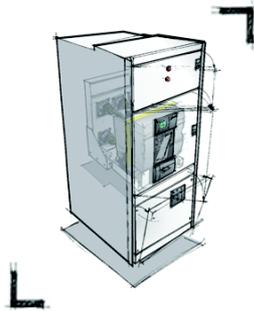


Metalclad cubicle

NEX Merlin Gerin 17.5 kV

User
Manual
2003



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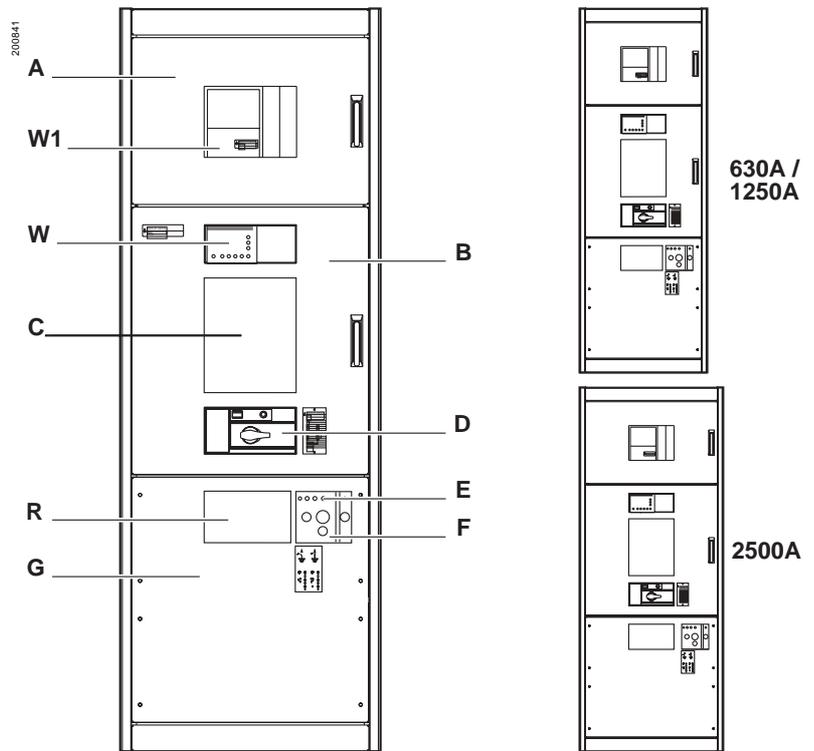
General description

Feeder/incomer cubicle

Incoming/outgoing feeder without VT or with fixed VT

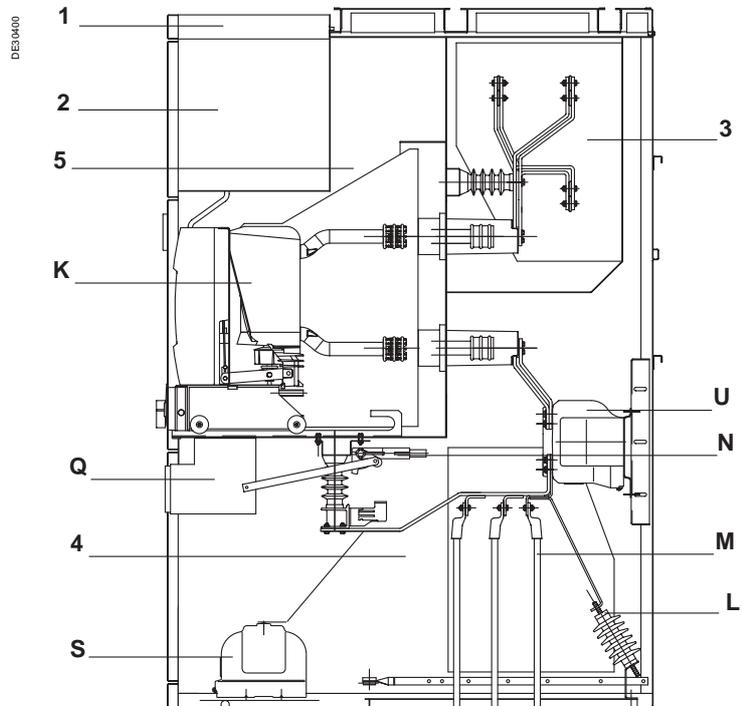
Front panel

- A:** LV compartment access door
- B:** removable part compartment door
- C:** removable part inspection window
- D:** removable part operating and interlocking plate
- E:** voltage indicators
- F:** earthing switch operating and interlocking plate
- G:** MV cable compartment access cover
- R:** earthing switch viewing window
- W:** Sepam 1000+ UMI (option)
- WI:** Sepam protection control and monitoring.



Left-hand view

- 1:** LV cable routing duct
- 2:** low voltage compartment
- 3:** busbar compartment
- 4:** VT and MV cable compartment
- 5:** removable part compartment
- K:** removable part (Evolis circuit breaker)
- L:** surge arrestors (option)
- M:** MV cable connection point
- N:** earthing switch
- Q:** earthing switch operating mechanism
- S:** fixed voltage transformer (option)
- U:** MV current transformers



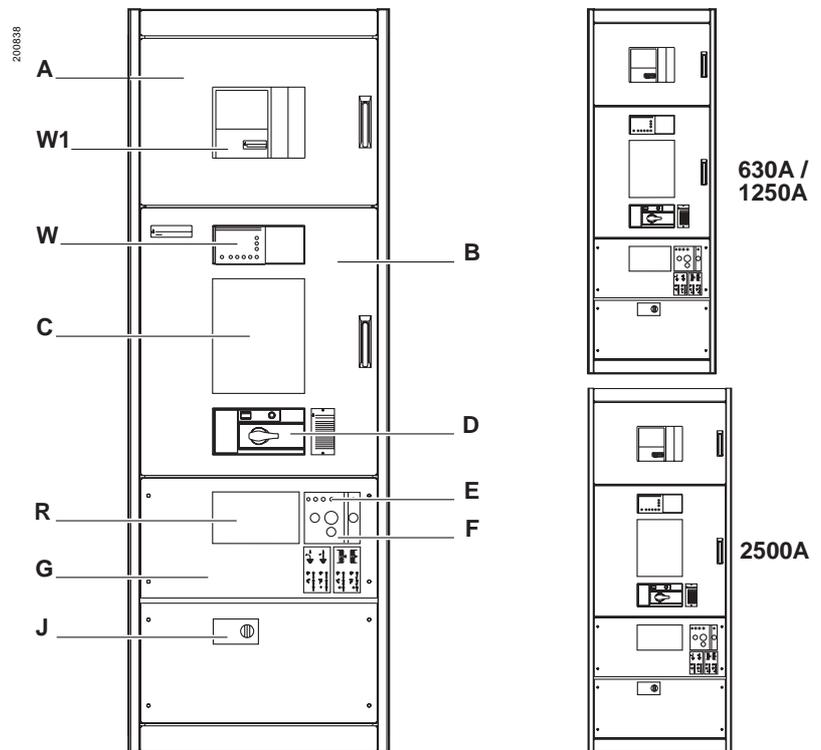
General description (cont'd)

Feeder/incomer cubicle

Incoming/outgoing feeder with withdrawable VT

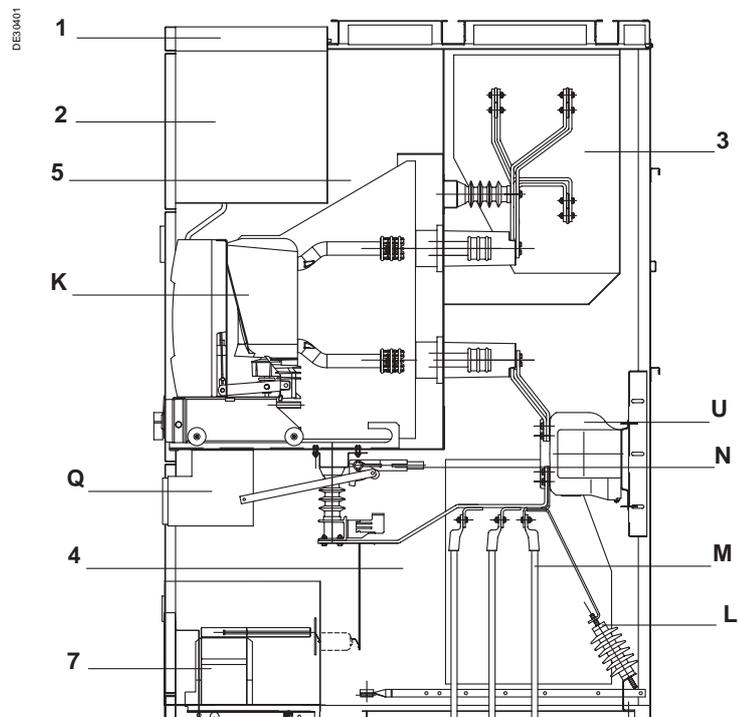
Front panel

- A:** LV compartment access door
- B:** removable part compartment door
- C:** removable part inspection window
- D:** removable part operating and interlocking plate
- E:** voltage indicators
- F:** earthing switch operating and interlocking plate
- G:** MV cable compartment access cover
- R:** earthswitch viewing window
- J:** withdrawable VT operating plate
- W:** Sepam 1000+ UMI (option)
- WI:** Sepam protection control and monitoring.



Left-hand view

- 1:** LV cable routing duct
- 2:** low voltage compartment
- 3:** busbar compartment
- 4:** VT and MV cable compartment
- 5:** removable part compartment
- 7:** withdrawable VT compartment
- K:** removable part (EVOLIS circuit breaker)
- L:** surge arrestors (option)
- M:** MV cable connection point
- N:** earthing switch
- Q:** earthing switch operating mechanism
- U:** MV current transformers

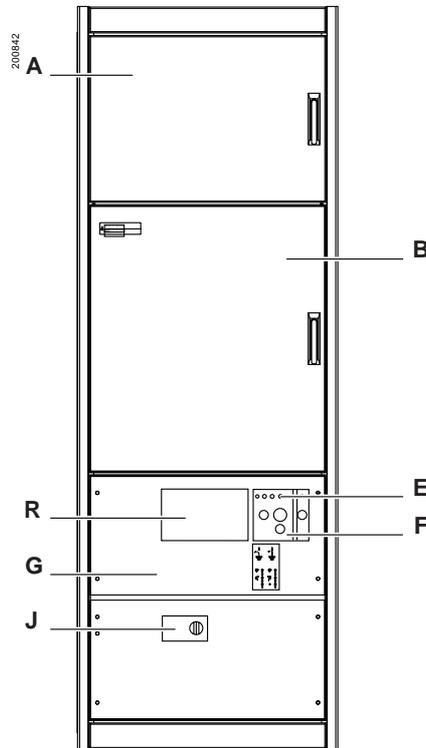


General description (cont'd)

Busbar voltage transformer cubicle

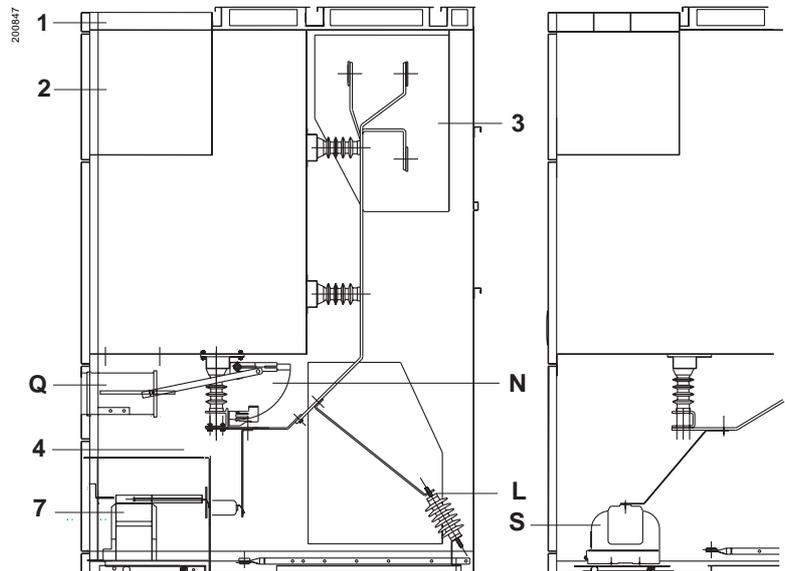
Front panel

- A:** LV compartment access door
- E:** voltage indicators
- F:** earthing switch operating and interlocking plate
- G:** MV cable compartment access cover
- R:** earthswitch viewing window
- J:** withdrawable VT operating plate



Left-hand view

- 1:** LV cable routing duct
- 2:** low voltage compartment
- 3:** busbar compartment
- 4:** VT and MV cable compartment
- 7:** withdrawable VT compartment
- L:** surge arrestors (option)
- N:** earthing switch (option)
- Q:** earthing switch operating mechanism
- S:** fixed voltage transformer (option)

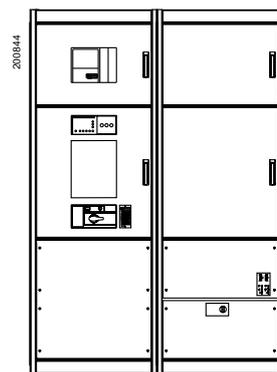
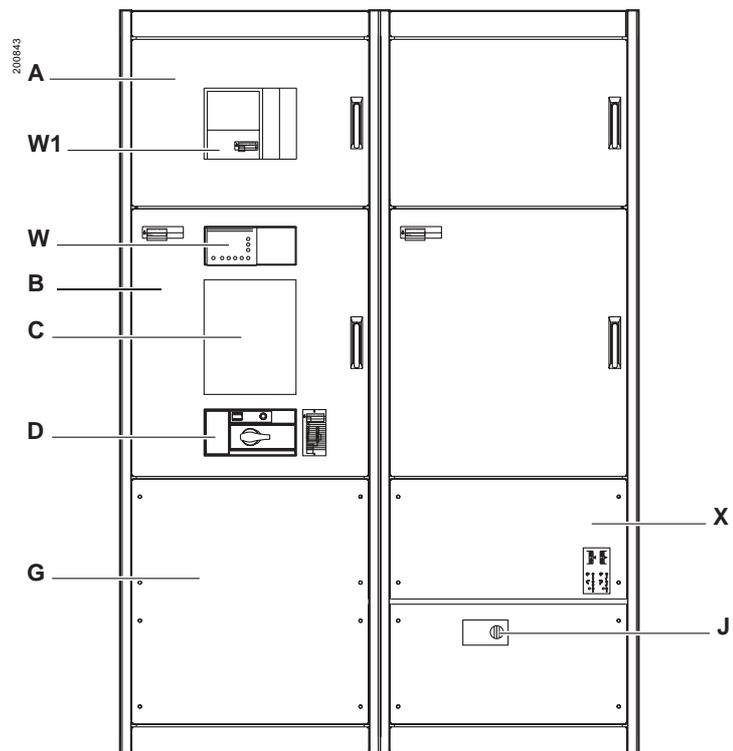


General description (cont'd)

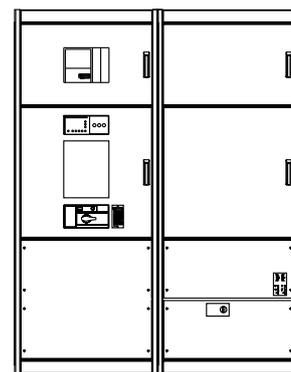
Coupler/riser cubicles with withdrawable VT

Front panel

- A:** LV compartment access door
- B:** removable part compartment door
- C:** removable part inspection window
- D:** removable part operating and interlocking plate
- G:** lower busbar compartment access cover
- J:** withdrawable VT operating plate
- X:** lower busbar compartment access cover
- W:** Sepam 1000+ UMI (option)
- W1:** Sepam protector, control and monitoring



1250 A

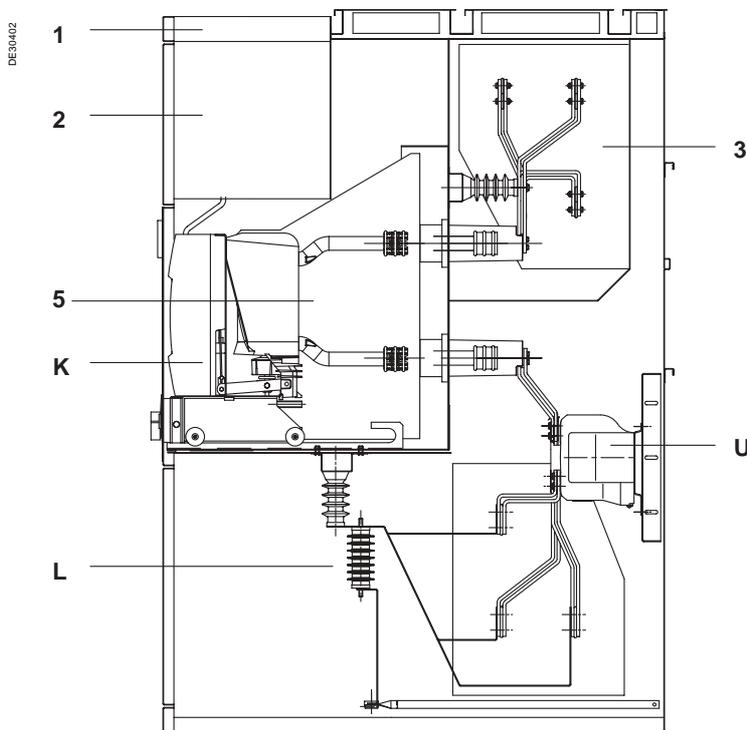


2500 A

General description (cont'd)

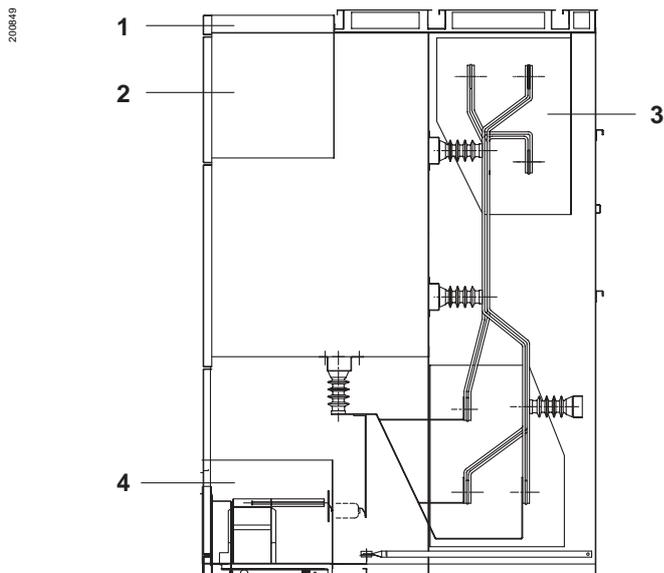
Left-hand view

- 1: LV cable routing duct
- 2: low voltage compartment
- 3: busbar compartment
- 5: removable part compartment
- K: removable part (EVOLIS circuit breaker)
- L: surge arrestors (option)
- U: MV current transformers



Left-hand view

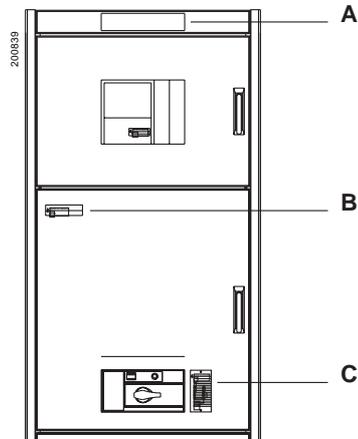
- 1: LV cable routing duct
- 2: low voltage compartment
- 3: busbar compartment
- 4: withdrawable VT compartment (option)



General description (cont'd)

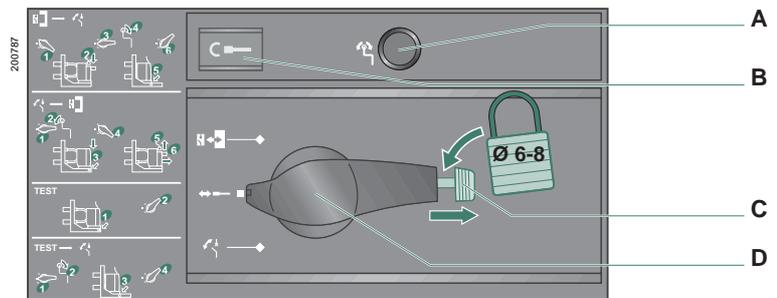
Cubicle identification

- A:** cubicle name
- B:** manufacturers plate
- C:** rating plate.



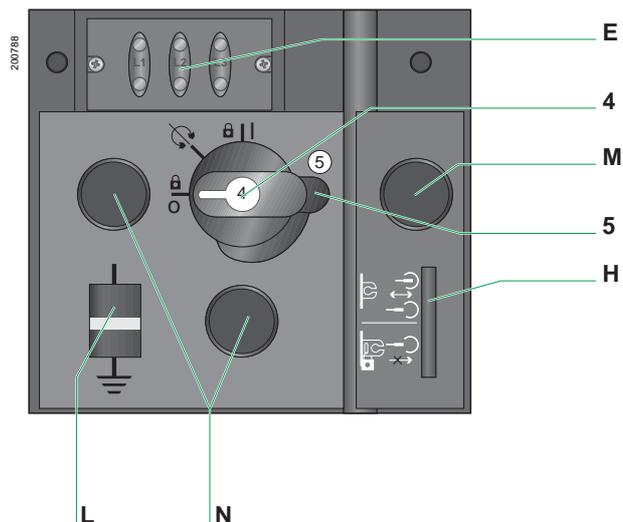
Front panel removable part

- A:** hole for operating handle
- B:** removable part position indication
- C:** removable part selector padlocking facility
- D:** removable part selector level.



Earthing switch voltage presence

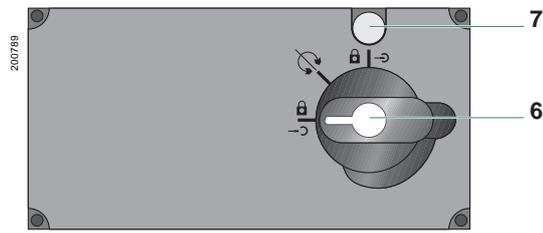
- 4:** earthing switch position selector
- 5:** hole for operating handle
- E:** voltage indication
- H:** plug-in interlock
- L:** mechanical indication earthswitch position
- M:** provision for plug-in prevention interlock
- N:** provision for earthing switch locks.



General description (cont'd)

Withdrawable voltage transformer

6: voltage transformer drawout position on selector
7: hole for inserting operating handle.



Symbols

Basic cubicle

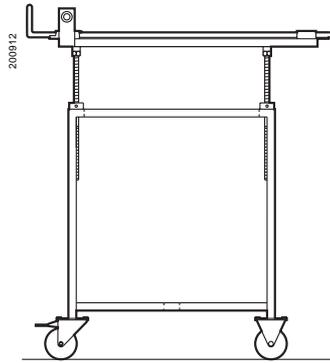
| | | |
|--------|---|--|
| 200648 |  | Operating position |
| 200649 |  | Earthing switch open position |
| 200650 |  | Earthing switch open position mechanical indicator |
| 200651 |  | Earthing switch closed position |
| 200652 |  | Earthing switch closed position mechanical indicator |
| 200653 |  | Position lockable with padlock |

Removable part

| | | |
|--------|---|----------------------------------|
| 200823 |  | Operating position/test position |
| 200790 |  | "Plugged in" position |
| 200791 |  | "Draw-out" position |
| 200824 |  | Insertion/extraction position |

General description (cont'd)

Removable part extraction table



List of accessories supplied with the switchboard

- 1 extraction table
- 1 operating handle
- end covers
- 1 busbar earthing carriage (optional)
- 1 phase concordance device (optional).

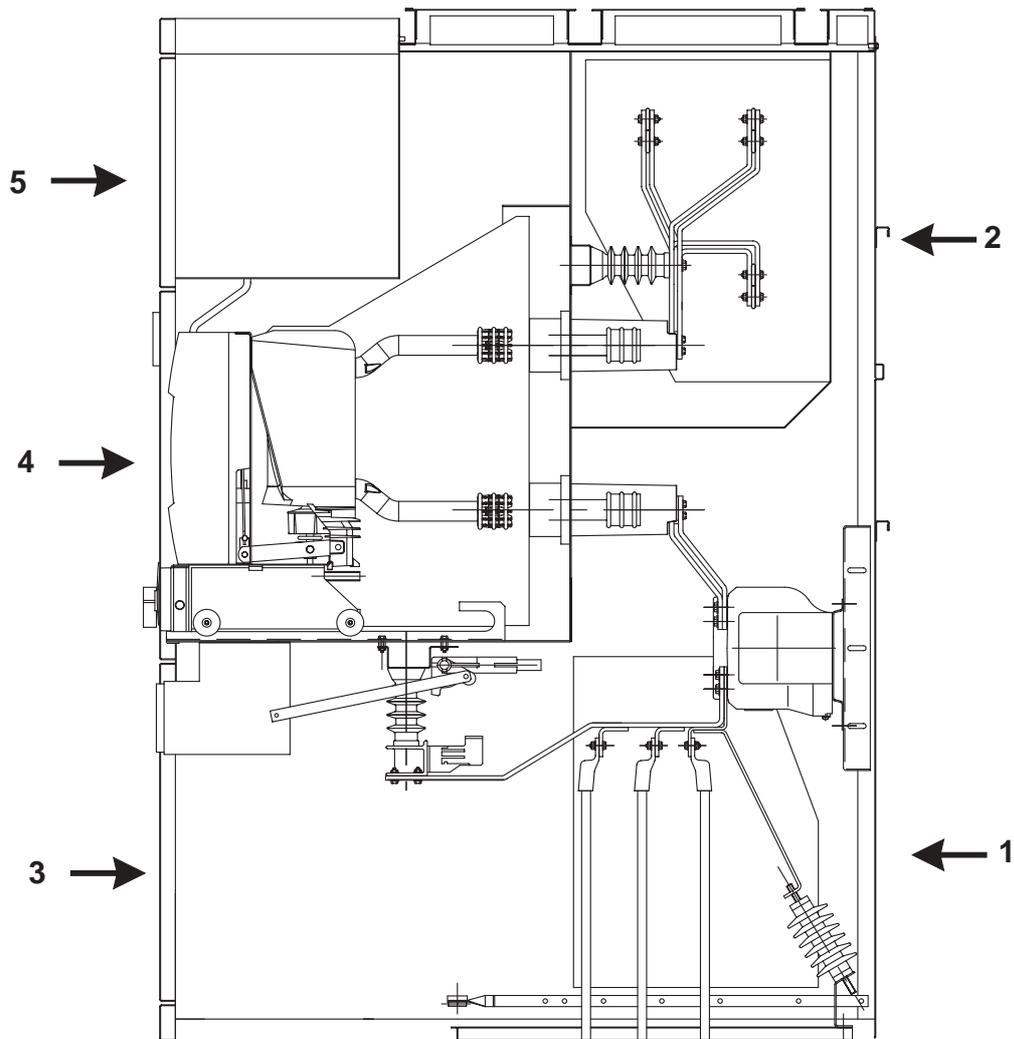
Glossary of abbreviations

LV: low voltage
MV: medium voltage
Evolis: range of circuit breakers
VT: voltage transformer
CT: current transformer.

Access to interior of the cubicle

Access possibilities to the cubicle

DE30403



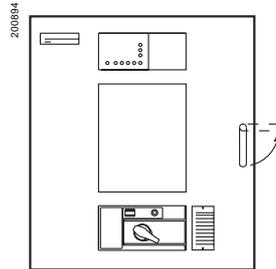
- 1:** Access to the cable terminations
- 2:** Access to the busbar chamber
- 3:** Access to the cable terminations
- 4:** Access to the removable part
- 5:** Access to the low-voltage compartment

Access to interior of the cubicle (cont'd)

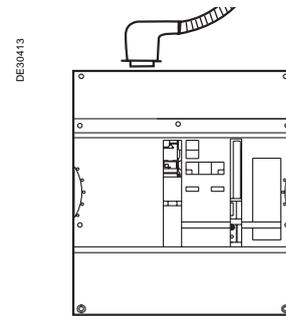
Extracting the removable part

Initial state

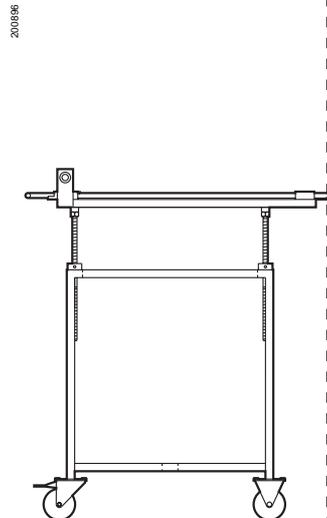
Removable part in test position



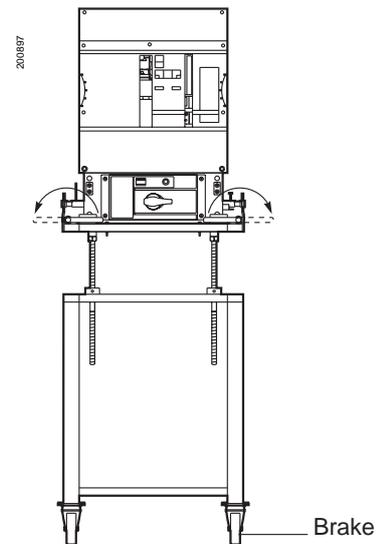
Open the cubicle door by pulling out the handle and turning anti-clockwise 90°. If the MV door/CB position interlock is fitted, the racking selector must be in the isolated position.



Unplug the LV auxiliaries lead and park the plug under the LV compartment.



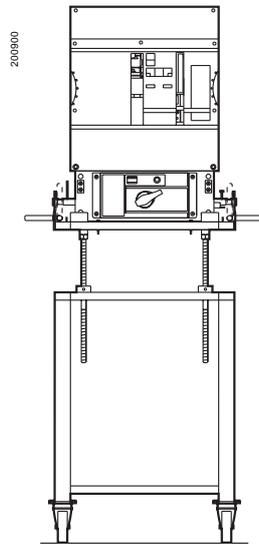
Move the ET into position as shown.



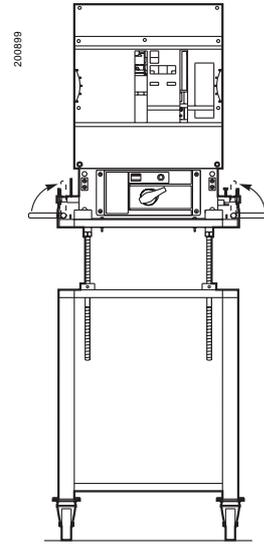
Lock in place by turning the two handles on the ET. Apply the brakes on the 2 castors of the ET.

Access to interior of the cubicle

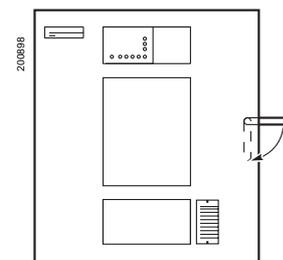
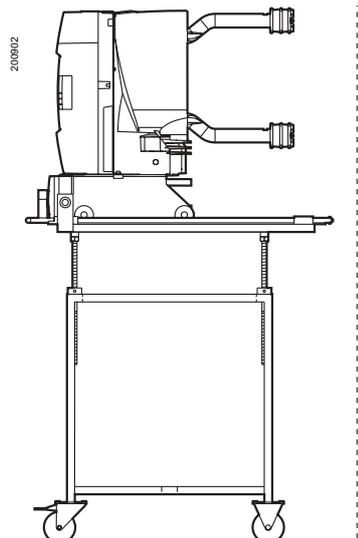
(cont'd)



You must unlock the catch on the front rail prior to extracting the removable part. Extract the removable part, until it reaches the rear stop on the ET. Return the selector to the service/test position (manually defeating the interlocks if necessary).



Disconnect the ET by turning the two handles to disengage the cradle. Release the brakes on the ET castors and withdraw the ET.

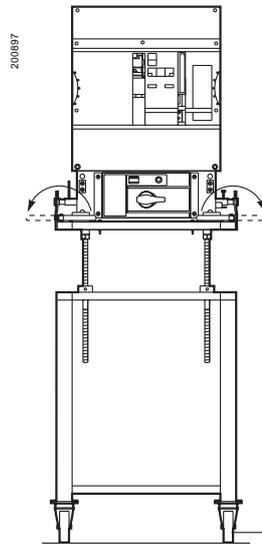


Close the cubicle door.

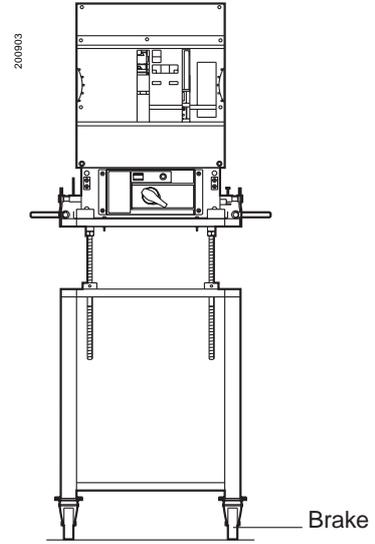
Access to interior of the cubicle

(cont'd)

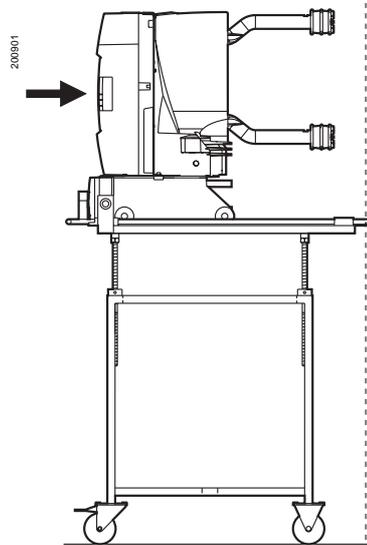
Installing the removable part



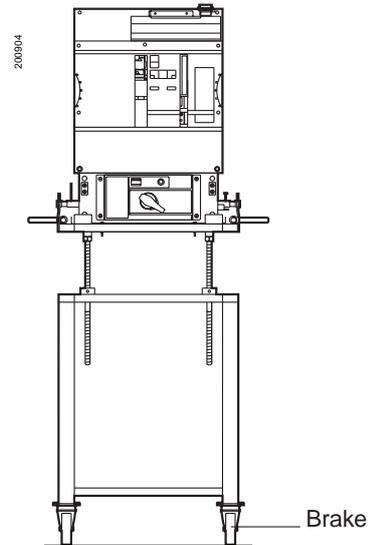
Move the ET into position. Lock in place by turning the two handles on the ET. Apply the brakes on the 2 castors of the ETL.



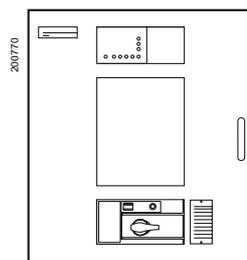
Unlock the CB from the extraction table by turning racking selector clockwise to isolated position.



Push the removable part into the cubicle to the test position. Remove the ET.



Release the LV auxiliaries cover on the CB and fit the LV plug to the CB.



Close the MV door and handle and move the racking selector to the racking position.

Rack in the removable part.

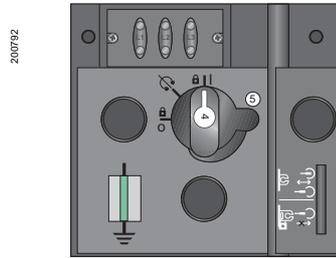
Access to interior of the cubicle (cont'd)

Access to the MV cable connection compartment

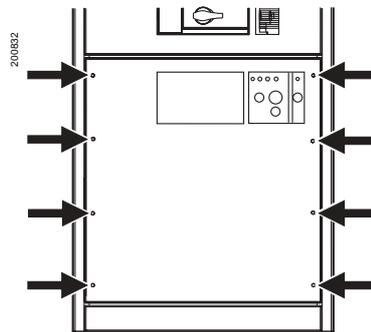
Cubicle without voltage transformer

Close the earthswitch
(see Chapter "how to close the earthswitch").

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

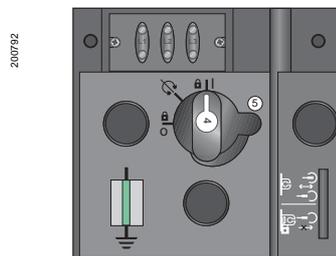


Remove the panel 8 screws.

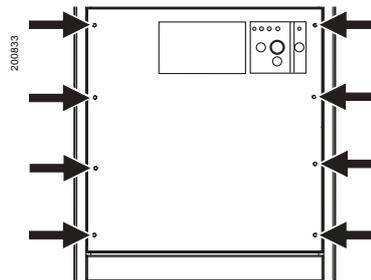


Cubicle with fixed voltage transformer

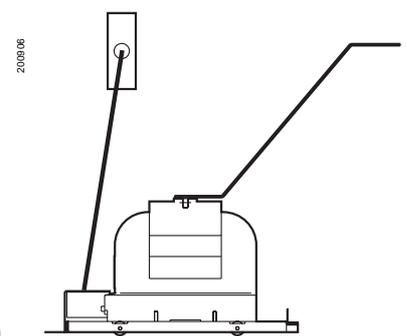
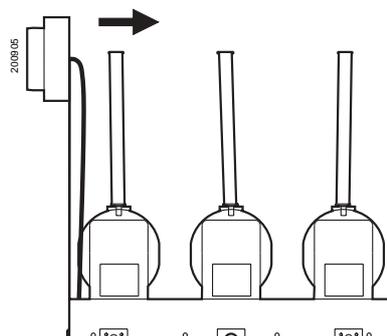
Close the earthswitch
(see Chapter "how to close the earthswitch").
Open the switch protector and VT
secondaries.



Remove the panel (8 screws) and the front plinth.



Un-plug the VT secondary low-voltage plug connector and disconnect copper bars.



Access to interior of the cubicle (cont'd)

Cubicle with withdrawable voltage transformer

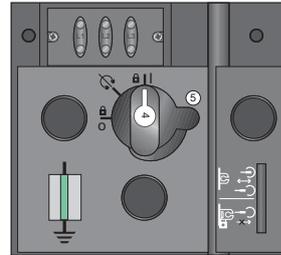
Draw out the VT (see chapter "how to draw out the VT").

200793



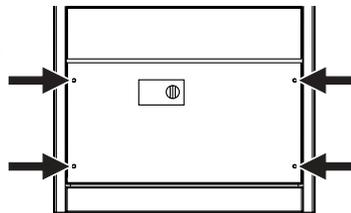
Close the earthswitch (see chapter "how to close the earthswitch").

200792



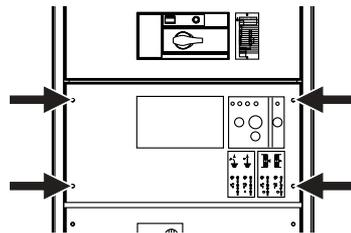
Remove the VT access panel (4 screws) and the front plinth.

200834



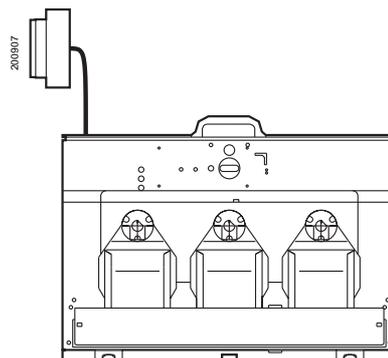
Remove the access panel to the MV cable connection chamber (4 screws).

200835



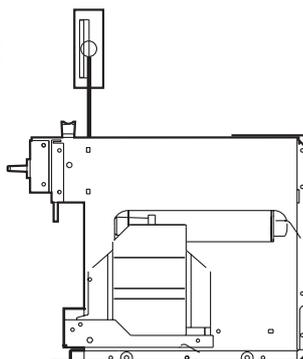
Un plug the VT secondary low-voltage plug connector.

200907



Draw out the VT compartment.

200908



Installation and operation recommendation

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.

Regular operation

We strongly recommended that you carry out at regular intervals (at least every two years) 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.

Schneider Electric services centres

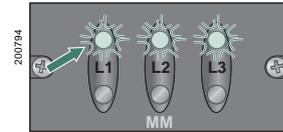
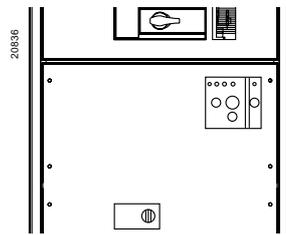
Our service centre is at your disposal at all times:

- 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

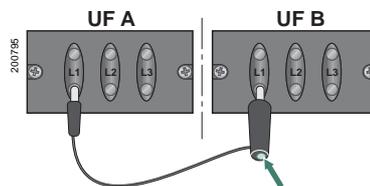
As soon as the cables are live, the lamps of the voltage indicator should light.



Checking phase concordance

Phases are in concordance:
lamp does not light.

Phases are not in concordance:
lamp lights.



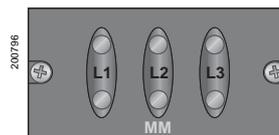
MV cable tests

Test conditions

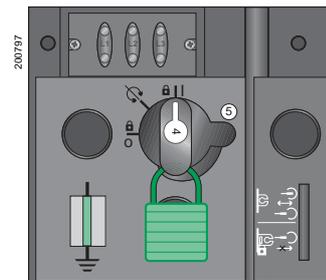
- earthing switch open
- cables connected to injector tools.

Injecting voltage into MV cable heads

Outgoing cables (without VT)



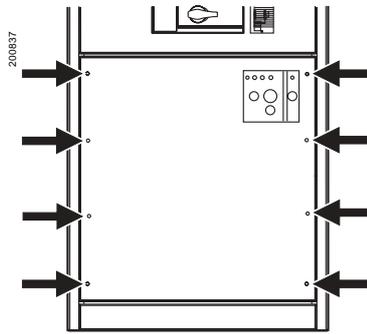
Verify the absence of voltage.
The voltage indicator lamps are off.



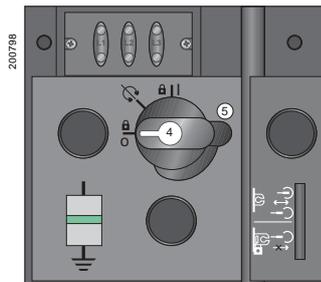
Close the earthing switch (see chapter "how to close the earthing switch").
We recommend you lock it in this position (see chapter "locking with padlocks").

Test arrangements (cont'd)

MV cable tests (cont'd)



Remove the panel (8 screws).
Connect the voltage injector
circuit to the cable lugs.



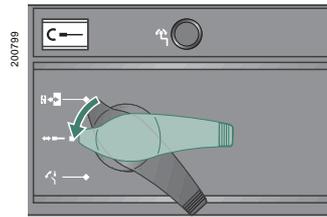
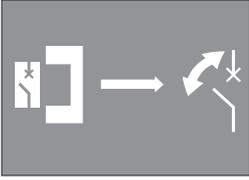
Open the earthing switch (see
chapter "how to open the
earthing switch") then carry out
the tests.

At the end of the tests:

- close the earthing switch
- remove the accessories.

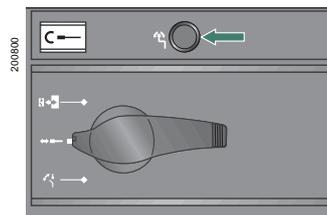
Operating instructions

How to plug in the removable part

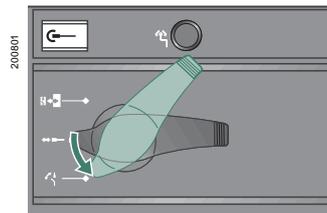


Conditions:

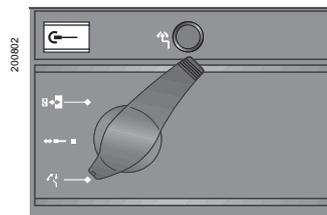
- door closed
 - earthing switch open
 - the low voltage plug fixed to the circuit breaker
 - racking-in interlock unlocked
 - circuit breaker open
- Set the selector to the racking position.



Insert the crank handle into hole. Plug in the removable part by turning the crank handle clockwise until the position indicator changes state.



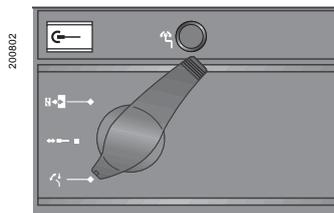
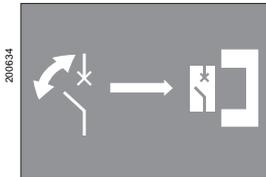
Set the selector to the service position.



In the case of a circuit breaker, electrical operation is now possible.

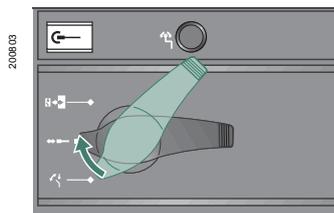
Operating instructions (cont'd)

How to draw out the removable part

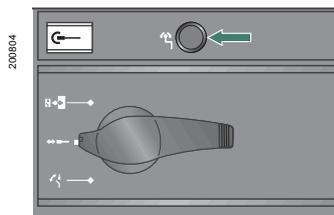


Conditions:

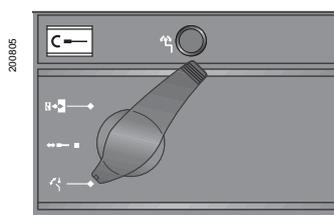
- removable part in plugged in position.



Remove all racking locks. Set the selector to the racking position



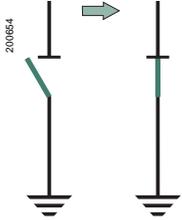
Insert the crank handle into hole. Withdraw removable part by turning the crank handle anti-clockwise until the position indicator changes state.



Set the selector to the service/test position. In the case of a circuit breaker, electrical operation is now possible.

Operating instructions (cont'd)

On a basic cubicle



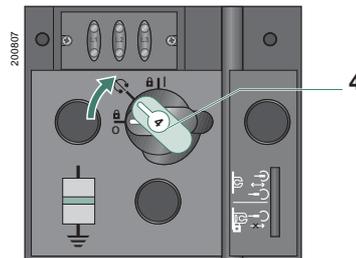
How to close the earthing switch (yellow background front plate)

Initial state:

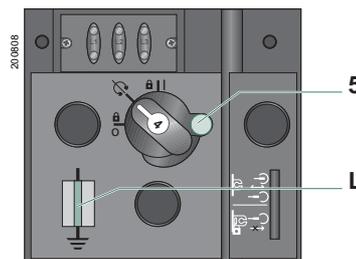
- the removable part in the isolated position or removed from the cubicle

check that the voltage indication lamps are off

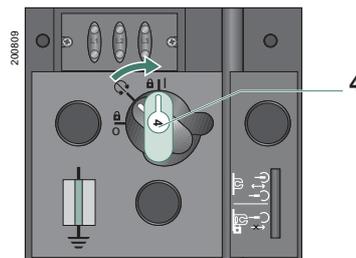
- the locks, if any, should be set to enable operation.



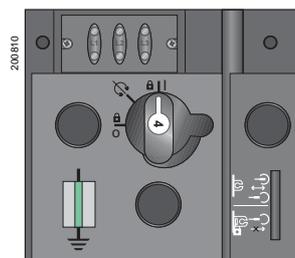
Set the selector "4" to  by pulling it out and then turning it.



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.



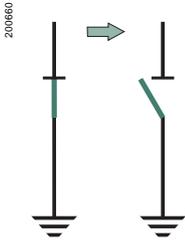
Set the selector "4" to  by pulling it out and then turning it.



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

Operating instructions (cont'd)

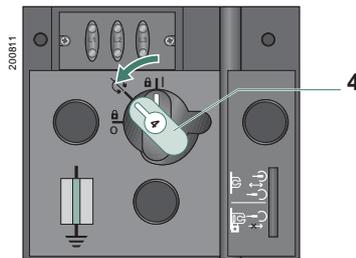
On a basic cubicle



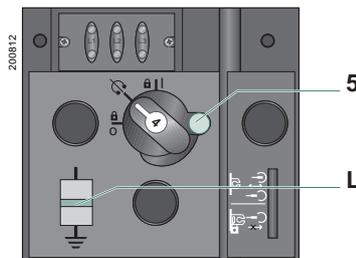
How to open the earthing switch (yellow background front plate)

Initial state:

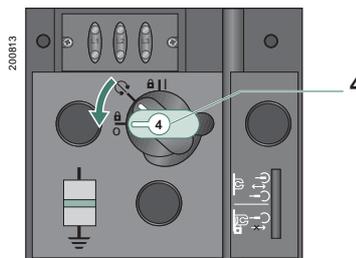
- the earthing switch is closed
- the locks, if any, should be set to enable operation.



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



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

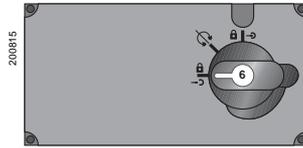


Set the selector "4" to  by pulling it out and then turning it. The earthing switch is now in the open position.

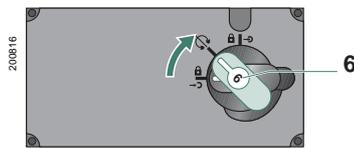
Operating instructions (cont'd)

On a basic cubicle

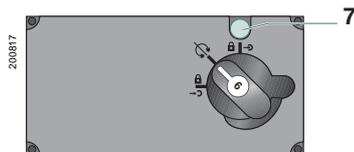
How to plug in the voltage transformer (blue background front plate)



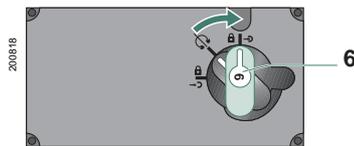
- Initial state:**
- lower panel mounted
 - selector "6" at 



Set the selector "6" to  by pulling it out and then turning it.



Insert the crank handle into the operating shaft "7" and turn the handle clockwise until the plugging in is complete. Plugging is completed when resistance is felt.

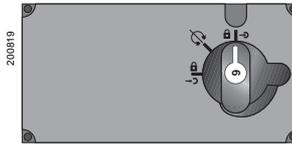


Set the selector "6" to  by pulling out and turning.

Operating instructions (cont'd)

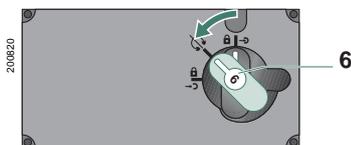
On a basic cubicle

How to drawout the voltage transformer (blue background front plate)

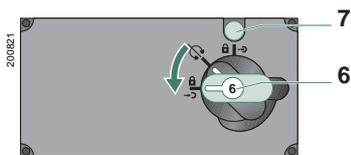


Initial state:

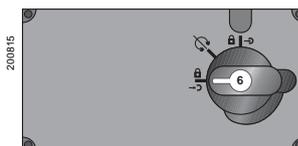
- lower panel mounted
- selector "6" at ←



Set the selector "6" to  by pulling it out and then turning it.



Insert the crank handle into the operating shaft "7" and turn the handle anti-clockwise until the withdrawal is complete. Withdrawal is completed when resistance is felt.



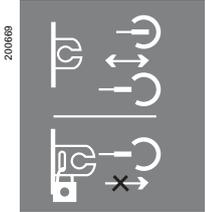
Set the selector "6" to  by pulling out and then turning it (this allows the access panel to be removed).

Operating instructions (cont'd)

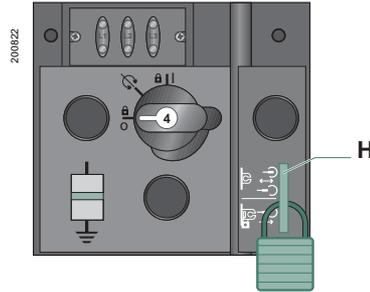
Locking and prevention by 6 to 8 mm diameter padlocks

Number of padlocks on each cubicle

- 2 on the racking in prevention lever
- 3 on the earthswitch operation selector
- 3 on the VT racking in selector
- 3 on the bushing shutter mechanism.



To prevent plugging in of the removable part



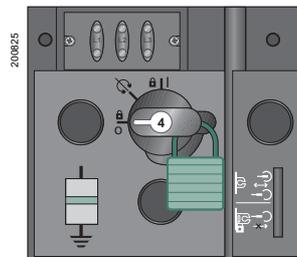
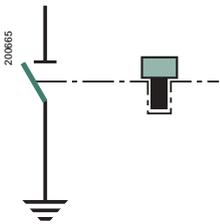
Pull out the lever **H** and fit the padlock in the oblong hole.

Preventing opening of the bushing shutters

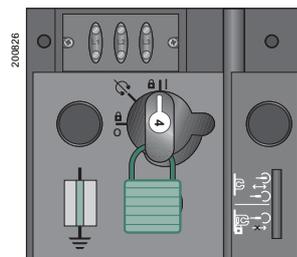
Lock closed

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

Locking the earthing switch in the open or closed position

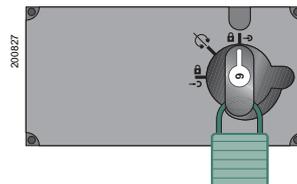


Earthing switch open: fit 1 to 3 locks to the selector "4" to prevent closing.

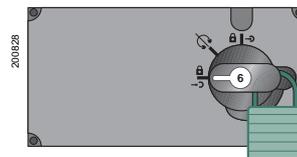


Earthing switch closed: fit 1 to 3 locks to the selector "4" to prevent opening. This also prevents racking in of the withdrawable part.

Locking operation of the withdrawable VT



VT racked in: fit 1 to 3 padlocks to the selector "6" to prevent drawing out. This also prevents removal of the front panel.



VT racked out: fit 1 to 3 padlocks to the selector "6" to prevent plugging in of the VT.

Operating instructions (cont'd)

Interlocking by locks (option)

- removable part in draw out position: 1 lock on the racking mechanism front plate
- (2 O) or (2 C) or (1 O & 1 C): on the earthing switch
- disconnecter truck (drawout busbar bridge)
- 1 lock in plugged in position (on earthing switch).

Interlocking by electromagnet (option)

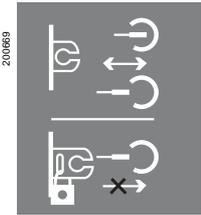
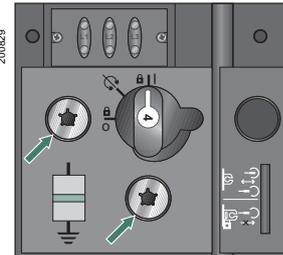
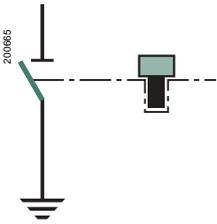
- removable part in drawn out position
- earthing switch.

Locking the removable part in the plugged in position

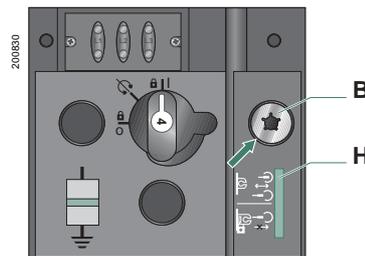
- earthing switch closed
- busbar bridge plugged in.

Interlocking the earthing switch

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



To prevent plugging in of the removable part.



Pull out the level **H** and turn key lock at **B** and remove key.

Preventive maintenance

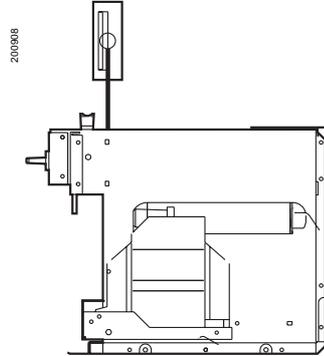
Trouble shooting

Table for drawout circuit breaker and cradle

| Symptoms | Faulty mechanisms | Probable causes and solutions |
|--|---|---|
| <p>The circuit breaker on its truck was just inserted into its cradle.</p> <p>The selector is in the circuit breaker extraction authorisation and removal position:</p> <p>The selector cannot be turned to the rack-in authorised position.</p> | The low voltage plug and the upper front cover of the circuit breaker. | Check that the low voltage plug was connected, the upper cover on the circuit breaker is correctly closed. |
| | The notching pins of the circuit breaker truck. | Make sure that nothing blocks the notching pins movement on the rails. |
| | A lock on the cubicle's front door. | Make sure that any possible locks on the cubicle's door do not act against the circuit breaker's truck. Close the cubicle's door. |
| | The selector and its padlocking function. | The truck selector is ready to receive a padlock. Close the padlock hole. |
| <p>The circuit breaker is racked-in</p> <p>The truck selector is in the closing authorised position.</p> <p>The circuit breaker is CLOSED:</p> <p>The selector cannot be turned to the rack-out authorised position</p> | The automatic opening function of the circuit breaker via the selector | <p>Manually open the circuit breaker using the opening pushbutton.</p> <p>In the case of a cubicle that has a locked door: electrically open the circuit breaker.</p> <p>In both cases contact a Schneider Electric service centre.</p> |
| <p>The circuit breaker is racked-in</p> <p>The truck selector is in the closing authorised position.</p> <p>The circuit breaker is OPEN:</p> <p>The selector cannot be turned to the rack-out authorised position.</p> | The safety function that prevents rack-in/out of the circuit breaker, if one of the circuit breaker poles remains closed. | <p>One of the circuit breaker's pole has remained closed despite the opening order on the circuit breaker.</p> <p>Contact a Schneider Electric service centre.</p> |
| | The notching pins on the truck. | <p>The truck notching pins are slightly blocked in the notch holes in the rail.</p> <p>Help disengage the crank notches using a tool.</p> <p>Check the correct operation by re-conducting the manoeuvre.</p> |
| <p>The circuit breaker on its truck was just racked-in.</p> <p>■ by using the handle (version using propulsion)</p> <p>Selector rotation to the closing authorised position is not possible.</p> | The circuit breaker is not completely racked-in. | <p>■ version with propulsion:</p> <p>Re-insert the handle into the truck's rack-in hole and continue to turn until rack-in has been completed.</p> |
| | The propulsion handle (if there is one). | Selector rotation is impossible with the propulsion handle inserted into the truck. Withdraw the handle. |
| <p>The circuit breaker on its truck is in the test position after racking-out (selector in the rack-in authorised position):</p> <p>The selector cannot be turned.</p> | The propulsion handle (if there is one). | Selector rotation is impossible with the propulsion handle inserted into the truck. Withdraw the handle. |
| <p>Truck with propulsion version:</p> <p>The circuit breaker on its truck is in the test position in the cubicle.</p> <p>The selector can be turned to 3 positions:</p> <p>The propulsion handle cannot be inserted all the way into the truck to allow for the circuit breaker to be racked-in.</p> | Interlocking with the cubicle's earthing switch or locked to prevent rack-in stemming from the cubicle. | Open the earthing switch or free the lock to prevent rack-in on the cubicle. |

Replacing the withdrawable VT fuses

Initial position VT racked out.

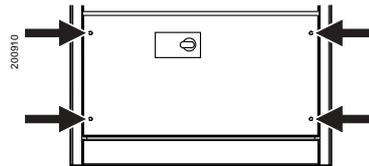


Remove the lower front cover (4 screws).

Replacing the withdrawable VT fuses

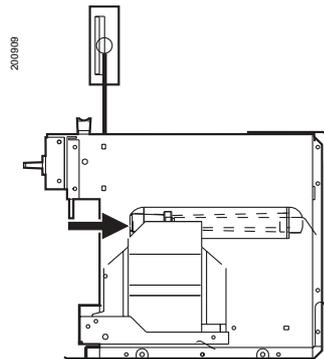
Removal

Remove the lower front panel.



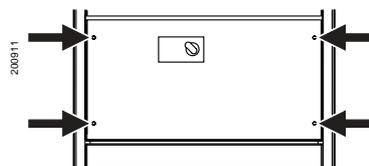
Installation

Unscrew the end caps on the VT.
Remove and replace the fuses (s).



Plug in the VT carriage.

Replace the lower front panel.



Rack in the VT.



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Schneider Electric Industries SAS

Address:
Department MV
F - 38050 Grenoble cedex 9
Tel : +33 (0)4 76 57 60 60
Fax : +33 (0)1 47 51 80 20

<http://www.schneiderelectric.com>
RCS: Nanterre B 954 503 439

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