All the equipment is packaged in one case. Please check that all the following components have been received in good condition: If any components are absent or damaged, please contact our After-Sales Service Department before commencing assembly.

1.1 Circuit breaker

<table>
<thead>
<tr>
<th>Illustration</th>
<th>Description</th>
<th>Qt Single Pole</th>
<th>Qt Two Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Breaker pole CBR</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Breaker pole CBR VL</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Manual opening kit</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Hardware</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>

1.2 Control cabinet

<table>
<thead>
<tr>
<th>Illustration</th>
<th>Description</th>
<th>Qt Single Pole</th>
<th>Qt Two Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control cabinet + umbilical cables</td>
<td>1 (1 umbilical cables)</td>
<td>1 (2 umbilical cables)</td>
</tr>
<tr>
<td></td>
<td>Hardware</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>

Option for cylindrical pole

<table>
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<th>Illustration</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Support for cylindrical pole</td>
<td>2</td>
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</table>

Option for catenary metallic pole

<table>
<thead>
<tr>
<th>Illustration</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Threaded rod</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Cross beam</td>
<td>4</td>
</tr>
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</table>
### 1.3 Circuit breaker Support

<table>
<thead>
<tr>
<th>Illustration</th>
<th>Description</th>
<th>Qt Single Pole</th>
<th>Qt Two Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schneider Electric pole for CBR and CBR VL</td>
<td>Lower part</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Upper part</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Support beam</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Cross beam</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Hardware</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Option for catenary metallic pole for CBR**

<table>
<thead>
<tr>
<th>Illustration</th>
<th>Description</th>
<th>Qt Single Pole</th>
<th>Qt Two Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bracket</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Threaded rod</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Cross beam</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Hardware</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Illustration</td>
<td>Description</td>
<td>Qt Single Pole</td>
<td>Qt Two Pole</td>
</tr>
<tr>
<td>-------------</td>
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</tr>
<tr>
<td></td>
<td>Schneider Electric pole for CBR and CBR VL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Option for catenary metallic pole for CBR VL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Threaded rod</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Upper beam</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Lower beam</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CBR support</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Hardware</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
2 Transport, storage and handling

2.1 Transport
The main unit is completely assembled, pre-set and inspected before dispatch.

⚠️ Warning
The main unit is supplied filled with insulating gas at a pressure of 0.5 bar relative (1.5 bar absolute).
Avoid any damage to the tank during transport and handling!
The content of the cases is described in chapter 1 (Packaging).

2.2 Storage
It is recommended that the equipment be stored so as to protect it against impact, in a dry place and preferably in its original packaging.
Store the control box in a dry place: its anti-condensation and heating* mechanism only works when switched on.

⚠️ Warning
- Follow the package storage instructions on the packages.

2.3 Handling
All the parts should be positioned as close as possible to the installation location, in their original packaging.
The “support - the cross beam”, “main unit” and “control box” units must be slung as indicated in Chapter 6 (Assembly).

⚠️ Warning
- The slinging of the various units of the apparatus must be carried out as described in Chapter 6 (Assembly). Other slinging procedures may damage the apparatus.
- The units must always be slung with flexible straps not chains.
- Never use the main unit seal wires as a means of lifting.
* Depending on the options.

2.4 Dimensions on Schneider Electric pole (substation)

CBR - Single pole version

---

NTV130 E

Schneider Electric
2 Transport, storage and handling (suite)

CBR - Two-pole version

CBR VL - Single pole version
2 Transport, storage and handling (suite)

CBR VL - Two-pole version

2.5 Dimensions for catenary metallic pole (pole not supplied)

CBR – Single-pole version:
2 Transport, storage and handling (suite)

CBR – Two-pole version:
CBR with extended support

Distance between the axis of the tank and the pole is 528mm instead of 296mm for the standard support.
2 Transport, storage and handling (suite)

CBR VL – Single-pole version:

CBR VL – Two-pole version:
This manual covers the CBR equipment in single-pole and two-pole versions. It is an isolation circuit breaker using vacuum switching in an insulating medium of inert SF6 gas at low pressure (1.5 bar absolute).

Identification:
- Rating plate:

Only the values indicated on the rating plate of the apparatus are contractual.
- Depending on the options
4 General Safety Measures

The instructions must be followed to ensure that the apparatus presents no danger in any circumstances.

To ensure the safety of personnel at all times, pay particular attention to (non-exhaustive list):

- The clearance distances to live parts, both high and low voltage.
- The earthing of the apparatus and the LV box.
- The correct handling of the parts, seal wires and pressurised safety devices (SF6).
- Avoid contact with the moving parts of the apparatus or those under spring tension.

For his part, the operator of the Low Voltage equipment must ensure that his personnel:

- Are familiar with the local or national safety measures in use and know the recommendations for the prevention of accidents, in particular for the high voltage installations and the gear.
- Have taken note of the "assembly and maintenance instructions" and the safety recommendations mentioned in the various paragraphs and appendices.
- Have received appropriate training.
- Will strictly observe the warnings placed directly on the apparatus.
- Will immediately notify of any alteration or modification of the equipment likely to affect the operating safety.

- This equipment contains Fluorinated Greenhouse Gas (SF₆) covered by the Kyoto Protocol, which has a Global Warming Potential (GWP) of 22200. SF₆ should be recovered and not released into the atmosphere. For further information on the use and handling of SF₆, please refer to IEC 62271: High-Voltage Switchgear and Controlgear - Part 303: Use and Handling of Sulphur Hexafluoride (SF₆).

⚠️ Warning!

The manufacturer will not be liable for faults or damage suffered through non-observance of the present "assembly and maintenance instructions".
5 Structure and operation

5.1 General description of the apparatus

The CBR is a structure-mounted, single-pole (fig.5.1.a) or two-pole (fig.5.1.b) single-phase device for outdoor use. It has not been designed for a particular application, but can be used as required for various single-phase applications, (in the railway sector or others).

The apparatus benefits from “Dead Tank” technology; i.e. the active circuit is placed in an inert insulating gas confined in a sealed and earthed stainless steel tank.

The load and short-circuit switching element (using vacuum switching technology), as well as its operating mechanism (using fixed coils and permanent magnet actuator technology), are installed in the main unit.

The completely welded apparatus is gasket-free, so maintenance and inspection operations are reduced.

The CBR and CBR VL apparatus is made up of the following main units:

- the main unit(s) [1]
- the main unit pole [2]
- the command control box [3]
- the manual opening ring [5]
- the multi-core cable(s) [6]
5.2 Breaker pole main Unit

The tank is a stainless steel sealed enclosure containing low pressure insulating gas. It is completely welded and has no gasket.

The switching element is made up of a vacuum switch activated by an electromagnetic actuator mechanism (with permanent magnets and fixed coils). This actuator is a bistable mechanism, so it does not require energy when idle. The vacuum switch and the actuator are housed in the sealed tank and require no maintenance.

The external parts of the main unit are made up of (fig.5.2.a and 5.2.b):

- The tank [1.01]
- The bushings, movable side [1.02] and fixed side [1.03]. The bushing [1.03] is vertical and upper for the CBR VL.
- The connection plates [1.09]
- The slinging lugs [1.04]
- The cover [1.05] (made up of the roof, the side steel sheets and the bottom)
- The beams [1.06] to mount the pole on its supports
- The valves [1.07] which, in case of internal arc, opens and enables the evacuation of the gases
- The tie rod and ring [1.10] of the emergency manual opening mechanism
- The window [1.12] through which the position indicator is visible [1.11]
- The rating plate [1.10] of the tank
- The sealed connector [1.13]

The internal parts of the main unit are made up of

- the moving position indicator and its mechanism [1.11] (fig.5.2.b). The red coloured "I" indicates the closed position of the circuit breaker and the green coloured "O" corresponds to the open position (visible through the window [1.12]).
- the safety disk [1.14] which, in case of internal arc, bursts and enables the evacuation of the gases towards the support.
5.3 Main Unit support

The support [2] constitutes the mechanical link between the mounting structure and the main unit pole(s).

CBR support for catenary metallic pole:

It is made up of (fig.5.3.a for the single-pole version and fig.5.3.b for the two-pole version):
- four U-shaped cross beams [2.01] used to mount the support at the pole.
- two brackets for the single-pole version, four brackets for the two-pole version, [2.02] to mount and earth the pole.
- four threaded rods [2.03] which connect the cross sections [2.01].

CBR VL support for catenary metallic pole:

It is made up of (fig.5.3.c for the single-pole version and fig.5.3.d for the two-pole version):
- Two (four for two poles) U-shaped cross beams [2.01] used to mount the support at the pole.
- Two (four for two poles) U-shaped cross beams [2.04] used to mount the support at the pole.
- four (eight for two poles) U-shaped cross beams [2.02] used to mount the circuit breaker at the support.
- four (eight for two poles) threaded rods [2.03] which connect the cross sections [2.01] and [2.04].
Schneider Electric pole for substation (CBR and CBR VL)

For the single pole version:
- two sockets [2.01] to be fixed on the concrete foundation
- Four poles [2.02]
- Two brackets [2.03] to link the poles [2.02]
- Two upper brackets [2.04]

For the two-pole version
- two sockets [2.01] to be fixed on the concrete foundation
- Four poles [2.02]
- Two brackets [2.03] to link the poles [2.02]
- Two upper brackets [2.04]
- Four beams [2.05]
- Four cross beams [2.06] to receive both breaker poles
5.4 Control device

The control device is made up of:
- the command control box [3] (fig.5.4.a).
- the locking control [7] (chap.5.4.2).

5.4.1 Command control box

The electrical control enables remote operation of the circuit breaker (from a control station or sub-station). As an option, it also enables local control of the equipment ("O" and "I" push-buttons inside the box).

The command control box [3] should be mounted on the support structure about two meters above ground level. It is made up of (fig.5.4.a and 5.4.b):
- the operator connection plate [3.02] used to run the client connection cables. This plate is intended to receive the stuffing boxes.
- the box earth connection [3.03].
- one cable [3.04] and one plug [3.05] for the single-pole version.
- two cables [3.04] for the two-pole version.

The box door is normally closed and locked using:
- 1 padlock (not supplied) with a maximum shank diameter of 8mm to be mounted on the quarter-turn handle.
- a quarter-turn handle [3.07], easy to use by hand, without tools.

It is necessary to open the door to access the Human-Machine Interface. This is made up of (fig.5.4.c):
- operations counter [3.08].
- green light « equipment open » [3.09].
- red light « equipment closed » [3.10].
- charge/discharge switch for the operating capacitor [3.11]. In normal service, the switch is in the « charge » position. During any operations on the electric/electronic circuits of the command control box, the switch must be set in the « discharge » position.
- switching-in and triggering buttons [3.12] (option). These push-buttons are placed inside the box and therefore they can only be used when the box door is unlocked and open.
- local control device [3.13] (option) Could be Push button, switch or locked switch. (options).
- terminal box for battery [3.14] (option).
- earth bar [3.16].
- rating plate [3.18]
- document case [3.19]
When required for maintenance, the low voltage case can be opened to access the following parts (fig.5.4.d):
- 2 (single-pole version) or 3 (two-pole version) electrolytic capacitors [3.20] dedicated to the switching-in circuit.
- condensation control system [3.21].
- low voltage components integrated into the triggering and / or switching-in circuits, in particular relays.

5.4.2 Opening by hook stick (option)

The ring emergency triggering control enables the manual opening of the circuit breaker, but not its closing.
When the ring is in the top position, the equipment can be either in the open position (the position indicator displays “O”) or in the closed position (the position indicator displays “I”).
When the ring is pulled down, an opening operation occurs, unless the circuit breaker is already in the open position.
The elements of the opening device are:
- ring [8.01].
- nuts and bolts.

5.5 Command control box support

All the cabinets have same fixing points distances whatever their overall width and height.

5.5.1 Mounting by cross beams (fig.5.5.a)

- 1 support [4.01] for the circuit breaker identification plate (option)
- 4 U shaped cross beams [2.01] used to mount the control on the pole
- 4 threaded rods [2.03] connecting the cross sections
5 Structure and operation (Contd.)

5.5.2 Mounting on cylindrical poles (fig.5.5.b)
- 2 supports [4.02] used to mount the control on the pole

5.5.3 Mounting on SCHNEIDER ELECTRIC pole in substation
- Direct fixing on the pole – 4 bolts M10
6 Assembly

⚠️ Warning

The correct assembly of the CBR equipment requires all the following instructions to be followed precisely:
- Do not begin the assembly work without having firstly read and understood all of the “Assembly” chapter.
- The assembly instructions describe the assembly operations of the equipment in the chronological order to be followed.
- No modification should be made to the equipment.
- All aspects of the safety regulations in force at the operator’s premises must be respected.

6.1 Assembly procedure

The main unit pole(s) and support(s) are supplied separately. The installation may be broken down into five stages:
- Installation of the SCHNEIDER ELECTRIC pole structure or brackets for catenary pole + main unit pole(s)
- Installation of the command control box
- Connection of the cable
- Installation of the manual opening control rod (option)
- Wiring of the command control

As a guide, the complete installation of a single-pole unit requires about 4 hours, excluding the work area safety and recording procedures.

⚠️ Warning!

- Sling using a flexible strap and not a chain in order NOT TO CONTAMINATE THE STAINLESS STEEL TANK AND TO MAINTAIN PROTECTION AGAINST CORROSION;
- The tank is pressurised: DO NOT PIERCE OR DAMAGE THE TANK.
- The safety disk is sensitive: DO NOT TOUCH THE DISK MEMBRANE (EVEN WITH THE FINGERS!), DO NOT CONTAMINATE IT WITH ANY MATERIAL WHATSOEVER

6.2 Tools and accessories.

The installer requires standard lifting and assembly tools to carry out the installation. The following tools and accessories are recommended:
- Open-ended and socket spanners 10 – 13 – 16/17-18/19 mm
- Torque wrench 0.5 to 5 daN.m
- Sockets for torque wrench with opening 10 – 13 – 16/17-18/19 mm
- 2 to 3 flexible straps of a double length of 2m minimum to sling the equipment and mount it at the top of the pole
- Stuffing boxes (IP55) for running the cables in the command control box
- 1 to 8 padlocks ∅ 8mm max.*
- Alcohol (isopropanol) and clean cloths to degrease the EPDM of the bushings
- Protective grease for the medium voltage electrical contacts
- Low temperature graphite grease for the fastening screws
- * Depending on option
6.3 Assembly and Installation of the support frame

CBR support for catenary metallic pole

Stage 1: Assembly and Slinging of the support

- Assemble the 2 brackets [2.02] on the cross beams [2.01].
- Repeat the operation with the remaining 2 brackets and cross beams for the two-pole version.
- Assemble the 4 threaded rods [2.03] on 2 cross beams [2.01]. Choose the oblong holes of the cross beams so that the horizontal spacing of the threaded rods is appropriate for the width of the mounting structure.
- Slinging is carried out with flexible straps which must be attached to the support frame on two points on the upper cross beam [2.01]
- Position the support frame [2] by placing the threaded rods [2.03] on both sides of the mounting structure. Adjust the straps to balance the support frame horizontally.
- Slowly lift as far as the required assembly height (3 to 6m from the ground for the live parts). Be careful not to damage the threaded rods during the lifting operation.
- Once the desired height is attained, rest the cross beams [2.01] against the mounting structure.

Figure 6.3.a

Legends:
E = nut
EF = lock nut
R = washer
RF = lock washer

E+RF+R M12+grease
Torque 5daN.m

HM12x40 screw
+E+R M12+grease
Torque 5daN.m

E+R M12+grease
Torque 5daN.m
Stage 2: Alignment and mounting of the support

- Single pole: Insert the rear cross beams [2.01] on the 4 threaded rods [2.03], the edges of the front cross beams [2.01] resting on the mounting structure (fig.6.3.b).
- Two-pole: Insert all the rear cross beams [2.01] and brackets [2.02] on the 4 threaded rods [2.03], the edges of the front cross beams [2.01] resting on the mounting structure (fig.6.3.d).
- Grease and screw - tightening manually - with plain washers R, and 2 nuts E, leaving a play of about 5mm between the cross beams and the mounting structure (fig.6.3.c).
- Laterally align the support in the pole spindle. Level the support frame by adjusting the upper cross beam [2.01] horizontally (fig.6.3.e).
- Once these alignments are finished, proceed with the tightening of the nuts E1 with a 3.6 daN.m torque, then that of the lock nut E2 to 5 daN.m. Check the alignment of the support frame [2]. Repeat the operation if necessary.
CBR VL support for catenary metallic pole

- Assemble the 2 threaded rods [2.3] on 2 cross beams [2.1].
- Position the cross beams [2.1] by placing the threaded rods [2.3] on both side of the mounting structure.
- Align in the pole spindle. Level the support by adjusting the cross beam [2.1] horizontally.
- Once these alignments are finished, proceed with the tightening of the nuts E1 with a 3.6 daN.m torque, then that of the lock nut E2 to 5 daN.m. Check the alignment of the support frame [2]. Repeat the operation if necessary.
- Assemble the 2 threaded rods [2.3] on 2 cross beams [2.4] (such that the cross beams [2.1]).
- Assemble the 4 cross beams [2.2].
- Once these alignments are finished, proceed with the tightening of the nuts on the threaded rods [2.3].
- Proceed with the tightening of the des screw M12 (5 daN.m).
- For a two poles CBR VL, repeat the operations.

Legends:
- E = Nut / R = washer / RF = lock washer

Figure 6.3.f

Figure 6.3.g

Figure 6.3.h
6 Assembly (contd.)

SCHNEIDER ELECTRIC Pole for substation (CBR and CBR VL)

- Remove the support [2] from the crate
- Fix on the foundations the assembled lower part of the pole

For a single pole version
- Adjust horizontally (water level) and tighten the 8 screws M10.
6 Assembly (contd.)

For a two-pole version

- Assemble the 4 cross beams [2.06] on the pole
- Assemble the 4 beams [2.05]
- Adjust horizontally (water level) and tighten [2.04], [2.05], [2.06], with the screws M10

6.4 Installation of the main unit pole(s) on the support frame

⚠️ Warning

- Scrupulously respect the procedure indicated.
- Never use the seal wires of the pole as a means of lifting.

The installation of the main unit pole(s) [1] on the support [2] requires few tools. This operation takes about 30 minutes.

⚠️ Warning

- The screw-nut-washer sets and the torques used are specified in this procedure.

CBR on catenary metallic pole

- Pass the flexible strap through the welded bracket [1.04] of the unit [1] (fig.6.4.a).
- Lift the unit [1] and be careful to balance it.
- Position the unit [1] in relation to the support bracket [2.02] (fig.6.4.c).
- Grease and insert the four HM12x40 screws + washers when the unit [1] is correctly positioned.
- Screw and torque to 5daN.m the unit [1] on the support frame [2] with nut + lock washer + washer.

Once the assembly procedure is finished, the equipment should appear as indicated in the photo (fig. 6.4.b). Repeat the operations for the second pole in two-pole version (fig.6.4.d).
6 Assembly (contd.)

Information
- The equipment will be in open position during the operational checks, before the connection to the medium voltage network.
- Clean the bushings with isopropanol.

CBR VL catenary metallic pole:
- Pass the flexible strap through the welded bracket [1.04] of the unit [1] (fig.6.4.a).
- Lift the unit [1] and be careful to balance it.
- Position the unit [1] in relation to the cross beams [2.2].
- Screw and torque to 5daN.m the unit [1] on [2.2] with screw HM12x30 + 2 washers + lock washer + nut.
- Once the assembly procedure is finished, the equipment should appear as indicated in the photo (fig. 6.4.e).
- Repeat the operations for the second pole in two-pole version.
Mounting on SCHNEIDER ELECTRIC pole for substation (CBR & CBR VL)
- Pass the flexible strap through the welded bracket [1.04] of the unit [1] (fig.6.4.a).
- Lift the unit [1] and be careful to balance it.
- Position the unit [1] in relation to the support bracket [2.04] (fig.6.4.f).
- Insert the four HM12x30 screws + washers when the unit [1] is correctly positioned.
- Screw and torque to 5daN.m the unit [1] on the support frame [2] with nut + lock washer + washer.

Once the assembly procedure is finished, the equipment should appear as indicated in the photo (fig. 6.4.g).

Mounting on SCHNEIDER ELECTRIC pole –two-pole version (CBR & CBR VL)
Repeat same process for the second breaker (fig.6.4h)
- Insert the four HM10x25 screws + washers when the unit [1] is correctly positioned.
- Screw and torque to 3.2daN.m the unit [1] on the support frame [2] with nut + lock washer + washer.

Once the assembly procedure is finished, the equipment should appear as indicated in the photo (fig. 6.4.j).
6.5 Installation of the control box.

6.5.1 Mounting with cross beams:

**Preparation (fig.6.5.a):**
- Remove the elements from the control box [3] and [9] from the packing case.
- Assemble the identification plate support [9.01] with the upper cross beam [2.01].
- Assemble the upper and lower cross beam [2.01] with the control box [3].
- Assemble the 4 threaded rods [2.03] on the 2 cross sections [2.01].
  Choose the oblong holes of the cross beam so that the horizontal spacing of the threaded rods corresponds to the width of the mounting structure.

**Slinging (fig.6.5.a):**
- The slinging is carried out with flexible straps that must be attached to the control box at two points on the upper cross beam [2.01].
- Position the control box [3] placing the threaded rods [2.03] on both sides of the mounting structure. Adjust the straps to balance it horizontally.
- Slowly lift the control box as far as the required assembly height, about 0.8m between the ground and the bottom of the box.
- Rest the cross beam [2.01] against the mounting structure.

**Alignment (fig.6.5.b):**
- Insert the 2 rear cross beams [2.01] on the 4 threaded rods [2.03], the edges of the front cross beams [2.01] resting on the pole.
- Grease and screw - manually tightening - with plain washers R, and 2 nuts E, leaving a play of about 5mm between the cross beams and the mounting structure.
- Laterally align the control box in the spindle of the mounting structure.
- Level the control box horizontally.

**Mounting (fig6.5.b):**
- Once the alignment is finished, proceed with the tightening of the nuts E1 with a 3.6 daN.m torque, then of the lock nuts E2 to 5 daN.m. Check the alignment of the support [2]. Repeat the operation if necessary.
- Where necessary, the protective films of the command control box [3] can be removed once installation is complete.
6.5.2 Mounting on cylindrical poles:

Preparation (fig.6.5.c):
- Remove the elements from the control box [3] and [9] the transport case.
- Assemble the upper support [9.02].
- Assemble the lower support [9.02].
- Position the 12mm diameter upper fastening screw in place on the pole that will enable hanging the control box. The required assembly height is approx. 0.8m between the ground and the bottom of the box.

Slinging (fig.6.5.c):
- The slinging is carried out with flexible straps that must be attached to the control box. Adjust the straps to balance it horizontally.
- Slowly lift the control box.
Alignment (fig.6.5.d):

Mounting (fig.6.5.d):
- Insert the 12mm diameter lower fastening screw between the support [9.02] and the pole.
- Proceed with the tightening of the 12mm diameter screws.
- Where necessary, the protective films of the command control box [3] can be removed once installation is complete.

Other possible fixing (fig.6.5.d):
- Hooping.

6.5.3 Mounting on SCHNEIDER ELECTRIC pole

Preparation (fig.6.5.e):
- Remove the elements of the control box [3] from the transport case.

Slinging (fig.6.5.e):
- The slinging is carried out with flexible straps that must be attached to the control box.
- Slowly lift the control box as far as the required assembly height, about 0.8m between the ground and the bottom of the box.

Alignment (fig.6.5.f):
- Position the control box [3] by placing the 4 supports in front of the holes.
- Grease and screw - by manually tightening - with plain washers R, and 2 nuts E.

Mounting (fig.6.5.f):
- Once these alignments are finished, proceed with the tightening of the nuts. The Supports have different shapes to provide natural slope to avoid permanent water on the top.
- Where necessary, the protective films of the command control box [3] can be removed once installation is complete.
6.6 Positioning the cable in place (fig 6.6.a)
Valid whatever the support and circuit breaker (CBR & CBR VL)
- Unroll the strand [6].
- Fit it along the mounting structure.
- Plug the cable [6] on the tank connector [1.13] as follows (fig.6.6a):
  - Locate the larger slot [A] on the connector [1.13]
  - Check the cleanliness of the plug and introduce it trying to fit the slots
  - Push the plug
  - Turn the clip clockwise up to reach a hard point and passed it
  - Check the right locking with the slot [B].
- Flange-mount the cable(s) to the pole at regular intervals. Avoid any traction on the cable at tightening. This mounting equipment is not supplied with the equipment.
- Loop the surplus cable at the bottom of the command control box and attach it to the mounting structure.
- Repeat the operation for the second cable in two-pole version.
- Depending on option.

6.7 Installation of the manual opening ring by hook stick (option)
The elements of the manual opening device to be installed are:
- 1 ring [8.01].
- Nuts and bolts.
Mount the ring(s) [8.01] on the brace(s) [1.08] using screws, washers and nuts (fig.6.7.a). Limit the tightening in order to leave the ring(s) [8.01] free to rotate.
6.8 Wiring of the command control

Open the door of the box and put the switch [3.11] to the “discharge” position in order to switch off the capacitors (fig.6.8.a).

⚠️ Warning!
- Before any intervention on the connections, turn the switch to the “discharge” position.
- Before handling the capacitor(s), check that the voltage in its/their terminal(s) is less than 20Vdc, even when the power supply is off.
- No intervention may be carried out on the command control box by an unqualified person!

Disassemble the connection plate [3.02] located under the command control box (fig.6.8.b).

Drill the hole(s) necessary for running the cables in the connection plate. The use of stuffing boxes is recommended to ensure the IP55 seal.

Before proceeding with the connection of the cable(s), check that the power supply voltages available correspond to the voltages of the equipment supplied. Refer to the rating plate [3.18] of the command control box. The voltages concerned are:
- Output power supply (M);
- Control power supply (C);
- 230Vac power supply for the condensation control system;
- Triggering instruction;
- Switching-in instruction.

Proceed with the wiring of the client connection terminals [3.17] and of the earth bar [3.16] referring to the wiring diagram supplied with the command control box. Be careful to respect the safety provisions in force (fig.6.8.c).

Finally carry out the earthing of the box via the earth bar [3.03]
6.9 Connection to the high voltage terminals

The equipment is supplied with connection plates of tin-plated copper (thick 10mm) attached at the end of the bushings (fig.6.10.a). The H.V. cables or the operator’s wire braids with copper or aluminium ends must be connected on these plates.

⚠️ Warning

- In no case must the connection plates fitted by the manufacturer be unscrewed or removed.

- Clean and degrease the contact lugs of the connections and the EPDM of the bushings (grey insulating part) using a cloth and cleaning alcohol (isopropanol). The use of abrasive tools or products is prohibited.

- Lightly coat the connections, lugs, screws, washers and nuts with protective grease for electrical contacts. Screw and firmly tighten the mountings.

⚠️ Warning!

- It is imperative that the high voltage connecting terminals be in perfect condition. The contact lugs which have not been prepared in accordance with the provisions may, during the flow of the current, lead to a significant rise in temperature likely to damage the equipment.

- The contact lugs are treated and must not undergo damaging or destructive cleaning (no abrasive tools or products)

- The connection of the H.V. parts must be carried out strictly respecting the safety provisions of the operator.
Check that the necessary dielectric distances between the live parts and the elements connected to the earth are achieved. See table below.

<table>
<thead>
<tr>
<th>Resistance to lightning strike Up (kVp)</th>
<th>Dielectric distance (mm) in the air (mm) (&lt; 1,000m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>170</td>
<td>320</td>
</tr>
<tr>
<td>200</td>
<td>360</td>
</tr>
<tr>
<td>250</td>
<td>480</td>
</tr>
</tbody>
</table>

Above 1,000 m altitude, apply the following multiplier coefficient to the dielectric distance:

\[ \text{EXP} \left( \frac{H - 1000}{8150} \right) \]

where H is the altitude in meters.


Example: to keep 170kVc at 2000m, the corrector coefficient is

\[ \text{EXP} \left( \frac{2000 - 1000}{8150} \right) = 1.13 \]

The dielectric distance required is

\[ 320 \times 1.13 = 365 \text{ mm} \]

<table>
<thead>
<tr>
<th>Altitude (m)</th>
<th>Correction coefficient</th>
<th>Corrected clearance (mm) for 170kVc</th>
<th>for 200kVc</th>
<th>for 250kVc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>1.00</td>
<td>320</td>
<td>360</td>
<td>480</td>
</tr>
<tr>
<td>1100</td>
<td>1.01</td>
<td>324</td>
<td>364</td>
<td>486</td>
</tr>
<tr>
<td>1300</td>
<td>1.04</td>
<td>332</td>
<td>373</td>
<td>498</td>
</tr>
<tr>
<td>1500</td>
<td>1.06</td>
<td>340</td>
<td>383</td>
<td>510</td>
</tr>
<tr>
<td>1700</td>
<td>1.09</td>
<td>349</td>
<td>392</td>
<td>523</td>
</tr>
<tr>
<td>1900</td>
<td>1.12</td>
<td>357</td>
<td>402</td>
<td>536</td>
</tr>
<tr>
<td>2100</td>
<td>1.14</td>
<td>366</td>
<td>412</td>
<td>549</td>
</tr>
<tr>
<td>2300</td>
<td>1.17</td>
<td>375</td>
<td>422</td>
<td>563</td>
</tr>
<tr>
<td>2500</td>
<td>1.20</td>
<td>385</td>
<td>433</td>
<td>577</td>
</tr>
<tr>
<td>2700</td>
<td>1.23</td>
<td>394</td>
<td>443</td>
<td>591</td>
</tr>
<tr>
<td>2900</td>
<td>1.26</td>
<td>404</td>
<td>455</td>
<td>606</td>
</tr>
<tr>
<td>3100</td>
<td>1.29</td>
<td>414</td>
<td>466</td>
<td>621</td>
</tr>
<tr>
<td>3300</td>
<td>1.33</td>
<td>424</td>
<td>477</td>
<td>637</td>
</tr>
<tr>
<td>3500</td>
<td>1.36</td>
<td>435</td>
<td>489</td>
<td>652</td>
</tr>
</tbody>
</table>

Table: Corrected clearance for altitudes between 1,000 and 3,500m

Note: For the insulation inside the tank, the dielectric characteristics are identical, whatever the altitude and there is no need to take special precautions. Only the external insulation is affected by the altitude.

Check that the main unit support is connected to the earth.
7 Commissioning

7.1 Checks before switching on

The equipment is completely assembled and tested in the factory. It requires no adjustment at commissioning.

The functional checks to be carried out on site after installation are reduced. The following checklist enables familiarisation with the equipment and the Human – Machine Interface and checking of the various functions.

If a fault is detected during these checks, refer to the « Operating – Maintenance » chapter.

Checks to be carried out before switching on the command control box:

1. Check the assembly conforms to the instructions in the present manual.
2. Note the number of operating cycles (FO) displayed on the operations counter [3.08].
3. Check the earth continuity between the equipment casing and the command control box, via the shielded cable and the connector connection.
4. Check the supply voltages of the low voltage control circuits. Refer to the associated wiring diagram. Check the voltages at the terminals of
   - the control power supply (C)
   - the output power supply (M)
   - the 230Vac power supply.

6. Check that the « enabled » LED [3.15] flashes for several seconds – charging time for the capacitor(s) – then stays on continuously.
7. Proceed with the checking of the equipment operation by carrying out five operating cycles by sending electrical closing / opening instructions (FO) from the sub-station. Check the status (green/red) of the display of the position indicator [1.11] during each operation. Check the correspondence with the "open" (green) [3.09] and the "closed" (red) [3.10] LED’s.
8. If necessary, repeat the previous operation by sending instructions on site via the push-buttons [3.12] (offered as an option). A control instruction via push-button is valid only if, depending on the option, the « Local control » push-button [3.13] is pressed simultaneously or the local/remote switch is positioned on local.

△ Warning

Before proceeding with the switching on, check that the supply voltages correspond to those specified on the box rating plate (Ua).

7.2 Switch-on and operating checks

Initial conditions:

- Box door open
- Local/remote switch in the remote position (option).

6. Check that the « enabled » LED [3.15] flashes for several seconds – charging time for the capacitor(s) – then stays on continuously.
7. Proceed with the checking of the equipment operation by carrying out five operating cycles by sending electrical closing / opening instructions (FO) from the sub-station. Check the status (green/red) of the display of the position indicator [1.11] during each operation. Check the correspondence with the "open" (green) [3.09] and the "closed" (red) [3.10] LED’s.
8. If necessary, repeat the previous operation by sending instructions on site via the push-buttons [3.12] (offered as an option). A control instruction via push-button is valid only if, depending on the option, the « Local control » push-button [3.13] is pressed simultaneously or the local/remote switch is positioned on local.
7 Commissioning (contd.)

⚠️ Warning
If the alarm is activated during commissioning, check that the procedure has been correctly carried out and refer to chapter 8 « Operating – Maintenance »

⚠️ Warning
At switch-on, the alarm (red LED) is activated after 15s if the capacitor is not charged. Position the « charge/discharge » switch in the « charge » position, then turn off the supply for several seconds.

⚠️ Warning
On request, the switching-in circuit is configured to accept instructions of duration of between 0.3s and 2.0s. Minimum duration for trip or close command: 100ms
Data for supply current

**△ Consumption**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Closing Operation</th>
<th>Charging capacitors on Uc</th>
<th>Tripping operation on Um</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 VDC</td>
<td>Single pole</td>
<td>&lt; 0.1A</td>
<td>&lt; 2A / 15s</td>
</tr>
<tr>
<td></td>
<td>Two poles</td>
<td>&lt; 0.1A</td>
<td>&lt; 2A / 15s</td>
</tr>
<tr>
<td>120 Vdc</td>
<td>Single pole</td>
<td>&lt; 0.1A</td>
<td>&lt; 2A / 15s</td>
</tr>
<tr>
<td></td>
<td>Two poles</td>
<td>&lt; 0.1A</td>
<td>&lt; 2A / 15s</td>
</tr>
<tr>
<td>230 Vac</td>
<td>Single pole</td>
<td>&lt; 0.1A</td>
<td>&lt; 2A / 15s</td>
</tr>
<tr>
<td></td>
<td>Two poles</td>
<td>&lt; 0.1A</td>
<td>&lt; 2A / 15s</td>
</tr>
</tbody>
</table>

10. Under Voltage function check
Check that the voltage input to be monitored is connected on terminals 42.

<table>
<thead>
<tr>
<th>Relay</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>K11</td>
<td>1. U% = 75%</td>
</tr>
<tr>
<td></td>
<td>2. HYS = 5%</td>
</tr>
<tr>
<td>Voltage monitoring</td>
<td>3. R=0%</td>
</tr>
<tr>
<td></td>
<td>4. F/D &gt; 0</td>
</tr>
<tr>
<td></td>
<td>Range 5 to 50V (48VDC supply)</td>
</tr>
<tr>
<td></td>
<td>Range 10 to 100V (120VDC supply)</td>
</tr>
<tr>
<td>K12</td>
<td>1. U% = 75%</td>
</tr>
<tr>
<td></td>
<td>2. HYS = 5%</td>
</tr>
<tr>
<td>Capacitors voltage</td>
<td>3. R=0%</td>
</tr>
<tr>
<td></td>
<td>4. F/D &gt; 0</td>
</tr>
<tr>
<td></td>
<td>Range 5 to 50V (48VDC supply)</td>
</tr>
<tr>
<td></td>
<td>Range 10 to 100V (120VDC supply)</td>
</tr>
</tbody>
</table>

In normal operation, both relays K11 and K12 are ON as both LED R & U
7.3 Connection to the medium voltage (MV) network

11. The equipment is in open position. Once the functional checks have been carried out and the possible problems have been resolved, connect the equipment to the MV network via the connection plates [1.14].
12. Check that the dielectric distances in relation to the live parts are adequate. See chapter 6.10.
13. The equipment may be switched on and may be operated in the normal conditions of use.
14. After commissioning, lock the door of the box with a padlock.

⚠️⚠️⚠️ Information

The ends of the wire braids or cables can be either in copper or aluminium. There is no risk of corrosion with the connection plates in tin-plated copper.
Clean again the bushings if grease is still there.
The command control box may be locked against any unauthorised intervention by a maximum of four 8mm padlocks.

The design of the box allows three operating levels:
■ Level 1 enables checking the correct operating of the box
■ Level 2 enables changing a module and the electronic board, in case of malfunction
■ Level 3 enables repairing a module. Level 3 is only within the manufacturer's remit.

The equipment is supplied without padlocks.

8.1 Operating level 1
Level 1 enables the operator to access the Human Machine Interface in order to obtain information on the status of the equipment:
■ Equipment position lights
■ Operations counter
■ Monitoring with the switching-in board:
  □ Power supply presence
  □ Equipment enabled, ready to switch-in
  □ Alarm
■ Capacitor charge / discharge switch
■ Push-buttons (optional) for the switching-in and trigger instructions

This level is accessible after opening of the box door.

The housing prevents access to the electrical or electronic subassemblies. Panel closed, the electrical protection is level IP2X.
8.2 Alarm types

Alarm conditions are associated with the monitoring functions described below. Two alarm types may be distinguished:

- The external alarms of PCB,
- The internal alarms of PCB.

**LED Auxiliary supply on**

**LED Ready to close**

**LED Alarm**

**Alarm contact (terminal 23, 24)**

*When powering up...*

- Normal operation, also after closing operation, flashing frequency ÷ U capacitor
- No power supply; fuse burnt; mistake in wiring; PCB damaged

*After a few seconds...*

- Lack of primary power supply
- Normal operation, ready to close
- Closing not allowed (lever locked or problem with under voltage release module (option) or mistake in wiring
- Switch S4 on discharge; mistake in wiring; PCB damaged
- **External fault of PCB [I]** 1 flash = not able to close, 2 flashes = coil fault, 3 flashes = capacitor fault, 4 = position fault, 5 = closing order impulse > 5s
- **Internal fault of PCB** relay “k5i” welded; capacitor charging time too long [II] (> 20s); faulty internal15V
- Internal fault of PCB: transistor Q15 faulty or relay “k4i” not supplied
8.3 Processing of an alarm

Switch off and then restore the PCB power supply. If the alarm persists after the reset or after a few operations, proceed like below:

Internal alarms - Red LED stays on:
Proceed with the replacement of the PCB. See chapter "Operating Level 2" The faulty PCB may be returned to our After-Sales Service Department.

External alarms - Red LED flashing:
- Check that the "charge/discharge" switch is on the "charge" position before powering up the cabinet.
- Check that the cable between the equipment and the cabinet is correctly connected at the two ends; check carefully the connector under the tank (see ch.6.6).
- Check that the closing order impulse is correctly adjusted between 0.3 and 2 seconds.
- If the problem remains, contact our After-Sales Service Department and return us the unconformity formulary.

Notes
(I) the alarm is kept after disappearance of faults 2 & 3
(II) The reason can be external, check the voltage µ-switch for capacitor charge (90V)
(III) A short time current don’t directly cause alarm
# 8.4 Malfunction without alarm

The following table deals with some cases of malfunction not generating an alarm:

<table>
<thead>
<tr>
<th>Fault Type</th>
<th>Cause of the fault</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>No LED or lamp is on</td>
<td>No power supply</td>
<td>■ Check that the auxiliary power supply connection to the cabinet terminals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Check that all the connectors are correctly connected:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Connectors between terminals and LV module.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Connectors of the electronic board.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ Connectors of the under voltage release module.</td>
</tr>
<tr>
<td>Closing failed</td>
<td>Closing order impulse not correctly calibrated</td>
<td>■ Check that the closing order impulse is correctly adjusted between 0.5 and 1.5s.</td>
</tr>
<tr>
<td></td>
<td>Not read to close</td>
<td>■ Check that the green LED “ready to close” is on before dispatch of sending a closing order:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ If the LED flashes, the capacitor is still not charged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>□ If the LED is off, the manual opening handle or lever is in locked position.</td>
</tr>
<tr>
<td>Opening failed</td>
<td>Actuator coil disconnected</td>
<td>■ Check that the cable between the tank and the cabinet is correctly connected.</td>
</tr>
<tr>
<td></td>
<td>Drop in voltage during a triggering instruction, insufficient power</td>
<td>■ Note the resistance of the opening coil and send the value to our After-Sales Service Department,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Check if the drop in voltage isn’t too important at the cabinet terminals for the actuator power way (14A peak for a single pole and 25A peak for a two poles). Check the section and the length of the cable.</td>
</tr>
</tbody>
</table>
8.5 Operating level 2.

This level is dedicated to the maintenance of the box on site.

To reach operating level 2, it is necessary:
- To turn off the power supply of the box
- To open the box door - operating level 1
- To discharge the capacitor through the switch (fig8.5.a).

The capacitor(s) is/are charged to 90Vdc. Wait about 2 min so that the capacitor voltage goes to less than 20Vdc. During the discharge, the green LED “Enabled” flashes with decreasing frequency. A frequency of 1.5Hz corresponds to 48V.

At operating level 2, the circuit may be broken down into two units:
- The electronic sub-assembly made up of an electronic board, power capacitor(s), cable strands and plug-in connectors.
- The electrical sub-assembly made up of power relays, terminal blocks, cable strands and plug-in connectors.

In case of malfunction, the complete electronic sub-assembly or the electronic board may be replaced by a qualified operator, in accordance with the following procedure:

To change the electronic board (fig.8.5.b):
- Check that all the power supplies are off and that the switch is in discharge position.
- Remove the two screws 1 of the top cover.
- Remove the top cover.
- For versions < 2009 remove the 4 plug-in connectors X1, X2, X3 and X4.
- For versions > 2009 remove the 10 plug-in connectors on the electronic board.
- Take out the earth wire.
- Remove the nut of the board support.
- Remove the board support.
- Install the new board in accordance with the reverse procedure.
### Allocation of μ switch

When installing or replacing the electronic board, check the position of μ switch.

**μ switch SW1 : Selection of the charging voltage**

<table>
<thead>
<tr>
<th>SW1</th>
<th>Unom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90 V</td>
</tr>
<tr>
<td></td>
<td>94.5 V</td>
</tr>
<tr>
<td></td>
<td>225 V</td>
</tr>
<tr>
<td></td>
<td>229 V</td>
</tr>
<tr>
<td></td>
<td>236 V</td>
</tr>
<tr>
<td></td>
<td>240 V</td>
</tr>
</tbody>
</table>

(contd.)
μ switch SW2: Pulse width selection

Software ≤ 1.05: Selection of pulse width to close the actuator.

<table>
<thead>
<tr>
<th>SW2</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60ms</td>
</tr>
<tr>
<td></td>
<td>80 ms</td>
</tr>
<tr>
<td></td>
<td>100 ms</td>
</tr>
<tr>
<td></td>
<td>120 ms</td>
</tr>
</tbody>
</table>

Picture 1: SW2 software ≤ 1.05

Software ≥ 1.06: Selection of software variant

<table>
<thead>
<tr>
<th>SW</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td></td>
</tr>
<tr>
<td>SB</td>
<td></td>
</tr>
<tr>
<td>ST</td>
<td></td>
</tr>
<tr>
<td>SN</td>
<td></td>
</tr>
</tbody>
</table>

Picture 2: SW2 software ≥ 1.06

Software ST
Closing on rising edge of the closing order.

Software SN
Closing on falling edge of an impulse that must last between 0.2 and 2s. Should the pulse last more than 5s on alarm is generated.

Software SA et SB
Not used
To change the complete command control module (fig.8.5.c):

- Check that power supplies are off and that the switch is at the discharge position.
- Remove the 4 plug-in connectors situated above the operator connecting terminals.
- Unscrew the four nuts 2.
- Remove the complete support
- Install the new support in accordance with the reverse procedure.

⚠️ Warning
Do not reverse the plug-in connectors during connections. Ensure the continuity of the wires by using their reference numbers.

These replacements require no specific tool, all the connections being carried out by plug-in discriminated connectors, with protection index IP2X.

Tubing protects the cable strands.

To add the under voltage release module (fig.8.5.d):

1. Check that all the power supplies are off and that the switch is in discharge position.
2. Remove the two screws 1 of the top cover.
3. Remove the top cover.
4. Remove the plug-in link X18 (don’t scrap because it’s necessary for functioning without under voltage release module).
To remove the under voltage release module:

1. Check that all the power supplies are off and that the switch is in discharge position.
2. Remove the two screws 1 of the top cover.
3. Remove the top cover.
4. Disconnect the 3 plug-in connectors X15, X16 and X18.
5. Remove the nut 2.
6. Move the module towards the top of the cabinet.
7. Remove the module into the rear plate notches.
8. Put back the module.
9. Plug in the plug-in link X18 on the cabinet connector X18.
10. Put back the top cover.

To change the under voltage release module:

1. Remove the module according to proceeding b) line 1 to 7.
2. Install the new module according to process a) line 6 to 10 above.
8 Operating – Maintenance (contd.)

To change the filtering relay 230Vac

After replacing the relay, check the setting.
K4 & K5 settings are identical.

1. Voltage setting: U > 60% (300V range = B2)
2. Hystérésis setting: 5%
3. Delay setting: 30 = 0.3s
4. Coefficient setting: >1
8.6 Operating level 3.

This level only concerns the repair of components of the electrical and electronic sub-assemblies. This maintenance level is obligatorily carried out by SCHNEIDER ELECTRIC services.

8.7 Replacement of a main unit breaker pole

The replacement of a main unit pole may be carried out in two hours, excluding out of service operations.

The operator (or the installer) of the Medium Voltage equipment must ensure that his personnel:

- Are familiar with the local or national safety measures in use and know the recommendations for the prevention of accidents, in particular for the high voltage equipment and installations.
- Have taken note of the present safety provisions and recommendations in the various paragraphs and appendices.
- Have received appropriate training
- Will strictly observe the warning placed directly on the equipment
- Will immediately notify any alteration or modification of the equipment likely to lessen the operating safety.

Before any intervention, the equipment must be turned off and the recording and safety of use procedures will be applied

1. On the command control box:
   - Put the “charge/discharge” switch [3.11] in “discharge” position (fig.8.7.a).
   - Switch off the box supplies
   - Put the lever (option) or the manual opening handle (option) at the “Locked” position.

2. Release the equipment by disconnecting the MV line from the connection plates [1.14].

3. Disconnect the cable [1.13] (fig.8.7.b).

4. Release the manual opening system (Option) (fig.8.7.c):
   - Single-pole:
     Remove the spindle [5.03] and separate the tube from the connecting rod [1.08].
   - Two-pole:
     Remove the HM10 screws and separate the rings from the connecting rods [1.08].
5. Run the flexible sling through the welded lifting points [1.04] of the unit [1] (fig.8.7.e). Keep the slings taut, ready to support the unit.

6. Remove the four M12 screws between the unit [1] and the brackets [2.02] (fig.8.7.d).

7. Lift the equipment, keeping it away from the support frame and from the mounting structure and bring it down to the ground slowly.

8. For the positioning of the replacement unit, follow the instructions in chapter 6 ASSEMBLY.
The CBR circuit breaker requires no specific maintenance. The tank containing the circuit breaker is sealed for life and the mechanism requires neither replacement of wearing parts nor the addition of any fluid. However, throughout the lifespan of the equipment, and in particular in severe operating conditions, inspection is nevertheless useful.

<table>
<thead>
<tr>
<th>Type Of Check</th>
<th>Periodicity</th>
<th>Qualification Of The Personnel</th>
<th>Deactivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual check</td>
<td>1 year after commissioning, then every 2 years</td>
<td>Operating personnel</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yes ¹</td>
</tr>
<tr>
<td>Change capacitors</td>
<td>Every ten years</td>
<td>Electrician</td>
<td>Yes</td>
</tr>
</tbody>
</table>

¹) Yes, if the protection of the personnel requires it. See “Safety measures” chapter.

Safety measures

Specific safety measures are to be taken during work linked to the visual inspections. See “Visual check” chapter.

All the other maintenance and repair works require the following preliminary safety measures:

⚠️ Warning

Before starting work, de-activate the circuit breaker and earth the high voltage terminals on both sides. The exact steps to be followed depend on the installation site; it is up to the operator to indicate it. Before any works inside the LV box, shut off all the control and supply circuits.

Visual check

⚠️ Warning

During the "visual checks", the circuit breaker may be live. Respecting of the dielectric safety distances is vital.

An inspection is useful after one year of operation after commissioning. This inspection will consist of a visual check of the circuit breaker and of the control device. Check the correct mechanical operation by carrying out some mechanical operations, in particular when the equipment rarely operates.
As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

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