

MV distribution

RONEX

metalclad switchgear
withdrawable circuit-breaker
1 to 17.5 kV

Operation guide



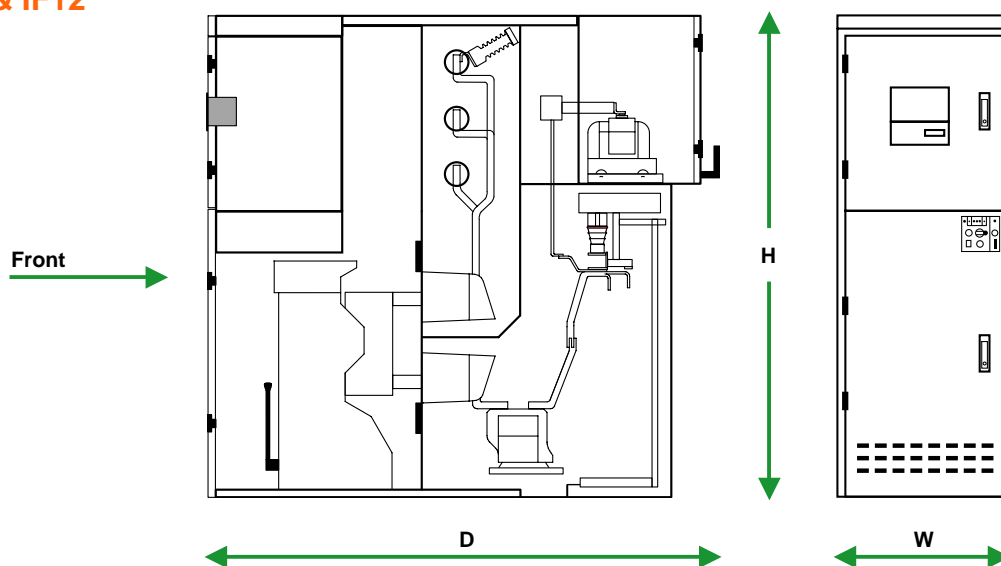
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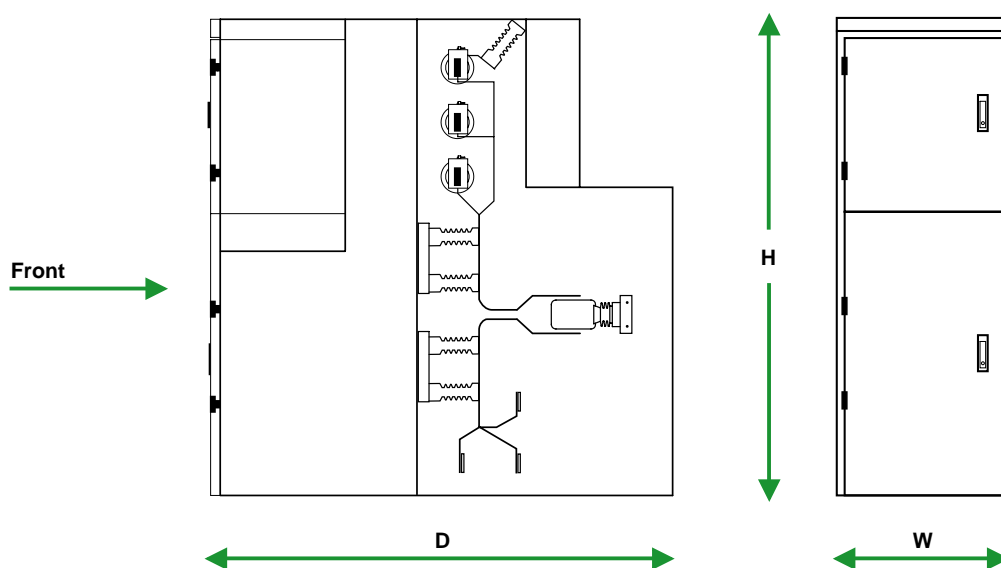
General description

Typical cubicles

Incomer & feeder IF11 & IF12



Riser R11 & R12



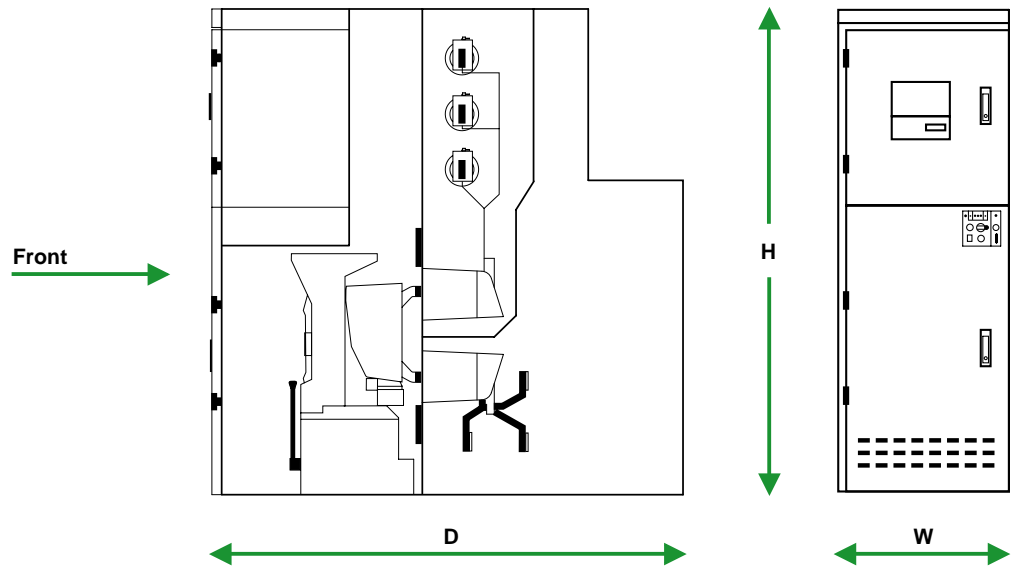
Switchgear type		IF11	IF12	R11	R12
Ratings		630 A - 1250 A	2500 A	1250 A	2500 A
Dimensions and weight					
height (H)	mm	2120	2120	2120	2120
width (W)	mm	750	950	750	950
depth (D)	mm	2044	2170	2044	2044
weight	kg	750	900	600	720

N.B.: the type of the current transformer could change according to the customer's requirement, however the overall dimensions are the same.

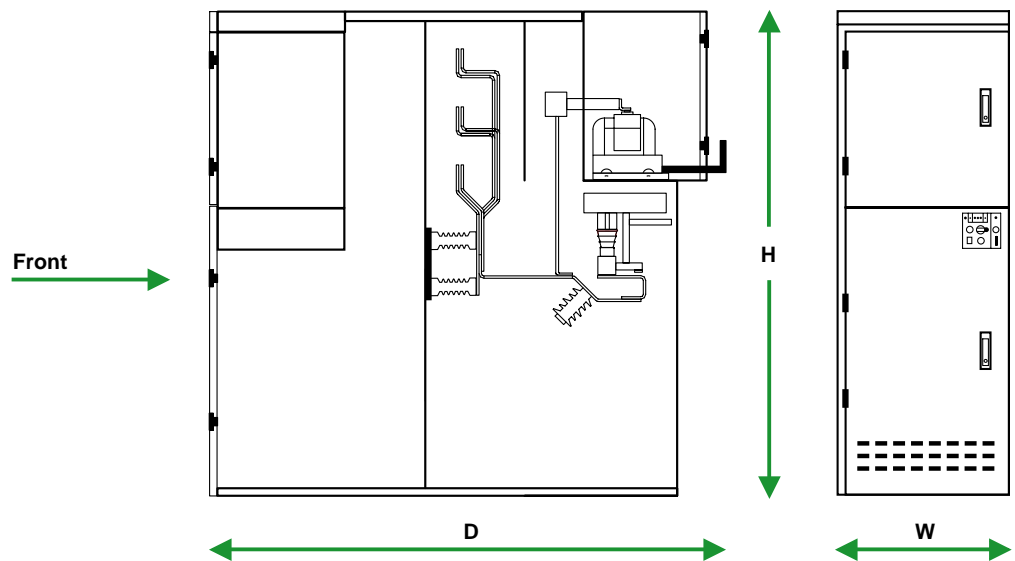
General description

Typical cubicles

Coupler C11 & C12



Metering MT11



Switchgear type		C11	C12	MT11
Ratings		1250 A	2500 A	630 A - 1250 A - 2500 A
Dimensions and weight				
height (H)	mm	2120	2120	2120
width (W)	mm	750	950	750
depth (D)	mm	2044	2044	2044
weight	kg	650	800	550

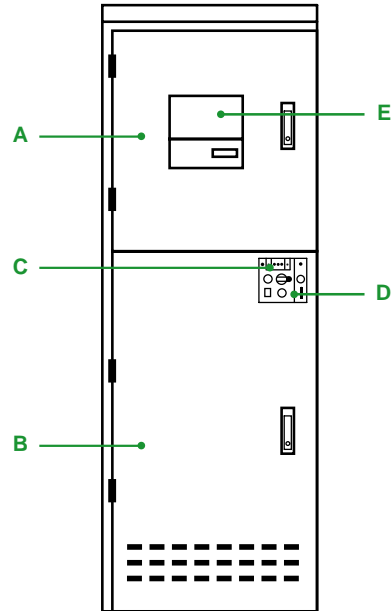
N.B.: the type of the current transformer could change according to the customer's requirement, however the overall dimensions are the same.

General description

Incomer / feeder without VT

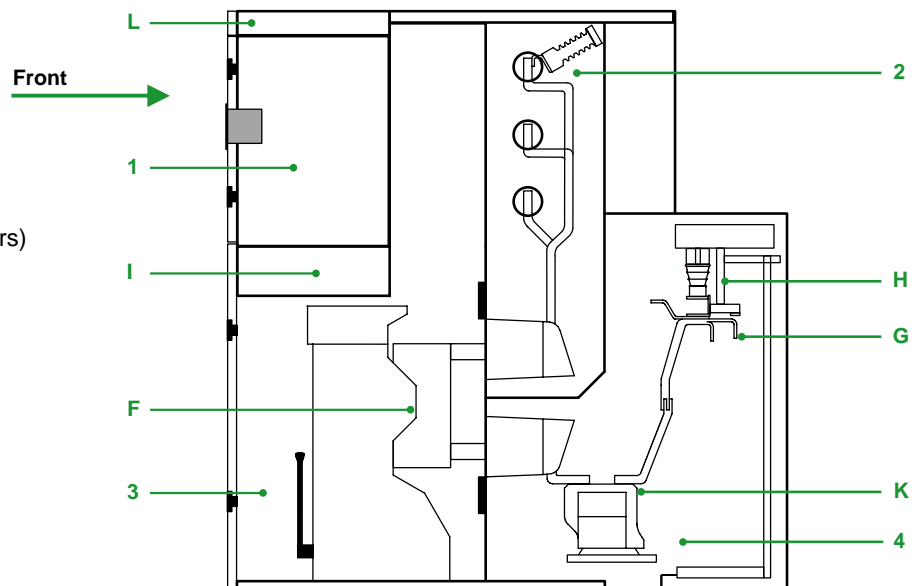
Front panel

- A:** LV compartment access door
- B:** removable part compartment door
- C:** voltage indicators
- D:** earthing switch operating and interlocking plate
- E:** Sepam protection control and monitoring



Left-hand view

- 1:** low voltage compartment
- 2:** busbar compartment
- 3:** removable part compartment
- 4:** medium voltage cable compartment
- F:** removable part (Evolis / LF circuit breakers)
- G:** medium voltage cable connection point
- H:** earthing switch
- I:** earthing switch operating mechanism
- K:** block CT
- L:** low voltage cable routing duct

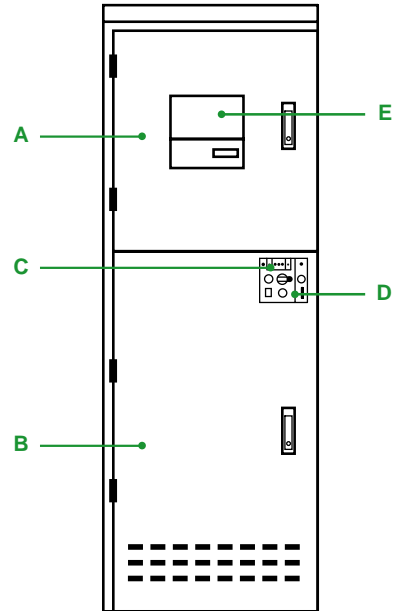


General description

Incomer / feeder with withdrawable VT

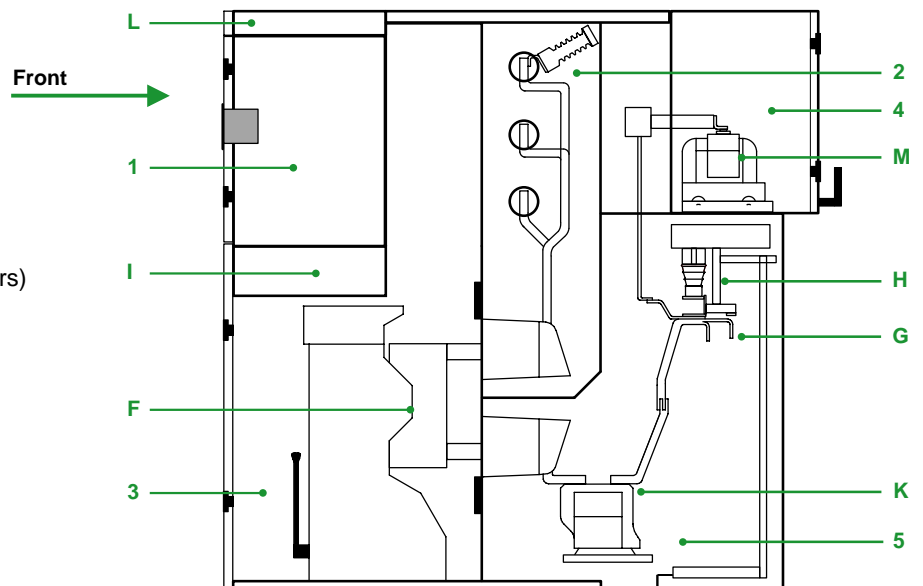
Front panel

- A:** LV compartment access door
- B:** removable part compartment door
- C:** voltage indicators
- D:** earthing switch operating and interlocking plate
- E:** Sepam protection control and monitoring



Left-hand view

- 1:** low voltage compartment
- 2:** busbar compartment
- 3:** removable part compartment
- 4:** withdrawable VT compartment
- 5:** medium voltage cable compartment
- F:** removable part (Evolis / LF circuit breakers)
- G:** medium voltage cable connection point
- H:** earthing switch
- I:** earthing switch operating mechanism
- K:** block CT
- L:** low voltage cable routing duct
- M:** VT

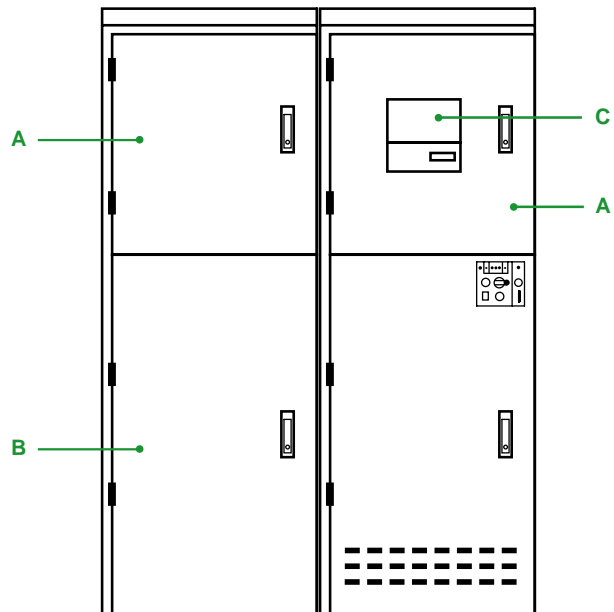


General description

Coupler / Riser cubicles

Front panel

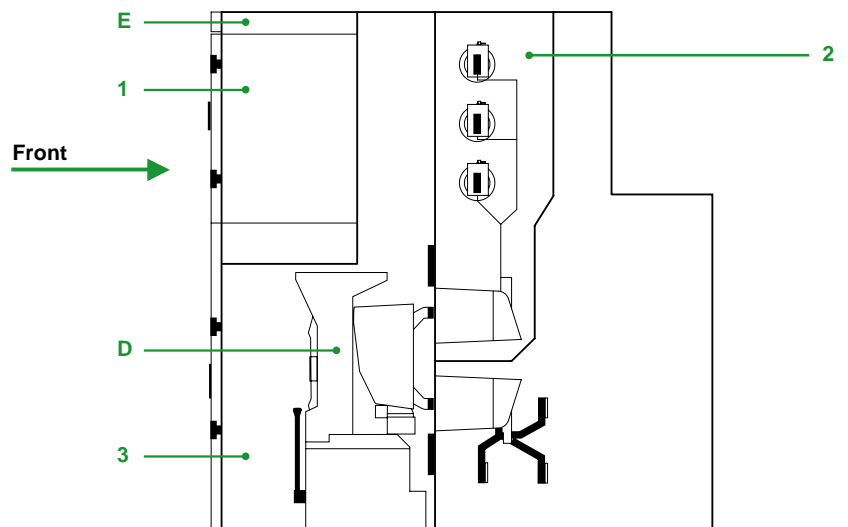
- A:** LV compartment access door
- B:** removable part compartment door
- C:** Sepam protection control and monitoring



Coupler

Left-hand view

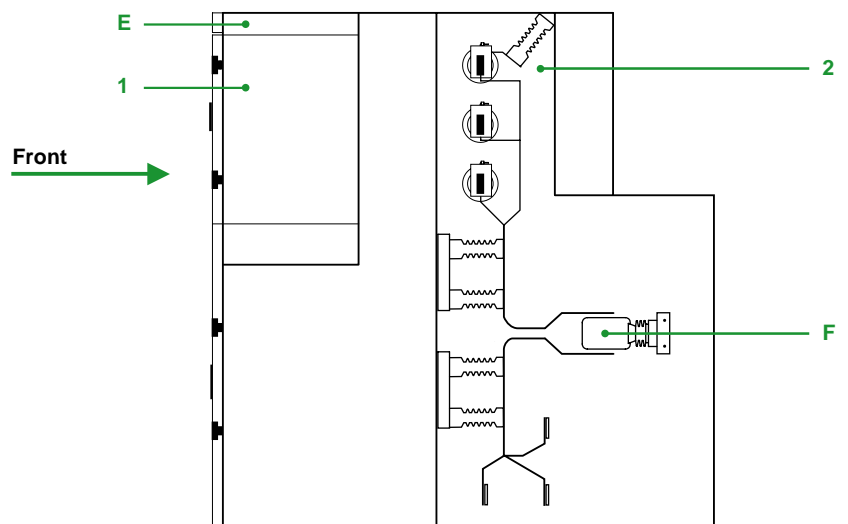
- 1:** low voltage compartment
- 2:** busbar compartment
- 3:** removable part compartment
- D:** removable part (Evolis / LF circuit breaker)
- E:** low voltage cable routing duct



Riser

Left-hand view

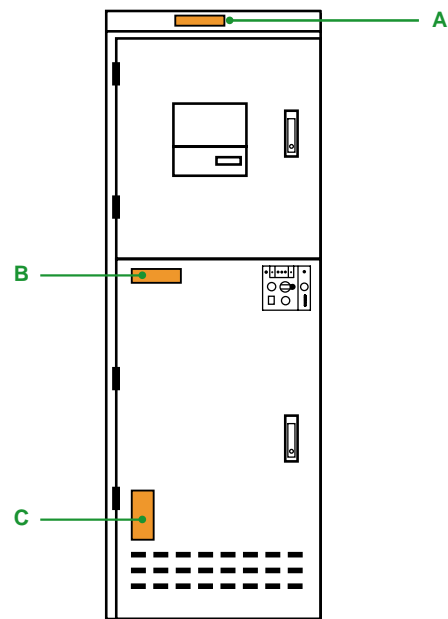
- 1:** low voltage compartment
- 2:** busbar compartment
- L:** low voltage cable routing duct
- M:** LPCT (low power current transducer)



General description

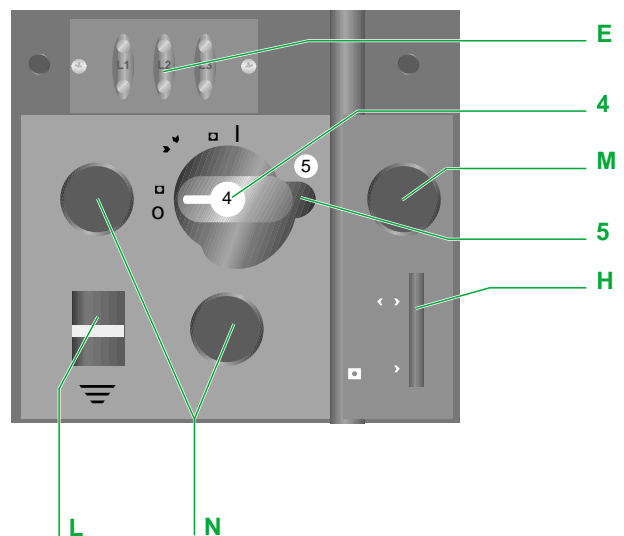
General cubicle identification

- A:** cubicle name
- B:** manufacturer's plate
- C:** rating plate



Earthing switch operation and CB plug-in interlock

- 4:** earthing switch position selector
- 5:** hole for operating handle
- E:** voltage indicator
- H:** plug-in interlock
- L:** mechanical indication earthswitch position
- M:** provision for plug-in prevention interlock
- N:** provision for earthing switch locks



General description

Interlocks of the withdrawable voltage transformer

1: VT's locked in draw-out position:

door in open position, shutters locked in close position.

2: VT's locked in draw-out position:

door in close position, shutters in free position.

3: VT's transfer free:

shutters locked in open position, door locked in close position.

4: VT's locked in draw-in position:

shutters locked in open position, door locked in close position.

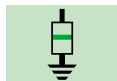
Symbols of earthing switch



Operating position



Earthing switch open position



Earthing switch open position mechanical indicator



Earthing switch closed position



Earthing switch closed position mechanical indicator



Position lockable with padlock

General description

List of accessories supplied with the switchboard

- 1 operating handle,
- Busbar reinforcement insulator (right end of the switchboard),
- 1 busbar earthing carriage (optional).



Handle



Insulator (refer to the installation guide for the assembly of the insulator)

Glossary of abbreviations

LV: low voltage

MV: medium voltage

Evolis: range of vacuum circuit breakers

LF: range of SF6 circuit breakers

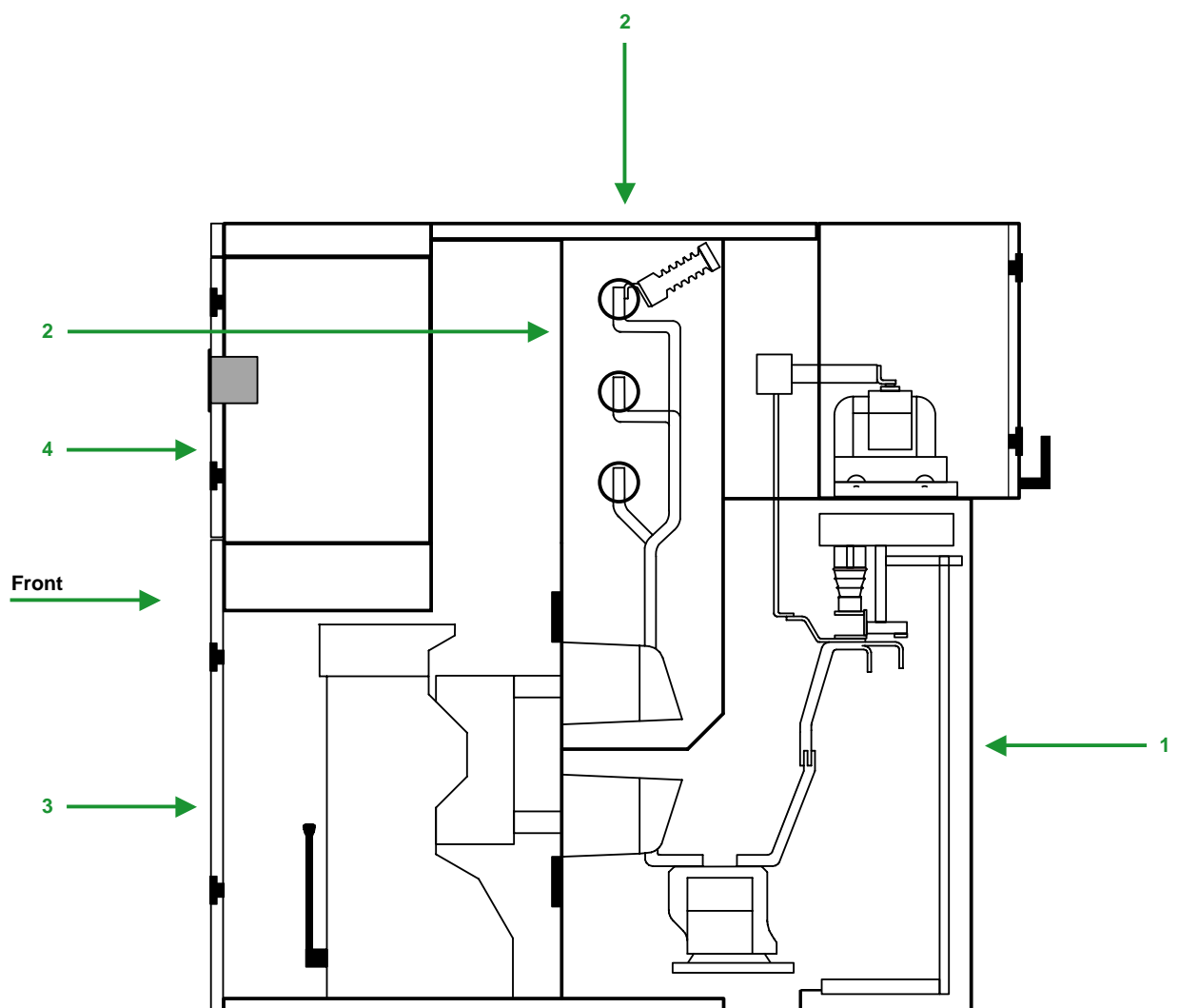
VT: voltage transformer

CT: current transformer

Access to interior of the cubicle

Access possibilities to the cubicle

- 1: access to the cable terminations
- 2: access to the busbar chamber
- 3: access to the removable part
- 4: access to the low voltage compartment



Access to interior of the cubicle

Access to the MV cable connection compartment

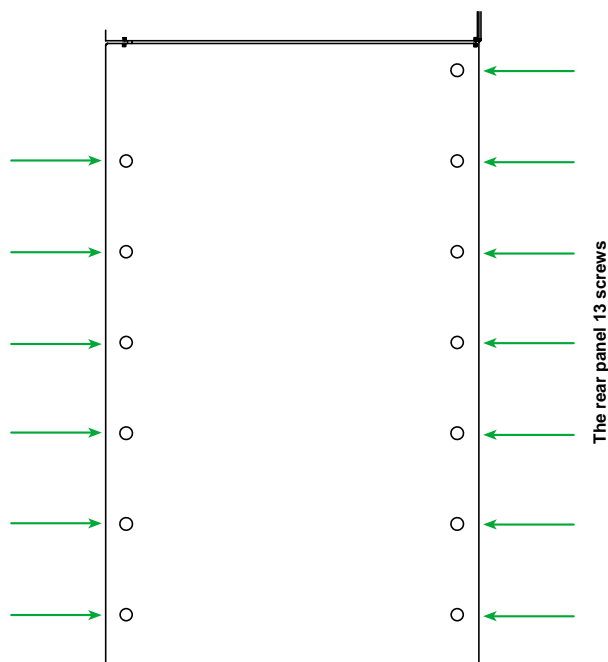
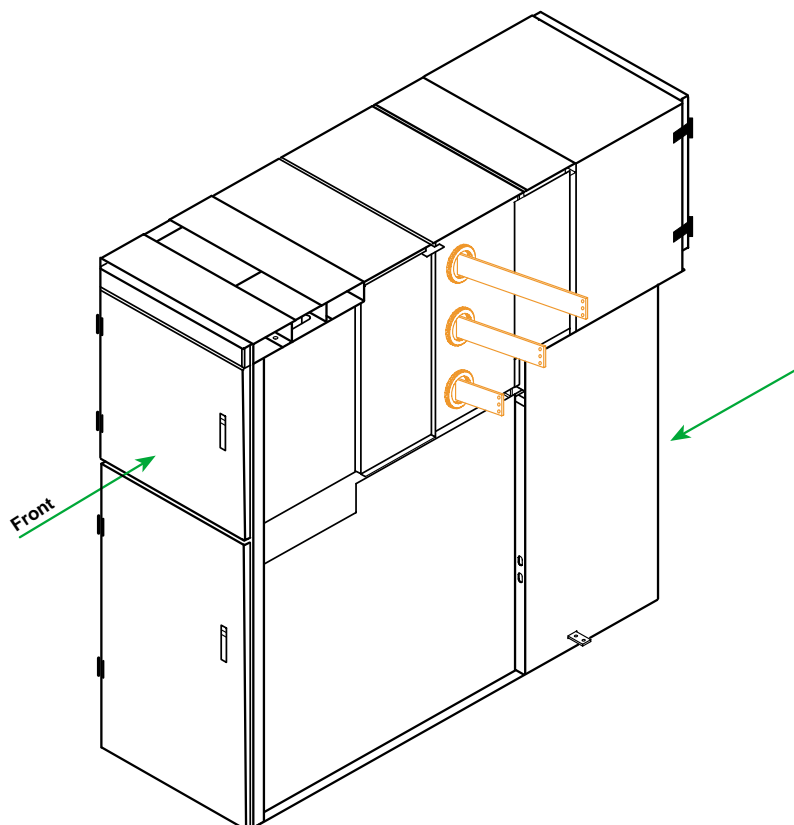
To carry out certain tests, access to the cable compartment is required. The following procedures describe this access:

- 1: close the earthing switch (see section named “How to close the earthing switch”),
- 2: remove the rear panel 13 screws.

N.B.: no interlocking between the two operations.



Caution: make sure that the earthing switch is closed before removing the rear panel.



Access to interior of the cubicle

Access to the busbar chamber

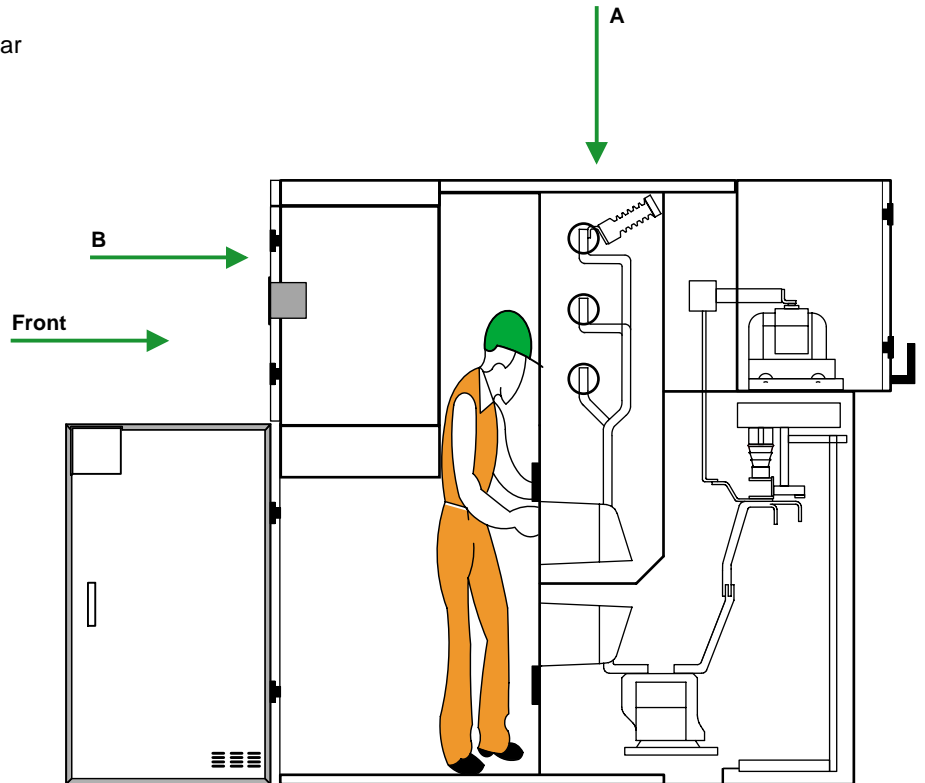
- 1: make sure that the circuit breaker is disconnected,
- 2: it is recommended to earth the main busbar using the earthing truck.

To access the busbar from the top (A)

A1: remove the top cover

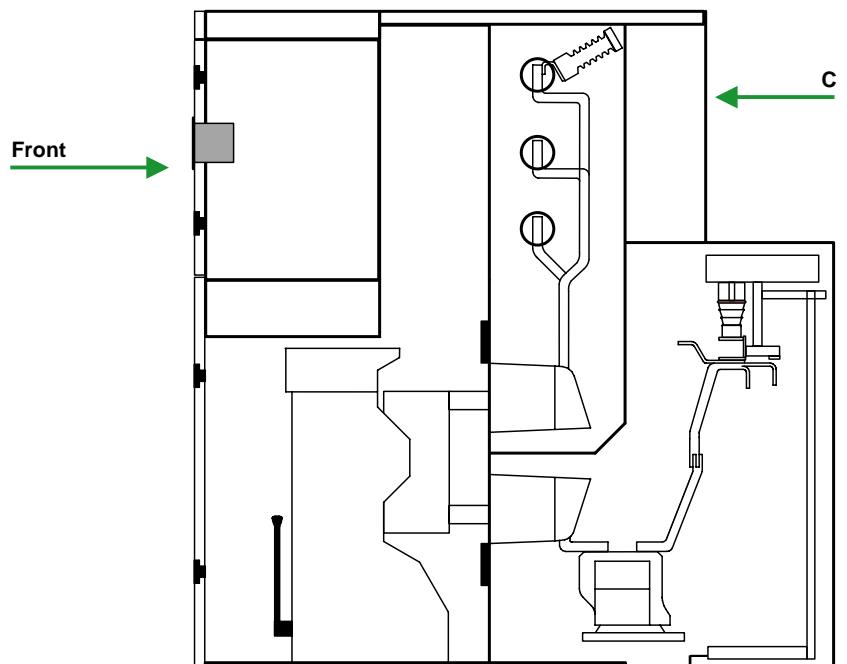
To access the busbar from the front (B)

- B1: open removable part door,
- B2: remove circuit breaker,
- B3: enter the cubicle,
- B4: remove the front partitioning of the busbar chamber.



In case of no potential transformers, access from the back of the cubicle is also available (C)

C1: remove the back panel

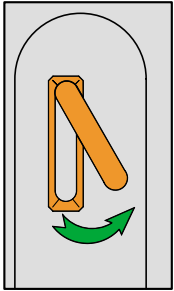


Caution:
make sure that the busbar is earthed before accessing the busbar chamber.

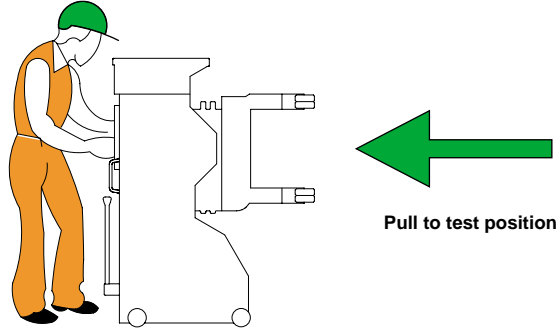
Operating instructions

Disengaging the circuit breaker (removable part)

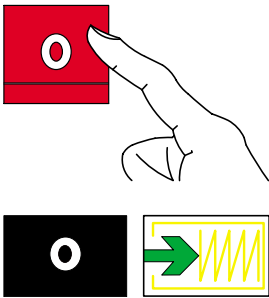
1: open the cubicle door by pulling out the door handle and turn it 90° anti-clockwise.



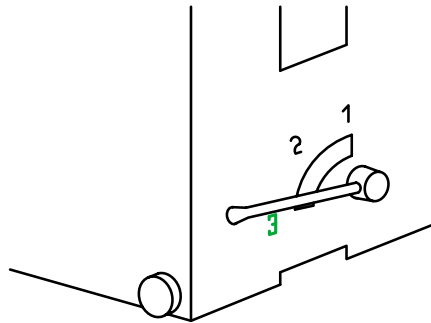
4: disengage the circuit breaker by pulling it towards you up to the stop. The circuit breaker, now, is in the disconnected position.



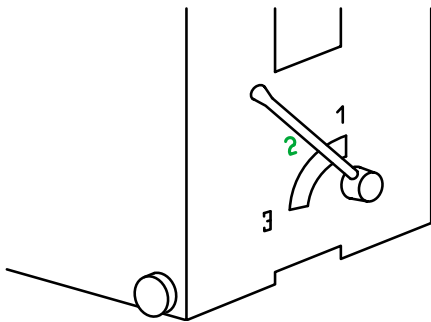
2: open the circuit breaker by pressing the mechanical OFF button "O".



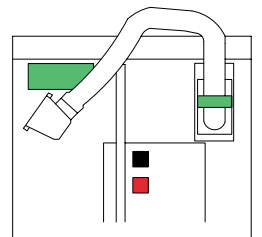
5: to remove the circuit breaker out of the cubicle:
5-A: move the arm to position "3",



3: move the arm to position "2".



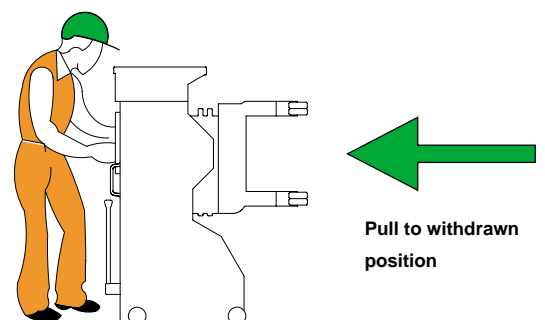
5-B: unplug the LV auxiliaries' lead & park the plug on the circuit breaker front,



5-C: extract the circuit breaker outside the cubicle. To proceed with no load operation test:

5-C-1: steps 1 + 2 + 3 + 4,

5-C-2: move the arm to position "1".

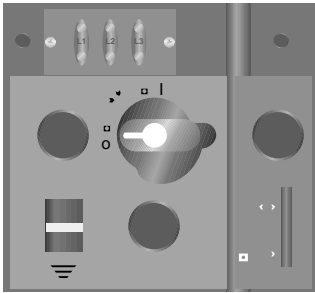


Operating instructions

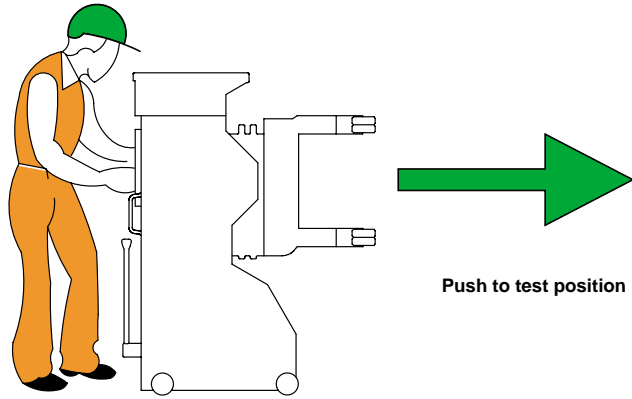
Engaging the circuit breaker (removable part)

1: check that the earthing switch is in the opened position from the mechanical indicator.

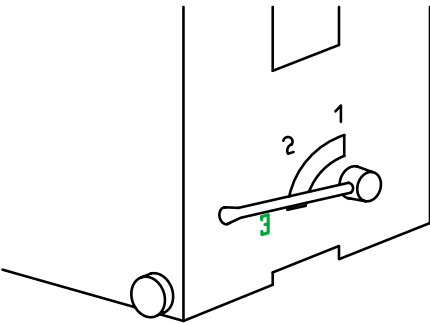
An interlocking device prevents the circuit breaker from being inserted if the earthing switch is closed.



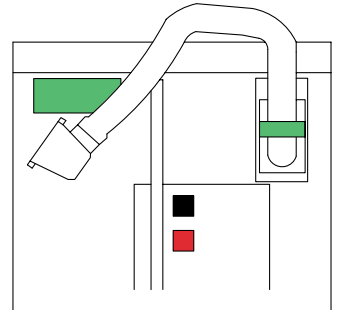
3: push the circuit breaker into the panel until it comes up against the stop.



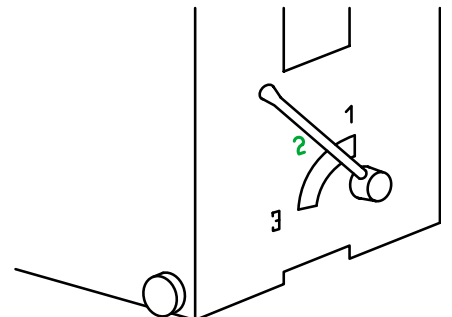
2: move the arm to position " 3 ".



4: plug the LV auxiliaries, otherwise the circuit breaker will not be inserted.

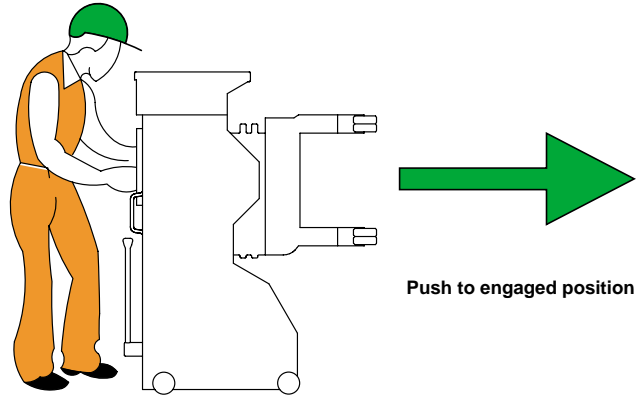


5: move the arm to position " 2 ".

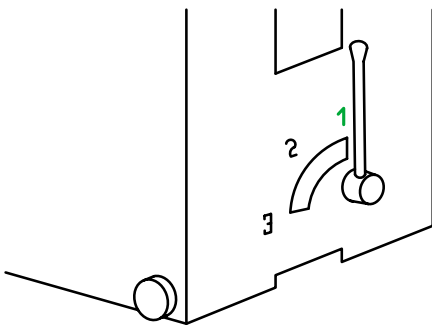


Operating instructions

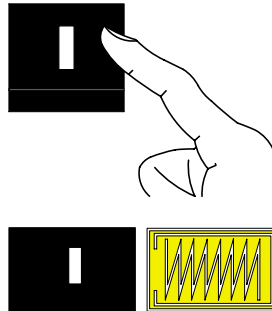
6: engage the circuit breaker by pushing it inwards.



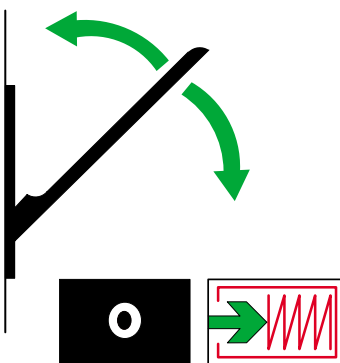
7: move the arm to position "1" to block it in the engaged position. The circuit breaker can then be closed by pressing the mechanical button "I" (provided the operating mechanism is loaded).



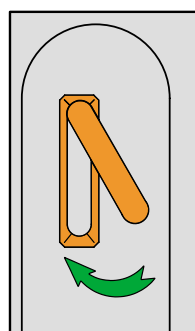
9: close the circuit breaker by pressing the mechanical ON button "I".



8: change the operating mechanism.

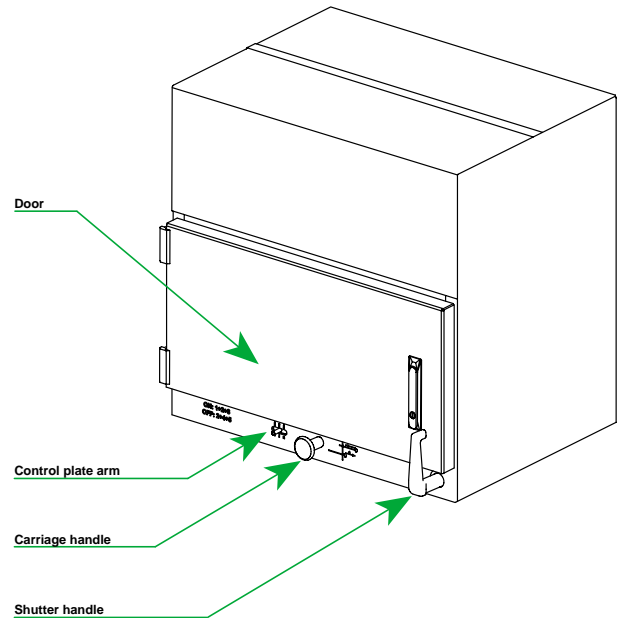


10: close the MV door with the door handle.



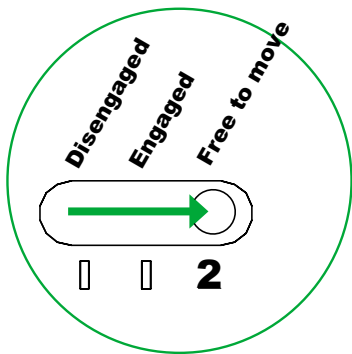
Operating instructions

Cubicle with withdrawable voltage transformer

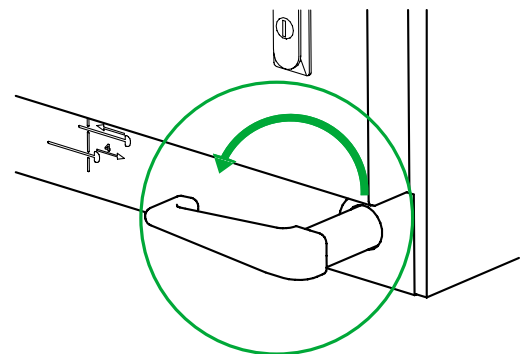


Disengaging the voltage transformer

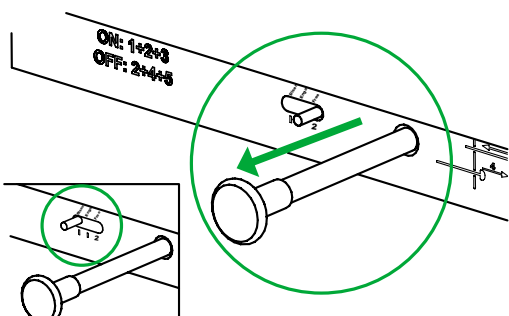
1: move the control plate arm to the right to liberate the shaft which pull the carriage.



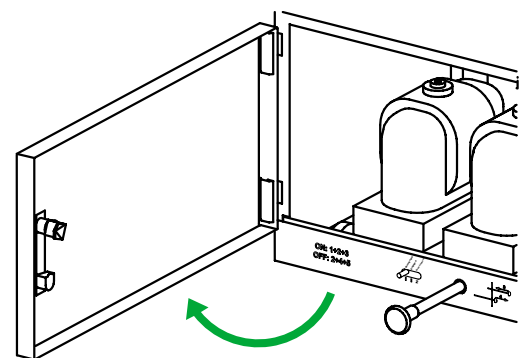
3: rotate the carriage handle in counter clockwise direction to close the shutter and enable the door opening.



2: while holding the control plate arm in the right direction, draw out the carriage handle till the stop. The control plate arm will move automatically to the disengaged position.



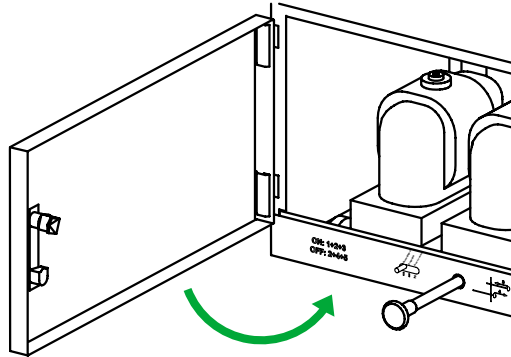
4: open the door.



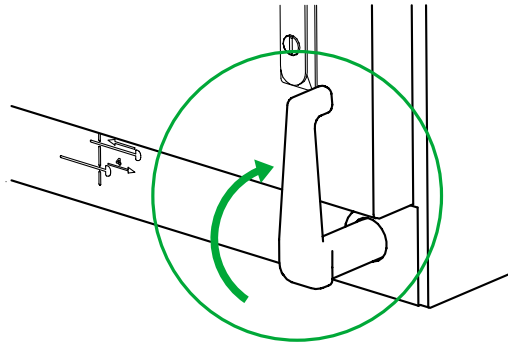
Operating instructions

Engaging the voltage transformer

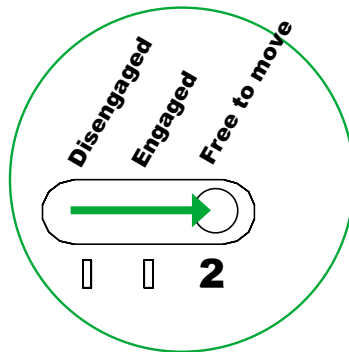
1: close the door.



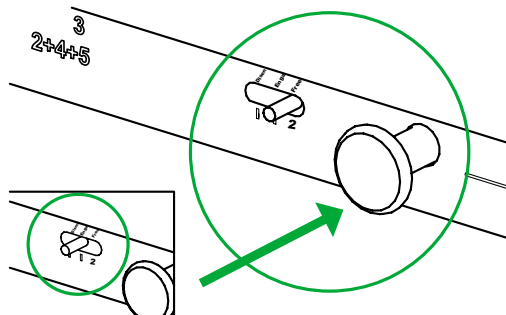
2: rotate the carriage handle clockwise direction to open the shutter and lock the door.



3: move the control plate arm to the right to liberate the shaft which pushes the carriage.



4: while holding the control plate arm in the right direction, push the voltage transformer inward till the stop. The control plate arm will move automatically to the engaged position.



Operating instructions


On an incomer / feeder cubicle

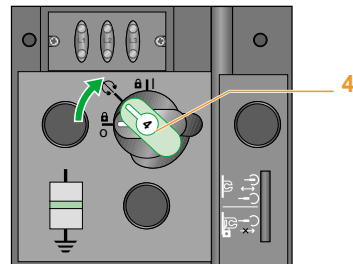
How to close the earthing switch (yellow background front plate)

Initial state:

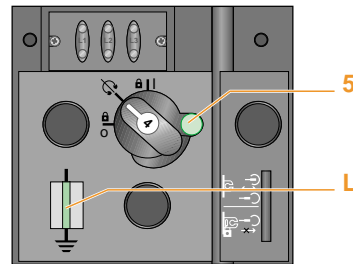
Before proceeding, ensure the following:


- The removable part in the isolated position or removed from the cubicle. Check that the voltage indication lamps are off.
- The locks, if any, should be set to enable operation.

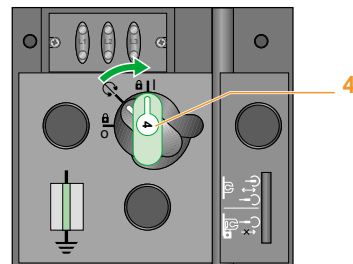
Set the selector "4" to  by pulling it out and turning it to the right.



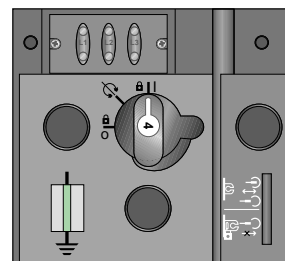
Insert the crank handle into the operation shaft "5" and turn the handle clockwise until the position indicator "L" changes state. Closure is accompanied by a distinctive sound.



Set the selector "4" to  by pulling it out and then turning it. The earthing switch is now in the earthed position. The MV cable connections are now short-circuit and earthed.



The earthing switch is now in the earthed position. The MV cable connections are now short-circuit and earthed.



Operating instructions


On an incomer / feeder cubicle

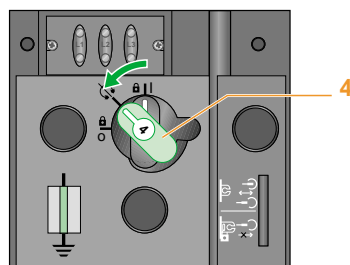
How to open the earthing switch (yellow background front plate)

Initial state:

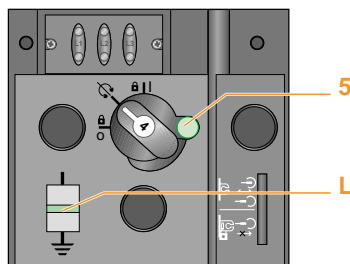
Before proceeding, ensure the following:


- The earthing is closed.
- The locks, if any, should be set to enable operation.

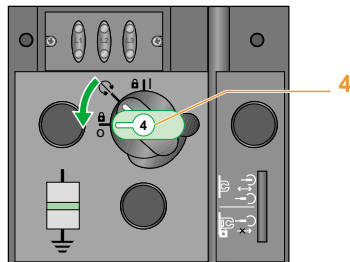
Set the selector “4” to  by pulling it out and turning it.



Insert the crank handle into the operation shaft “5” and turn the handle clockwise until the position indicator “L” changes state. Closure is accompanied by a distinctive sound.



Set the selector “4” to  by pulling it out and then turning it.

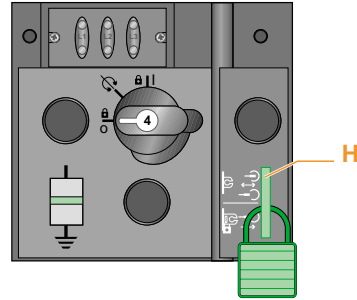
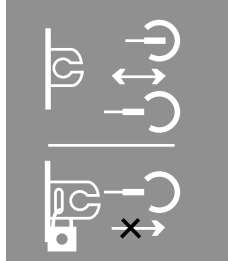


Operating instructions

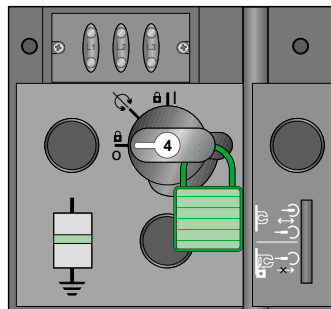
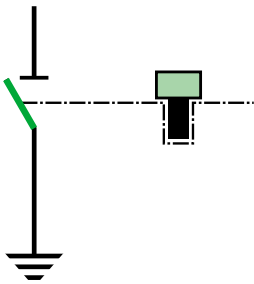
Locking by padlocks

To prevent plugging-in of the removable part

Pull out the lever "H" and lift the padlock in the oblong hole.

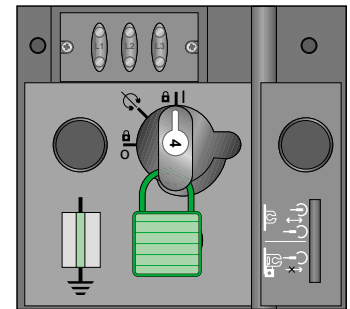


Locking the earthing switch in the open or closed position



Earthing switch open:

fit 1 to 3 locks to the selector "4" to prevent closing.



Earthing switch closed:

fit 1 to 3 locks to prevent opening. This also prevents racking in of the closing of the withdrawable part.

N.B.: all locks are 6 - 8 mm diameter padlocks

To prevent opening of the bushing shutters lock

On the bushing shutter mechanism when shutters are closed. The bushing shutter mechanism is inside the cubicle on the right hand side.

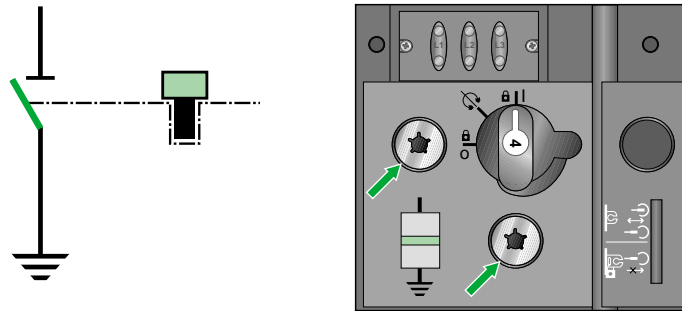
Operating instructions

Interlocking by locks (option)

- (2 O), (2 C) or (1 O & 1 C): on the earthing switch
- 1 lock in plugged-in position (on earthing switch)

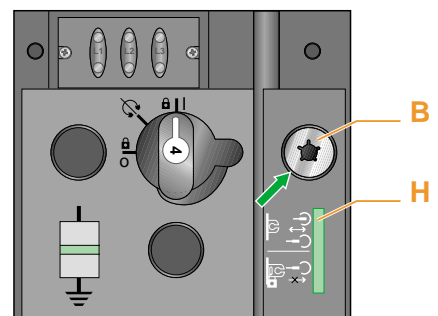
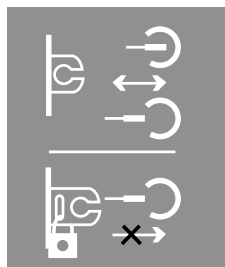
Interlocking the earthing switch

The key is released only if the earthing switch is locked.



Locking the removable part in the drawn-out position

- earthing switch closed,
- pull-out the level “H” and turn the key lock at “B” and remove the key.



Installation & operation recommendation

Long term switchgear performance

Long term switchgear performance in a 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.

Regular operation

We strongly recommend that you carry out at regular intervals (at least every two years) a few operating cycles on the switching devices. Outside normal operating (between -5 °C and +40 °C, absence of dust, corrosive atmosphere, etc.) we recommend that you contact our Schneider Electric Service Centre in order to examine the measures to be taken to ensure proper installation and operation.

Schneider Electric services centres

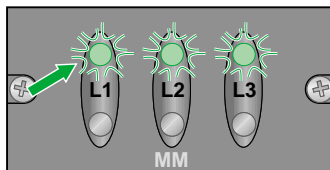
Our service centre is at your disposal at all times:

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

Test arrangements

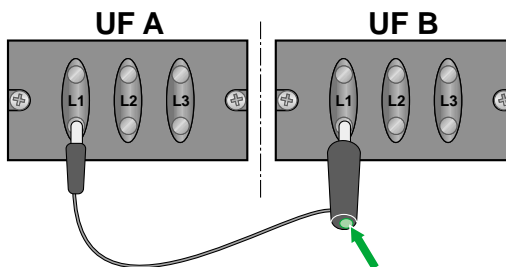
Voltage presence on MV cables

As soon as the cables are live, the lamps of the voltage indicator should light.



Checking phase concordance

- phases are in sequence: lamp does not light (no volt),
- phases are not in sequence: lamp lights (volt).

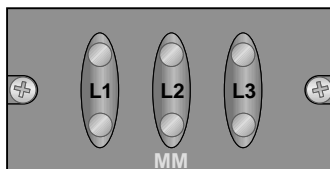


MV cable tests

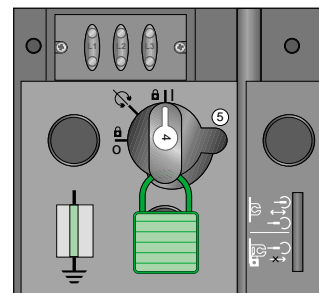
Injecting voltage into MV cable heads
Outgoing cables (without VT)

Test conditions:

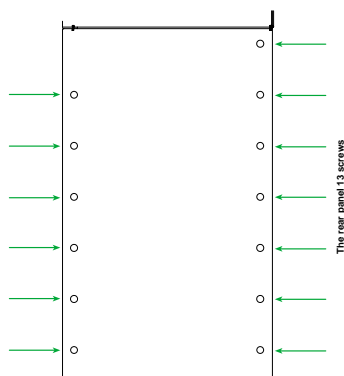
- earthing switch open
- cables connected to injector tools.



Verify the absence of voltage.
The voltage indicator lamps are off.



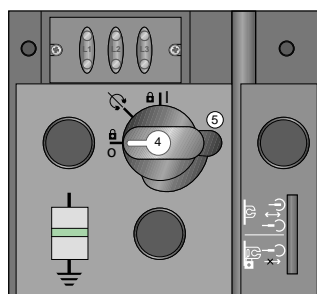
Close the earthing switch (see chapter how to close the earthing switch). We recommend you lock it in this position (see chapter locking with padlocks).



- remove the panel (13 screws).
- connect the voltage injector circuit to the cable lugs.

At the end of the tests

- close the earthing switch,
- remove the accessories.



Open the earthing switch (see chapter how to open the earthing switch) then carry out the tests.

Preventive maintenance

Trouble shooting table for drawout circuit breaker

Symptoms	Faulty mechanisms	Probable causes and solutions
The circuit breaker on its trolley was just inserted into the cubicle. The lever is in the circuit breaker extraction authorization and removal position (position no. 3) The selector cannot be turned to the rack-in authorised position (position no. 2).	The low voltage plug.	Check that the low voltage plug is connected.
	The notching pins of the circuit breaker truck.	Make sure of using the right CB trolley.
	Mismatch	
The circuit breaker is connected (position no. 1). The circuit breaker is closed: the lever cannot be turned to the rack-out authorized position no.2	The automatic opening function of the circuit breaker via the selector.	Make sure of pushing and holding the CB mechanical off button while moving the level from 1 to 2.

Notes



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