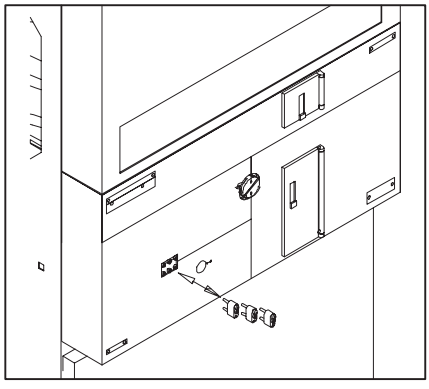


First remove the top of the fuse.



Then lift the fuse out of its bottom support and remove it completely. To fit the new fuses, refer to the section on fitting fuses in QM cubicles.

replacing a voltage indicator block



Pull out the voltage indicator block. (the switchboard can remain energized)

trouble-shooting chart
IM and PM cubicles

■ voltage indicator not illuminated	■ check that the incoming cables are live ■ check the voltage indicator block ■ check the neon lampk ■ check that the switch (QM cubicle) is closed ■ check that the fuses have been fitted ■ check that the fuses are in working order
■ front panel cannot be opened or closed	■ check that the earthing switch is closed
■ earthing switch cannot be operated	■ check that the switch is open
■ switch cannot be operated	■ check that the earthing switch is open ■ (if a new mechanism is fitted) check the interlock of the switch

motor mechanism (option)

■ electrical operation impossible	■ check the LV fuses (CIP2) ■ check electrical interlocks S13−14 (lever insertion) ■ check that the earthing switch operating shaft has reached its end position ■ check that contact S14 has not disabled the power supply and re-adjust if necessary
S13 = switch lever input S14 = earth switch lever input	■ check the configuration of the CIP1 subassembly (see diagram)
■ (*) manual operation impossible following an electrical closing cycle for a voltage level less than −15% rated value	■ use the operating lever to apply a torque in the closing direction until the end position is reached; manual operation should now be possible
■ (*) insertion of lever impossible following an electrical closing cycle for a voltage level greater than +15% rated value	■ if possible, carry out an electrical operation, using a backup power source if necessary ■ to allow insertion of the operating lever, push the back of the switch shaft in the closing direction using a large screwdriver; (for safety reasons, remember to first lock out the electrical operating mechanism; if necessary, push up and hold the locking blade that actuates contact S13)

(*) Operation is guaranteed for rated voltage ±15%.

spare parts

- fuses (CF Fusarc).
- voltage indicator

(for other parts, please consult us: see **groupe Schneider service centers**)

options

(please consult us)

For IM cubicles :

- motor mechanism
- auxiliary contacts
- phase concordance tester
- keyed interlocks
- 150 W heating element
- fault indication.

For QM cubicles :

- motor mechanism with shunt trip release
- auxiliary contacts
- keyed interlocks
- 150 W heating element
- contact for ”fuse blown” indication

groupe Schneider service centers are there for:

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