Medium Voltage Distribution

NEX
Air insulated switchboard
Withdrawable circuit breaker 24 kV

Instruction for use
July 2009
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Glossary

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<th>Code</th>
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<td>FU</td>
<td>Functional unit (cubicle + mobile part + relay unit)</td>
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<tr>
<td>IF</td>
<td>Incomer/Feeder cubicle</td>
</tr>
<tr>
<td>BC</td>
<td>Bus coupler</td>
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<tr>
<td>RF</td>
<td>Bus riser - Fixed type</td>
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<tr>
<td>RW</td>
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<td>LB</td>
<td>Fuse switch feeder cubicle</td>
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<tr>
<td>VT</td>
<td>Voltage transformer</td>
</tr>
<tr>
<td>CT</td>
<td>Current transformer or current sensor</td>
</tr>
<tr>
<td>VPIS</td>
<td>Voltage Presence Indicating System</td>
</tr>
<tr>
<td>LV</td>
<td>Low voltage</td>
</tr>
<tr>
<td>MV</td>
<td>Voltage class 24kV</td>
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<tr>
<td>ES</td>
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<td>EVOLIS</td>
<td>Withdrawable circuit-breaker with vacuum breaking which is used in AD and CL cubicles</td>
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<td>Extraction table</td>
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<tr>
<td>ID</td>
<td>Incoming direct to busbar cubicle</td>
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Recommendations

Installation above the switchboard

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

Marking

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

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

<table>
<thead>
<tr>
<th>Screw</th>
<th>Torque in Nm</th>
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<tbody>
<tr>
<td>Ø 6</td>
<td>13</td>
</tr>
<tr>
<td>Ø 8</td>
<td>28</td>
</tr>
<tr>
<td>Ø 10</td>
<td>40</td>
</tr>
<tr>
<td>Ø 12</td>
<td>75</td>
</tr>
<tr>
<td>Ø 14</td>
<td>120</td>
</tr>
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</table>
**General description**

**IF - Incomer/Feeder cubicle without VT or with fixed VT**

**Front panel**

A: LV cabinet 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  
H: earthing switch viewing window.

**Right-hand view**

1: LV cable routing duct  
2: LV cabinet  
3: busbar compartment  
4: VT and MV cable compartment  
5: removable part compartment  
6: removable part (Evolis circuit breaker)  
7: surge arrestors (option)  
8: MV cable connection point  
9: earthing switch  
10: earthing switch operating mechanism  
11: fixed voltage transformer (option)  
12: MV current transformers.
General description

IF - Incomer/Feeder cubicle with withdrawable VT

Front panel
A: LV cabinet 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
H: earthing switch viewing window
I: withdrawable VT operating plate
J: VT compartment access cover.

Right-hand view
1: LV cable routing duct
2: LV cabinet
3: busbar compartment
4: VT and MV cable compartment
5: removable part compartment
6: withdrawable VT compartment
7: removable part (Evolis circuit breaker)
8: surge arrestors (option)
9: MV cable connection point
10: earthing switch
11: earthing switch operating mechanism
12: MV current transformers.
General description

IF - Incomer/Feeder cubicle with top entry via cables

Front panel
A: LV cabinet 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
H: earthing switch viewing window
I: withdrawable VT operating plate
J: VT compartment access cover.

Right-hand view
1: LV cable routing duct
2: LV cabinet
3: busbar compartment
4: VT and MV cable compartment
5: removable part compartment
6: withdrawable VT compartment
7: removable part (Evolis circuit breaker)
8: surge arrestors (option)
9: cables compartment
10: earthing switch
11: earthing switch operating mechanism
12: MV current transformers.
General description

IF - Incomer/Feeder cubicle with top entry via busbars

Front panel
A: LV cabinet 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
H: earthing switch viewing window
I: withdrawable VT operating plate
J: VT compartment access cover.

Right-hand view
1: LV cable routing duct
2: LV cabinet
3: busbar compartment
4: VT and MV cable compartment
5: removable part compartment
6: withdrawable VT compartment
7: removable part (Evolis circuit breaker)
8: surge arrestors (option)
9: busbars compartment
10: earthing switch
11: earthing switch operating mechanism
12: MV current transformers.
General description

BM - Busbar metering cubicle

Front panel
A: LV cabinet access door
B: voltage indicators
C: earthing switch operating and interlocking plate
D: MV cable compartment access cover
E: earthing switch viewing window
F: withdrawable VT operating plate (option).

Right-hand view
1: LV cable routing duct
2: LV cabinet
3: busbar compartment
4: VT and MV cable compartment
5: VT compartment
6: earthing switch (option)
7: earthing switch operating mechanism
8: fixed and withdrawable voltage transformer (option).
General description

BC - Busbar coupler cubicle without VT

Front panel
A: LV cabinet access door
B: CB compartment
C: inspection window
D: CB operating and interlocking plate
E: lower busbar compartment access cover.

Right-hand view
1: LV cable routing duct
2: LV cabinet
3: busbar compartment
4: CB compartment
5: CB (Evolis circuit breaker)
6: MV current transformers.
General description

BC - Busbar coupler cubicle with VT

Front panel
A: LV cabinet access door
B: CB compartment access door
C: inspection window
D: CB operating and interlocking plate
E: lower busbar compartment access cover
F: VT operating plate
G: VT compartment access door.

Right-hand view
1: LV cable routing duct
2: LV cabinet
3: upper busbar compartment
4: CB compartment
5: CB (Evolis circuit breaker)
6: MV current transformers
7: lower busbar compartment
8: withdrawable VT.
**General description**

**RF - Busbar riser cubicle fixed connections with withdrawable VT**

**Front panel**
A: LV cabinet access door
B: CB compartment door
C: lower busbar and VT compartment access cover
D: withdrawable VT operating plate.

**Right-hand view**
1: LV cable routing duct
2: LV cabinet
3: upper busbar compartment
4: lower busbar compartment
5: withdrawable VT.
General description

**RW - Busbar riser cubicle with withdrawable connections with withdrawable VT**

**Front panel**
A: LV cabinet access door
B: access door of the withdrawable part
C: inspection windows
D: operating and interlocking plate of the withdrawable part
E: interlocking
F: lower busbar and VT compartment access cover
G: withdrawable VT operating plate.

**Right-hand view**
1: LV cable routing duct
2: LV cabinet
3: busbar compartment
4: withdrawable connections
5: withdrawable VT.
**General description**

**LB - Fuse switch feeder cubicle**

**Front panel**
A: LV cabinet access door  
B: voltage indicator  
C: MV cable compartment access cover  
D: switch and fuse compartment access door.

**Right-hand view**
1: LV auxiliary circuits duct  
2: LV cabinet  
3: busbar compartment  
4: MV cable compartment  
5: gas discharge flaps  
6: switch and earthing switch  
7: fuses.
General description

ID - Incoming direct to busbar cubicle

Front panel
A: LV cabinet access door
B: removable part compartment door
C: MV cable compartment access cover
D: VT compartment access cover.
E: voltage indicators
F: earthing switch operating and interlocking plate
G: earthing switch viewing window
H: withdrawable VT operating plate.

Right-hand view
1: LV cable routing duct
2: LV cabinet
3: busbar compartment
4: VT and MV cable compartment
5: removable part compartment
6: removable part (Evolis circuit breaker)
7: earthing switch operating mechanism
8: withdrawable VT compartment
9: earthing switch
10: surge arrestors (option)
11: MV cable connection point
12: MV current transformers.
General description

Identification

Functional unit
A: feeder name
B: manufacturer's plate
C: name plate (serial number, ratings, etc.).

Evolis
D: name plate (serial number, ratings, etc.)
E: manufacturer's plate.
General description

Front panel

Removable part
1: mechanical opening push-button (red)
2: circuit-breaker position and handling selector
3: hole for inserting the crank to move the circuit-breaker
A: mechanical indicator of circuit-breaker position
B: key-lock in service position for sectionalizing trucks (on request for circuit-breaker).

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

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

Symbols

Cubicles

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Earthing switch open position.</td>
</tr>
<tr>
<td><img src="Image" alt="Icon" /></td>
<td>Earthing switch open position mechanical indicator.</td>
</tr>
<tr>
<td><img src="Image" alt="Icon" /></td>
<td>Earthing switch closed position.</td>
</tr>
<tr>
<td><img src="Image" alt="Icon" /></td>
<td>Earthing switch closed position mechanical indicator.</td>
</tr>
<tr>
<td><img src="Image" alt="Icon" /></td>
<td>Position lockable with padlock.</td>
</tr>
</tbody>
</table>

Removable part

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><img src="Image" alt="Icon" /></td>
<td>“Plugged in” position.</td>
</tr>
<tr>
<td><img src="Image" alt="Icon" /></td>
<td>“Draw-out” position.</td>
</tr>
<tr>
<td><img src="Image" alt="Icon" /></td>
<td>Insertion/extraction position.</td>
</tr>
<tr>
<td><img src="Image" alt="Icon" /></td>
<td>Operating position.</td>
</tr>
</tbody>
</table>
General description

Removable part extraction table

List of accessories supplied with the switchboard
- 1 extraction table
- 1 operating handle
- inspection windows
- end covers
- 1 busbar earthing carriage (optional)
- 1 phase concordance device (optional).
Access to interior of the cubicle

Access possibilities to the cubicle

A: access to the cable terminations
B: access to the busbar chamber
C: access to the cable terminations
D: access to the removable part
E: access to the low-voltage compartment
F: access to busbar when installed against wall.
Access to interior of the cubicle

Extracting the removable part

Initial state;
Removable part in test position.

Unscrew the 11 screws and 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

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

Installing the removable part

1. 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.

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

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

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

5. Close the LV door and handle and move the racking selector to the racking position.

6. Rack in the removable part.
Access to interior of the cubicle

Access to the MV cable connection compartment

Cubicle without VT

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

Close the earthing switch (see chapter “Earthing switch closing procedure”).

Remove the 8 fixing screws and open the door.

Unscrew the indicated fixing screw, lift up and remove the insulating plate.

Cubicle with fixed VT

Close the earthing switch (see chapter “Earthing switch closing procedure”). Open the switch protector and VT secondaries.

Unscrew the 8 screws and open the door.

Remove the bottom trim and door seal from the cubicle.

Unplug the VT secondary low-voltage plug at the point 1. Remove the VT base plate fixing screw at the point 2.

Remove the fixed VT unit on its base plate. Now the access is free to the cable connections.
Access to interior of the cubicle

Cubicle with withdrawable VT

Draw out the VT (see chapter “Voltage transformer withdrawal procedure”).

Close the earthing switch (see chapter “Earthing switch closing procedure”).

Remove the VT access panel (6 screws) and the front plinth.

Remove the access panel to the MV cable connection chamber (6 screws).

Unplug the VT secondary low-voltage plug connector.

Draw out the VT compartment.
Access to interior of the cubicle

Installation of fuses in a FS cubicle

Install FUSARC type fuses with medium type strikes according to CEI 32 - 3IEC 282-1 and DIN 43-625.

- The fuse characteristics and direction of mounting are printed on the fuse. The striker end shall be the upper one.
- Turn the fuse so that the label is on the front.
- The striker end of the fuse is marked.
- For different types of fuse, please contact Schneider Electric.

- Open the unit MV compartment.
- Insert the field control rings at both the fuse ends, starting from the inner phase.

Fuses should never be held in the middle.
Open the upper field control screen by using the top end of the fuse.

- Insert the bottom end of the fuse into the lower fixed contact.
- Then fit the top of the fuse in the upper contact and check that the field screen is properly closed.
- Position the label to the front of the unit.
Long term switchgear performance

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

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

The influence of the relative humidity factor:
The installation of heating resistors is essential in climates with high humidity and large temperature differences.

Ventilation control:
Cubicle ventilation must not be impeded. This is to ensure air circulation within the switchboard cubicles.

Operation

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

Specific operation:
After 6 to 12 month operations, we recommend you to check the busbars and MV cable connection tightening. It should be done with a calibrated torque spanner, adjust to lower torque compare to values indicated in page 4. If no problems are detected and if the busbars and cable connections haven’t been modified, it will not necessary to do again this check. In case of dismantling, the elastic washers must be change and replace by new ones supplied by Schneider Electric.

Schneider Electric services centres

Our service centre is at your disposal at all times:
- to conduct an installation diagnosis
- to suggest the appropriate maintenance operations
- to offer you maintenance contacts
- to suggest adaptations.
Tests 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 onto MV cable heads

Outgoing cables (without VT).

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

Close the earthing switch (see chapter “Earthing switch closing procedure”). We recommend you lock it in this position (see chapter “Locking and prevention by 6 to 8 mm diameter padlocks”).
Tests arrangements

Remove the panel (6 screws). Connect the voltage injector circuit to the cable lugs.

Open the earthing switch (see chapter "Earthing switch opening procedure") then carry out the tests.

At the end of the tests:
- close the earthing switch
- remove the accessories.
IF-BC-RW cubicles

Circuit-breaker plug-in procedure

The symbols marked on the black front cover summarize the above-mentioned procedure.

- Lower the protective flap for pushbutton 1.
- Press and hold down push-button 1 while setting selector 2 to .

This operation trips the circuit-breaker and prevents closing during insertion.

In case of earthing or sectionalizing trucks (option), the key H be required to make the insertion possible.

- Door closed.
- Selector switch 4 to 0 (open earthing switch).
- Selector switch H in plug-in or drawout position to .

- Insert the crank into hole 3.
- Move in the circuit-breaker turning the crank clockwise until the position indicator reads

Note:
Until the selector 2 is set in position , it is not possible to close the circuit-breaker even if this is connected to the main circuit).

Lift the shutter protecting push-button 1.

- Now it becomes possible to electrically operate the circuit-breaker energizing the connected circuit.

The symbols marked on the black front cover summarize the above-mentioned procedure.
Circuit-breaker withdrawal procedure

Starting conditions
- Circuit-breaker in service position.
- Lower the shutter protecting push button 1.
- Press and hold down push button 1 while setting selector 2 to .

This operation trips the circuit-breaker and prevents closing during withdrawal.

- Insert the crank into hole 3.
- Withdraw the circuit-breaker turning the crank counter-clockwise until the position indicator reads.
- Set selector 2 to disconnected position .
- Lift the shutter protecting push button 1.

The circuit-breaker is in disconnected/test position.

The symbols marked on the black front cover summarize the above-mentioned procedure.
Earthing switch closing procedure
(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

Earthing switch opening procedure (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 \( \circ \) 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 \( \circ \) by pulling it out and then turning it. The earthing switch is now in the open position.
Operating instructions

Voltage transformer plug-in procedure
(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 operation 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

Voltage transformer withdrawal procedure (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 operation 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

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 earthing switch 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

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
- disconnector 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.
Operating instructions

LB - Fuse switch cubicle

Operation and position indication

I: charged/uncharged indication.

Earthing switch opening procedure

Starting condition: the mimic diagram shows that the earthing switch is closed.

- Close and bolt the MV compartment access door,
- Insert the operating crank into the earthing switch operating mechanism slot,
- Rotate counter-clockwise to open the earthing switch,
- Take out the crank at the end of the sequence.

- The mimic diagram shows that the earthing switch is open.
Switch disconnector closing procedure

**Starting condition:** the mimic diagram shows that the switch disconnector is open.

**Charging the spring:**
- Insert the operating crank into the spring charging slot (A) and rotate it clockwise,
- Take out the crank when the mechanical indicator (B) shows the operating mechanism spring charged.

**Closing the switch-disconnector by pushing the push button I (indicated in the drawing)**

**Final condition:** the mimic diagram shows that the switch-disconnector is closed.

---

Switch disconnector opening procedure

**Starting condition:**
the mimic diagram shows that the switch is closed.
Operating instructions

Earthing switch closing procedure

Press the push button 0 (indicated in the drawing)

Final condition: the mimic diagram shows that the switch-disconnector is open.

The synoptic diagram shows that the earthing switch is open.

Close the earthing switch after verifying that the MV cables live (see page 23).
- Insert the operating crank into the earthing switch operating mechanism slot,
- Rotate clockwise to close the earthing switch,
- Take out the crank at the end of the sequence,
- Close the MV cable compartment door.

Final condition: the mimic diagram shows that the earthing switch is closed.
Operating instructions

Fuse indications

- Fuses efficient (white indicator).
- One or more fuses blown (red indicator).

Padlocking

- Padlocking of motor mechanism (option).
- It is possible to discharge the motor mechanism, by locking the electrical charging of the closing spring and carrying out a complete O-C-Q cycle.
- Lock out the motor mechanism using a padlock before opening the switch.
- The motor mechanism can be locked in or out using the padlocks.

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

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

Operating safety

The front door must only be opened if the earthing switch is closed.
## Trouble shooting

### Table for circuit-breaker and cradle

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

Replacing the withdrawable VT fuses

Initial position VT racked out.

Removal

Remove the lower front cover (6 screws).

Installation

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

Plug in the VT carriage.

Replace the lower front cover (6 screws).
Rack in the VT.
Annexe

Adaptation/instructions

Replacement of the voltage presence type VPIS 1 by type VPIS 2 and VPIS 2 by VPIS 2

Note: the subject of this new version of this user guide is about the annexe “Adaptation/instructions - Replacement of the voltage presence type VPIS 1 by type VPIS 2 and VPIS 2 by VPIS 2”, updated on july 2009.
Symbols and conventions

Caution: you will find all the symbols below throughout the document, indicating the hazard levels depending on the different types of situation.

DANGER

As per iso 3864-2
DANGER: failure to follow this instruction will result in death or serious injury.

WARNING

As per iso 3864-2
WARNING: failure to follow this instruction may result in death or serious injury.

CAUTION

As per iso 3864-2
CAUTION: failure to follow this instruction may result in injuries.
This alert signal can also be used to indicate practices that could damage the unit.

INFORMATION - ADVICE:
we draw your attention to this specific point.

Contact the Schneider Electric service unit for diagnosis and advice

Call your sales representative who will put you in contact with the closest SCHNEIDER ELECTRIC group service centre.
You can log on to: www.schneider-electric.com
Adaptation/instructions
Replacement of the voltage presence type VPIS 1 by type VPIS 2 and VPIS 2 by VPIS 2

Distribution rules

CAUTION

The aim of this publication is to enable the equipment to be installed correctly.

CAUTION

This document is not a commercial document. It is a strictly technical document drawn up by Schneider Electric.

Safety rules

CAUTION

All the operations described below must be performed in compliance with applicable safety standards, under the responsibility of a competent authority.

CAUTION

Only undertake the work after having read and understood all the explanations given in this document. If you have any difficulty complying with these rules, please contact Schneider Electric.

WARNING

The contractor must be certified and authorised to manipulate and perform work on the equipment.

Information

THE INFORMATION WHICH FOLLOWS CONCERNS THE INSTALLATION INSTRUCTION (VOLTAGE PRESENCE INDICATING SYSTEM)

VPIS

Présentation of VPIS-V1 and VPIS-V2

VPIS: Voltage Presence Indicating System, a case with 3 built-in lights.

VPIS-V1: production until February 2009.

VPIS-V2: production starting from March 2009.

Characteristics

Conforming to IEC 61958, relative to voltage presence.

Operating instructions

WARNING

The indication provided by a VPIS-V1 or V2, alone is not sufficient to ensure that the system is de-energised.

A: voltage presence indicator light (one for each phase)

B: connection point designed for the connection of a phase concordance unit (one for each phase)

When the ambient lighting is particularly bright, it may be necessary to improve visibility by protecting the indication.
Adaptation/instructions
Replacement of the voltage presence type VPIS 1 by type VPIS 2 and VPIS 2 by VPIS 2

Phase concordance unit
Phase concordance testing for VPIS-V1 and VPIS-V2 must be carried out each time a cable is connected to a functional unit. It is a way of making sure that all three cables are each connected to the corresponding phase of the substation.

Principle
The principle of the phase concordance unit is that it allows a check of the phase concordance between 2 energised functional input units on the same panel.

Reminder of accessories that can be used for phase concordance testing
Phase concordance unit V1-51191954FA  Phase concordance unit V2-VPI62421

Rules for the use of phase concordance unit
WARNING
It is impossible to carry out a phase concordance of test with 2 VPIS of different types.

Balanced phase:
■ The phase concordance unit light (1) is unlit.

Unbalanced phase:
■ The phase concordance unit light (1) is lit.
Adaptation/instructions

Replacement of the voltage presence type VPIS 1 by type VPIS 2 and VPIS 2 by VPIS 2

Rules for choosing phase concordance unit

<table>
<thead>
<tr>
<th>Phase concordance unit</th>
<th>Functional unit 1</th>
<th>Functional unit 2</th>
<th>Compatibility result</th>
<th>Corrective actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPIS-V1</td>
<td>V1</td>
<td>V1</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>VPIS-V1</td>
<td>V1</td>
<td>V2</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>VPIS-V2</td>
<td>V1</td>
<td>V1</td>
<td>OK</td>
<td>Replace VPIS-V1 by VPIS-V2 Use a phase concordance unit V2</td>
</tr>
<tr>
<td>VPIS-V2</td>
<td>V2</td>
<td>V2</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>VPIS-V1</td>
<td>V1</td>
<td>V2</td>
<td>OK</td>
<td>Replace VPIS-V1 by VPIS-V2</td>
</tr>
<tr>
<td>VPIS-V2</td>
<td>V2</td>
<td>V2</td>
<td>OK</td>
<td></td>
</tr>
</tbody>
</table>

Check before phase concordance test

Please refer to the previous chapters in the event of test malfunctioning.

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual checking of the indicator lights on the VPIS units of functional unit 1 and of functional unit 2</td>
<td>The 3 indicator lights of each VPIS are on. The 2 functional units are energised, the VPIS units are operating and the check can continue.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The 3 indicator lights of the VPIS are off. The functional unit is not energised or the VPIS is defective.</td>
<td>Apply power to the functional unit. If VPIS-V1 remains unlit, replaced it by a VPIS-V2.</td>
</tr>
<tr>
<td></td>
<td>1 or 2 indicator lights unlit.</td>
<td>The VPIS is probably defective. Replace by a VPIS-V2.</td>
</tr>
</tbody>
</table>

Phase concordance unit check choice

On each functional unit test phases 1 and 3.

<table>
<thead>
<tr>
<th>Functional unit 1</th>
<th>Functional unit 2</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>You can test.</td>
<td>You cannot test them. The choice of the phase concordance unit is wrong or it is not functioning correctly.</td>
<td></td>
</tr>
</tbody>
</table>
Adaptation/instructions

Replacement of the voltage presence type VPIS 1 by type VPIS 2 and VPIS 2 by VPIS 2

Phase concordance test

The 3 indicator lights of the 2 VPIS are lit and the phase concordance unit is correct meaning that phase concordance test can be performed.

Lexique

- Phase concordance unit LED lit
- LED unlit.

<table>
<thead>
<tr>
<th>Functional unit 2</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>Conclusion regarding phase concordance</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td></td>
<td></td>
<td></td>
<td>Connection is satisfactory.</td>
</tr>
<tr>
<td>L2</td>
<td></td>
<td></td>
<td></td>
<td>Reverse the MV cables connected to L1 and L2 and one of the functional units.</td>
</tr>
<tr>
<td>L3</td>
<td></td>
<td></td>
<td></td>
<td>Reverse the MV cables connected to L2 and L3 on one of the 2 functional units.</td>
</tr>
<tr>
<td>L1</td>
<td></td>
<td></td>
<td></td>
<td>Reverse the MV cables connected to L1 and L3 on one of the 2 functional units.</td>
</tr>
<tr>
<td>L2</td>
<td></td>
<td></td>
<td></td>
<td>Change the position of each MV cable on one of the 2 functional units.</td>
</tr>
<tr>
<td>L3</td>
<td></td>
<td></td>
<td></td>
<td>Change the position of each MV cable on one of the 2 functional units.</td>
</tr>
<tr>
<td>L1</td>
<td></td>
<td></td>
<td></td>
<td>Change the position of each MV cable on one of the 2 functional units.</td>
</tr>
<tr>
<td>L2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Adaptation/instructions

Replacement of the voltage presence type VPIS 1 by type VPIS 2 and VPIS 2 by VPIS 2

Information

THE INFORMATION WHICH FOLLOWS, CONCERNS “THE CORRECTIVE MAINTENANCE SECTIONS” (REPLACE OF THE VOLTAGE PRESENCE UNIT)

Removing the VPIS 1 voltage presence unit

CAUTION

The screws must be retained.

Unscrew the 2 self-tapping screws. Remove the VPIS 1 type voltage presence unit Disconnect the VPIS 1 voltage presence unit.

Instructions to be respected

In case of replacement of a VPIS 1 by a VPIS 2, all the VPIS 1 installed on the unit need to be replaced in order to compare phases.

Contents of the kit VPIS 2

1: indicator unit
2: cable gland seals
3: VPIS-V2 safety
4: screws (x 4).

CAUTION

The screws removed earlier are reused (2 self-tapping screws).
Adaptation/instructions
Replacement of the voltage presence type
VPIS 1 by type VPIS 2 and VPIS 2 by VPIS 2

Preparation of the cable gland seal before mounting the voltage presence unit VPIS 2

Follow the dotted line to cut the cable gland.

To integrate the cable gland seal (2) onto the wiring harness, the 4 holes must be cut open using a Stanley knife.

CAUTION
Cut the cable glands in one place ONLY per hole to slide the wires inside.

Mounting the voltage presence unit VPIS 2

Position the cable gland seal (2) on the voltage presence connection (5). Clip the cable harness connector (5) onto the VPIS V2 safety (3) and fit the seal.

Checks to be made before continuing with the operation

Check the condition of the wiring harness (5) and the VPIS 2 rating using the optional diagnostic tool (VPI62420) (not included in the kit) or see correspondence table below.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Operating voltage range</th>
<th>Min</th>
<th>Max</th>
<th>Min</th>
<th>Max</th>
<th>Min</th>
<th>Max</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td></td>
<td>3.5</td>
<td>μA</td>
<td>7.4</td>
<td>μA</td>
<td>10.7</td>
<td>μA</td>
<td>15.5</td>
<td>μA</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td></td>
<td>1 kV</td>
<td>1.9 kV</td>
<td>2 kV</td>
<td>3 kV</td>
<td>3.1 kV</td>
<td>5.9 kV</td>
<td>6 kV</td>
<td>8.9 kV</td>
</tr>
</tbody>
</table>

Key
Minimum and maximum operating voltage for usage in 50 Hz and 60 Hz. Values used in Elonet (ADD) for the choice of VPIS.
Adaptation/instructions
Replacement of the voltage presence type VPIS 1 by type VPIS 2 and VPIS 2 by VPIS 2

Please refer to the chapter entitled "contents of the kit"

Screw the indicator unit (1) onto the VPIS V2 protection (3) using the 4 screws.

CAUTION
Tighten the screws to exert slight pressure on the cable gland seal without distorting it.

CAUTION
The screws removed earlier are reused.

Install the voltage presence unit in the correct position using the 2 self-tapping screws removed earlier.

Removing the VPIS 2 voltage presence unit

CAUTION
The screws must be retained.
Adaptation/instructions

Replacement of the voltage presence type VPIS 1 by type VPIS 2 and VPIS 2 by VPIS 2

Mounting the new VPIS 2 voltage presence unit

**CAUTION**

Remove the unit. Remove the 4 screws from the indicator unit.

Discard the faulty indicator unit. Leave the existing surge arrestor and seal.

Install the new voltage presence indicator unit.

Screw up the 4 screws.

**CAUTION**

Tighten the screws to exert slight pressure on the cable gland seal without distorting it.

**CAUTION**

The screws removed earlier are reused.

Install the voltage presence unit in the correct position using the 2 self-tapping screws removed earlier.
Schneider Electric group service centers are there to provide:
- engineering and technical assistance,
- commissioning,
- training,
- preventive and corrective maintenance,
- adaptation work,
- spare parts.

Call your sales representative who will put you in touch with your nearest Schneider Electric group service center or directly call the following telephone number: +33 (0)4 76 57 60 60 Grenoble France.