

SeT Series

SM AirSeT - Up to 24 kV and 630 A Modular Cubicles

Operating and Maintenance Guide

Basic / Advance Versions

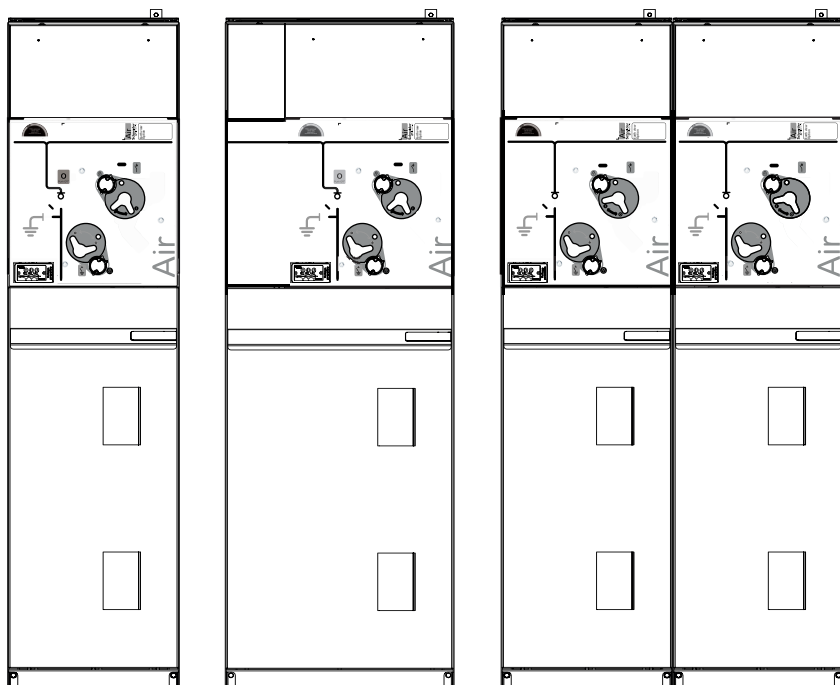
For Internal Arc, IAC:

A-FL / A-FLR, 12.5 kA, 1 s

A-FL / A-FLR, 16 and 20 kA, 1 s

NNZ1586901-04

08/2024



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Foreword

Safety Information

Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a “Danger” or “Warning” safety message indicates that an electrical hazard exists which will result in death or serious injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages with this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

Failure to follow these instructions will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

Failure to follow these instructions can result in injury or equipment damage.

NOTICE

NOTICE is used to address practices not related to physical injury.

Failure to follow these instructions can result in equipment damage.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and its installation and has received safety training to recognize and avoid the hazards involved.

Safety Precautions

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplies of the equipment before working on or inside equipment.
- Respect the LOTO (Lock Out Tag Out) procedure.
- Always use a properly rated voltage sensing device to confirm that power is off.
- Before turning on the switch, check all devices, covers and doors are in correct position. In addition check that downstream circuit is not earthed and ready to be energized.
- Beware of potential hazards, and carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Do not operate the switch if interlocks and protective barriers are removed.
- Never go behind the cubicle when it is energized.

Failure to follow these instructions will result in death or serious injury.

CAUTION

HAZARD OF STORED ENERGY

Discharge mechanism before working on or inside product.

Failure to follow these instructions can result in injury or equipment damage.

Cleaning Instructions



⚠️⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not use high-pressure cleaner for cleaning the equipment.

Failure to follow these instructions will result in death or serious injury.

⚠️ CAUTION

HAZARD OF INAPPROPRIATE CLEANING

Do not use solvents or alcohol for cleaning the equipment.

Failure to follow these instructions can result in injury or equipment damage.

Disposal of the Equipment at End-of-Life

This equipment contains pressurized air and compressed springs.

⚠️ WARNING

HAZARD OF INCORRECT DISMANTLING OPERATION

- Apply appropriate protective equipment (PPE) and follow safe work practices.
- Do not carry out any dismantling operations unless authorized.
- Air pressure contained inside the tank must be released before any end-of-life treatment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

About this Document

Document Scope

This manual provides information to enable the SM AirSeT 630 A cubicles to be operated and maintained correctly.

This document is intended for qualified and trained personnel in charge of equipment operation and maintenance.

Validity Note

This manual applies to SM AirSeT 630 A cubicles.

The information contained in this document could be updated at any time. Schneider Electric strongly recommends that you have the most up-to-date version. You can download updated documentation from www.se.com or contact your local Schneider Electric representative for the latest information about your product.

There are 4 versions available:

For SM AirSeT	Basic	Advance
12.5 kA, 1 s, IAC: A-FL	X	—
12.5 kA, 1 s, IAC: A-FLR	—	X
16 kA, 1 s, IAC: A-FL / IAC: A-FLR	—	X
20 kA, 1 s, IAC: A-FL / IAC: A-FLR	—	X

Document History

Document reference-revision	Release date	Modifications
NNZ1586901-04	07/2024	Addition of operation descriptions on NSM, DMVL-A /D/S, and DM2 cubicles
NNZ1586901-03	10/2022	Minor modifications for consistency with Rev03 of Installation and Commissioning guide
NNZ1586901-02	09/2022	Modifications of terminology for consistency Improvements in descriptions and layout
NNZ1586901-01	07/2022	Complete content review Integration of JYT61182_Additive to NNZ1586901-00 Operation and Maintenance Guide.pdf
NNZ1586901-00	04/2021	Creation

Related Documents

Title of Documentation	Reference Number
SM AirSeT Civil Engineering Guide - Basic version	NNZ1586301
SM AirSeT Civil Engineering Guide - Advance version	GEX6469301
SM AirSeT Installation and Commissioning Guide	NNZ1587001
AirSeT Motorized Switch User Guide	GEX1881501
Keylocks Installation and Operation	JYT4515901
VPIS (Voltage Presence Indicating System) Phase Concordance Unit and Test Notice	NT0021401
VPIS Installation	JYT3626301
Replacement of a VPIS or VDIS with a VDIS	GEX2912700
VDIS (Voltage Detector and Indicating System) Phase Concordance Unit and Test Notice	PKR8700602

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Acronyms and Abbreviations

Acronyms and abbreviations used in the manual:

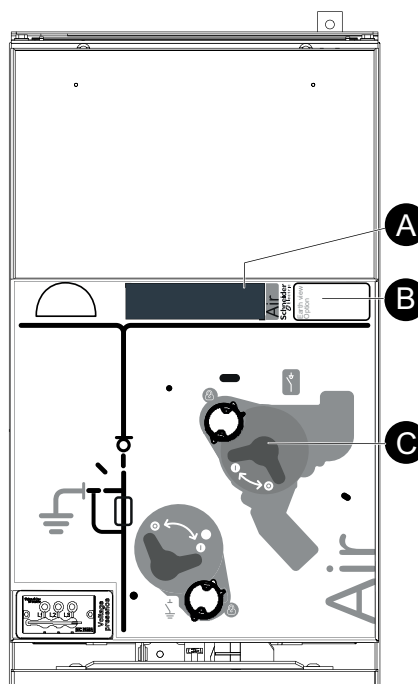
Acronym or Abbreviation	Full name
A-FL	Accessibility Type A - Front Lateral
A-FLR	Accessibility Type A - Front Lateral Rear
IAC	Internal Arc Classification
LV	Low Voltage
MV	Medium Voltage
VPIS	Voltage Presence Indicating System

Information on Non-Inclusive or Insensitive Terminology

As a responsible, inclusive company, Schneider Electric is constantly updating its communications and products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contain terms that are deemed inappropriate by some customers.

Cubicle Identification

- A. Nameplate. Refer to Nameplate description below.
- B. Earth view option (optional)
- C. For IM / IMC / IMB / PM / QM / QMB / NSM cubicles (optional): motorization



Example of an aluminium rating label (A):

SM AirSeT Type DMVL-AX 	Ur: 12kV lk: 16kA Ud: 28kV tk: 1s Up: 75kV fr: 50/60Hz Un: 20kV LSC2A		Internal arc performance: IAC A-FL 12.5kA 1s
	Sealed pressure system acc. IEC66271-1 Pure Air: 0.122 kg Pre: 150 kPa rel		SN: SMAIRSET-2021-WXX-X-XXXX Made in: France  Ir: 630A  NNZ1586901 Schneider Electric

Nameplate Description

Type: cubicle type	Certified Standard	Ur: rated voltage (kV) Ud: rated power frequency withstand voltage (kV) Up: rated lightning impulse withstand voltage (kV) Un: nominal voltage, customer operating voltage (kV)	Ik: rated admissible short-time current tk: rated duration of short-circuit fr: rated frequency LSC2A: loss of service continuity category ⁽¹⁾	Internal arc performance: SN: Serial Number • SMAIRSET6-2021: manufacture code – year of manufacturing • Wxx: week of manufacturing • X: day of the week • XXXX: manufacturing raw	
		Sealed pressure system acc.: sealed pressure system values Pre: rated pressure (kPa abs)		Ir: rated normal current	NNZ1586901: SM AirSeT Operating and Maintenance Guide reference number

(1) If at least one set of busbars can remain live, and all other functional units can stay in service, then service is optimal. For more information, refer to [What is Loss of service continuity category \(FAQs\)](#).

Operating Instructions

Checking Cubicles Before Energizing

For All Cubicles

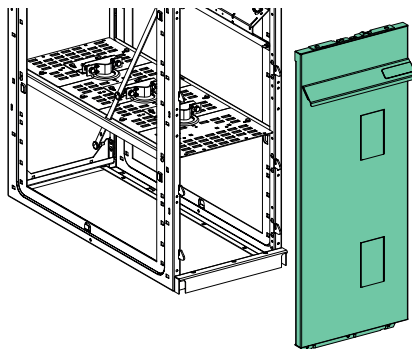
DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Check that nothing has been left inadvertently in the connection compartment.

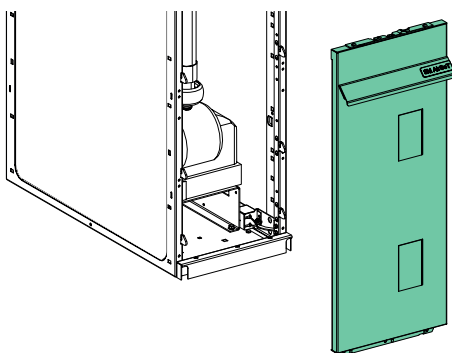
Failure to follow these instructions will result in death or serious injury.

Re-install the front panel.



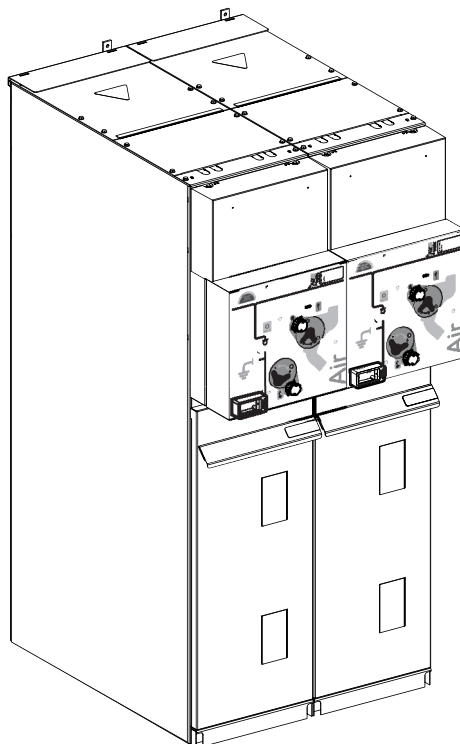
Specificities for CM / CM2 / PM / QM / QMB / QMC, TM Cubicles

1. Check for all phases that:
 - the fuse has been properly fitted,
 - the field distributor have been properly positioned on all phases.
2. Re-install the front panel.



Specificities for NSM Cubicle

1. Refit the front panels in place.
2. Check that the changeover relay is operational.



Checking Manometer Before Energizing

For a correct reading of the manometer, look at the position of the needle according to the ambient temperature.

⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- If the needle is not in the green area, contact Schneider Electric service center immediately.
- Do not make any operation on the cubicle if the needle is in the red area.

Failure to follow these instructions will result in death or serious injury.

Manometer 12kV

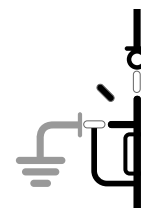


Manometer 24kV



Before Energizing the MV Incoming Cables

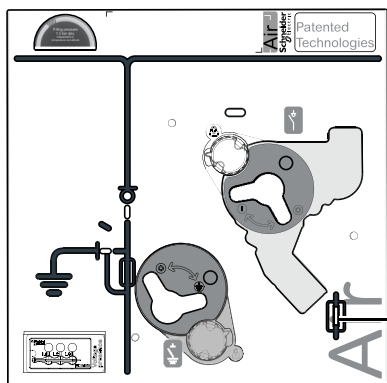
⚡⚠ DANGER
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
The devices must be in the open position.
Failure to follow these instructions will result in death or serious injury.



Operating the Equipment

⚠ WARNING
HAZARD OF INCOMPLETE CHECKING
• For each cubicle, before energizing, check the operating mechanism by operating the switch-disconnector and the earthing switch three to five times. • Follow the instructions described in the following pages related to <i>Manual operation on earthing switch and switch-disconnector depending on the operating mechanism</i>, further in this guide.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Mechanism Overview



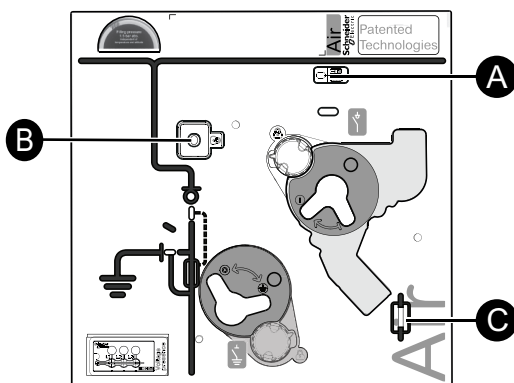
- **CDT / CDTS** operating mechanism front plate.

A. Fuse blown indicator

- Fuses in service: white indicator



- At least one fuse has blown: red indicator



- **CD1** operating mechanism front plate.

A. Charging status

- White indicator: spring discharged



- Yellow indicator: spring charged



B. Opening push button

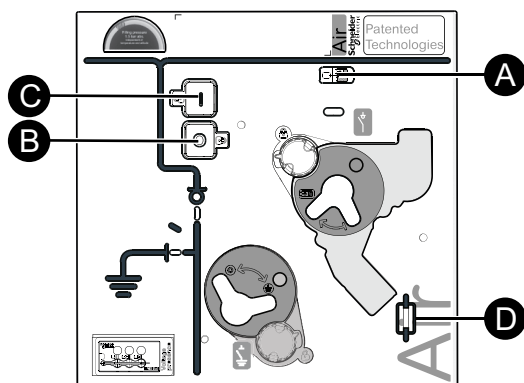
C. Fuse blown indicator

- Fuses in service: white indicator



- At least one fuse has blown: red indicator





- **CD2** operating mechanism front plate.

- A. Charging status

- White indicator: spring discharged



- Yellow indicator: spring charged



- B. Opening push button

- C. Closing push button

- D. Fuse blown indicator

- Fuses in service: white indicator



- At least one fuse has blown: red indicator



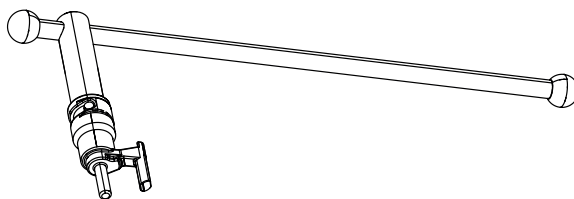
Operating Lever

NOTICE

HAZARD OF WRONG OPERATING CONDITIONS

Use the original SM AirSeT operating lever provided with the cubicle.

Failure to follow these instructions can result in equipment damage.

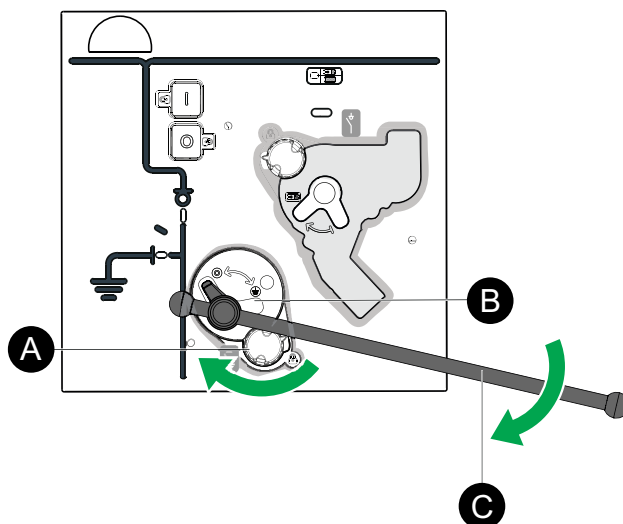


When ordering the SM AirSeT unit, the operating lever is delivered with the SM AirSeT unit. If the lever is missing, contact Schneider Electric.

Manual Operation of the Earthing Switch with CDT, CDTs, CD1 and CD2

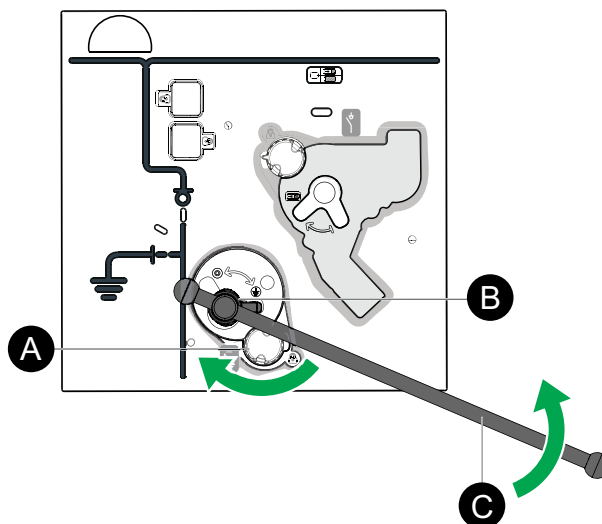
Closing the Earthing Switch

1. Turn transparent porthole located in front of switch socket **(B)**.
2. Turn the shutter blanking **(A)** of the earthing switch.
3. Insert the operating lever **(C)** into the earthing switch socket **(B)**.
4. Turn the operating lever **(C)** clockwise, to $\perp$ indicator.
5. Remove lever **(C)** and close transparent porthole.



Opening the Earthing Switch

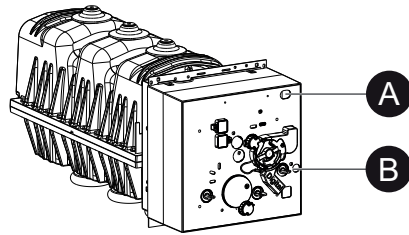
1. Turn transparent porthole located in front of switch socket **(B)**.
2. Turn the shutter blanking **(A)** of the earthing switch.
3. Insert the operating lever **(C)** into the earthing switch socket **(B)**.
4. Turn the operating lever **(C)** counterclockwise, to **O** indicator.
5. Remove lever **(C)** and close transparent porthole.



Earthing Switch Contacts Visual Access (Optional)

The operating mechanism cover allows the checking of the closed position of the earthing switch.

A visual check of the earthing switch contacts engaged on their fixed contacts can be done as shown below:

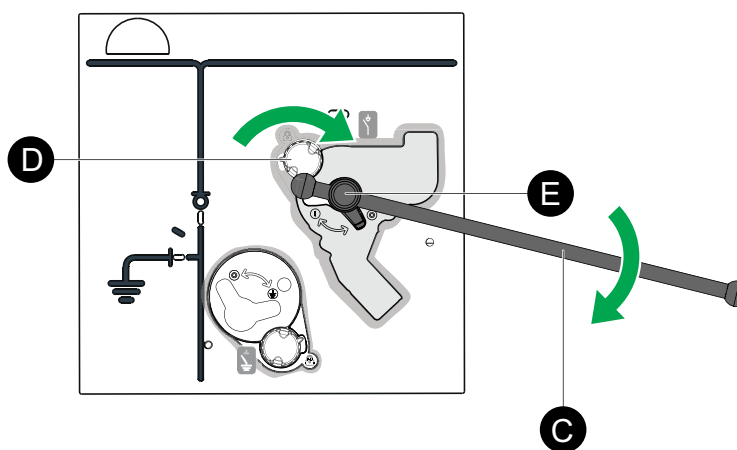


- A. Visual access for the closed position of the earthing switch contacts.
- B. Light access to illuminate the view of the earthing switch contacts.

Manual Operation of the Switch-Disconnecter with CDT and CDTs

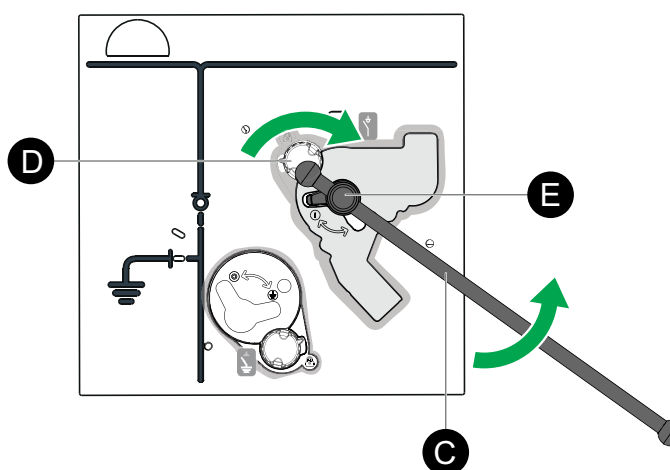
Closing the Switch-Disconnecter

1. Turn transparent porthole located in front of switch-disconnector socket (**E**).
2. Turn the shutter blanking (**D**) of the switch-disconnector.
3. Insert the operating lever (**C**) into the switch-disconnector socket (**E**).
4. Turn the operating lever (**C**) clockwise, to **I** indicator.
5. Remove lever (**C**) and close transparent porthole.



Opening the Switch-Disconnecter

1. Turn transparent porthole located in front of switch-disconnector socket (**E**).
2. Turn the shutter blanking (**D**) of the switch-disconnector.
3. Insert the operating lever (**C**) into the switch-disconnector socket (**E**).
4. Turn the operating lever (**C**) counterclockwise, to **O** indicator.
5. Remove lever (**C**) and close transparent porthole.



Manual Operation of the Switch-Disconnecter with CD1

⚡⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.

During charging, do not use manual opening action.

Failure to follow these instructions will result in death or serious injury.

NOTICE

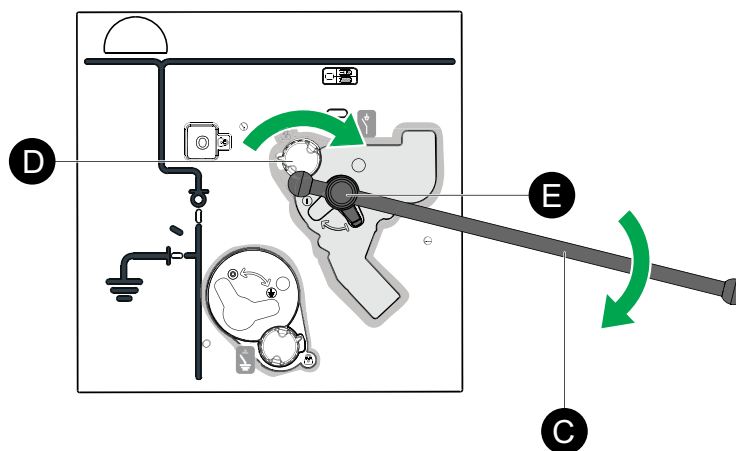
HAZARD OF IMPROPER OPERATION

When any opening command is active (such as the energization of the coil, a fuse trip or a remote opening), manual and electrical charging actions are prohibited.

Failure to follow these instructions can result in equipment damage.

Closing the Switch-Disconnecter

1. Turn transparent porthole located in front of switch-disconnector socket (**E**).
2. Turn the shutter blanking (**D**) of the switch-disconnector.
3. Insert the operating lever (**C**) into the switch-disconnector socket (**E**).
4. Turn the operating lever (**C**) clockwise, to **I** indicator to close the switch-disconnector.



The opening spring is automatically charged.

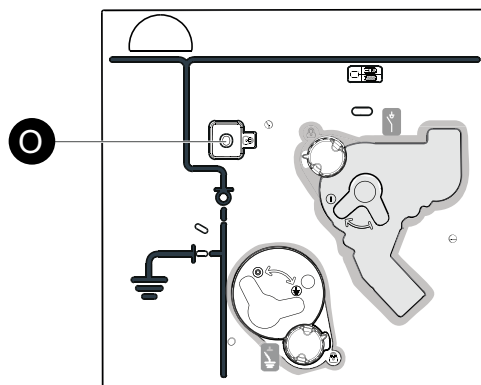
Check spring charged: yellow indicator



5. Remove lever (**C**) and close transparent porthole.

Opening the Switch-Disconnecter

Press push button **O** to open the switch-disconnector.



Manual Operation of the Switch-Disconnecter with CD2

⚡ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.

During charging, manual closing or opening action is prohibited.

Failure to follow these instructions will result in death or serious injury.

NOTICE

HAZARD OF IMPROPER OPERATION

- When any opening command is active (such as the energization of the coil, a fuse trip or a remote opening), manual and electrical charging actions are prohibited.
- When the spring is charged and the switch-disconnector is in the open position, press the close button first.

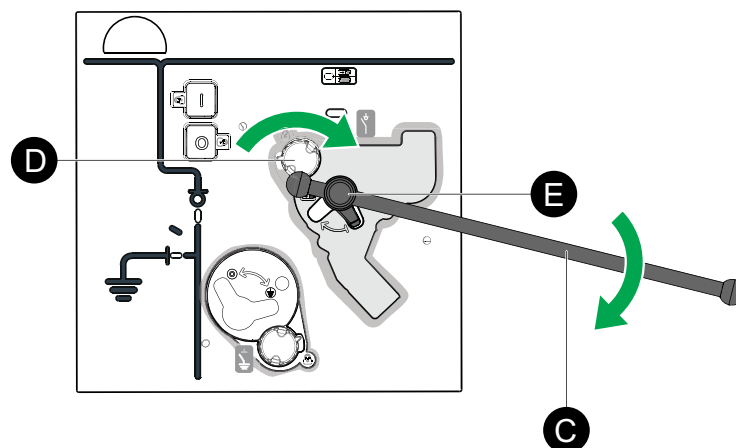
Failure to follow these instructions can result in equipment damage.

Closing the Switch-Disconnecter

1. Turn transparent porthole located in front of switch-disconnector socket **(E)**.
2. Turn the shutter blanking **(D)** of the switch-disconnector.
3. Insert the operating lever **(C)** into the switch-disconnector socket **(E)**.

4. Manually charge the closing spring by turning the operating lever **(C)**

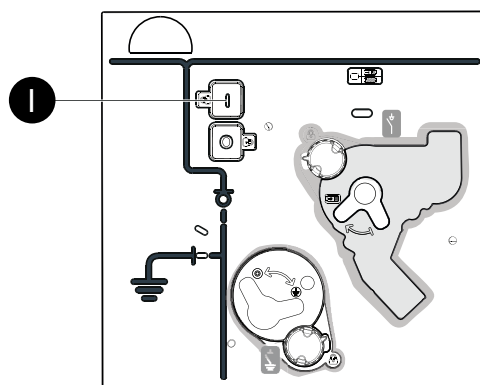
clockwise to spring charged indicator .



Check spring charged: yellow indicator

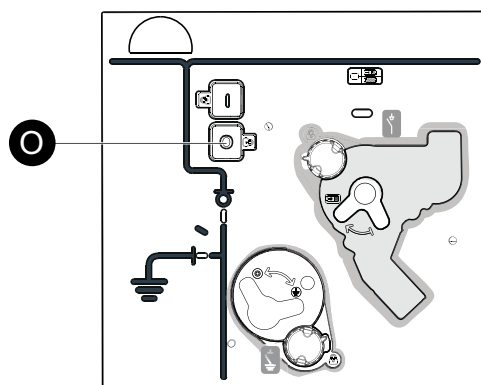


5. Remove lever **(C)** and close transparent porthole.
6. Press push button **I** to close the switch-disconnector.



Opening the Switch-Disconnecter

Press push button **O** to open the switch-disconnector.



Motorized Operation of the Functions

DANGER

HAZARD OF IMPROPER INSTALLATION

The motorization must be connected through the Control Terminal Block (CTB).

Failure to follow these instructions will result in death or serious injury.

The cubicle can be fitted with motorized controls. The opening and closing of the switches can be operated by two methods as follows:

- Remotely controlled.
- Through the push buttons on the controller in the LV compartment.

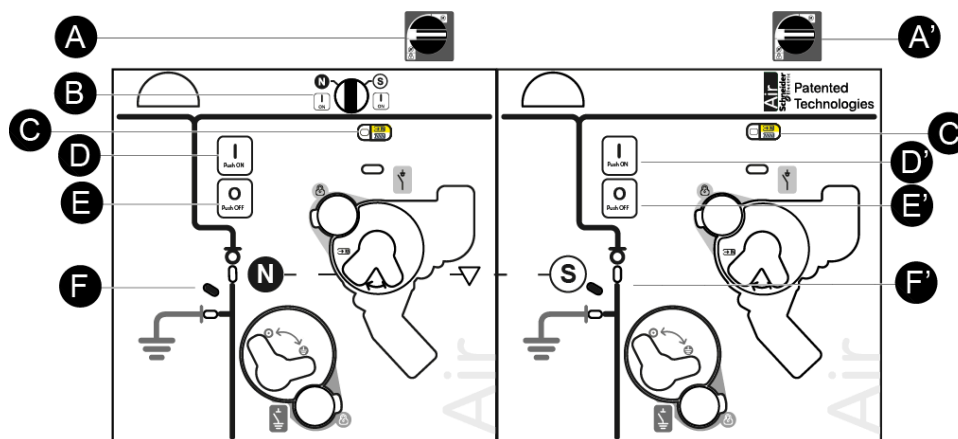
For more information, please refer to the *Motorized Switch User Guide* – GEX1881501.

Operating NSM Cubicles

Description of the NSM Cubicle Operating Mechanism

The NSM cubicle is composed of two switches:

- Main or Normal switch N
- Secondary or emergency switch S



A / A'. Motor On/Off button, located on LV box

- Position 0 = OFF
- Position I = ON

B. Selector button: used to select the commissioning of either the N switch or the S switch

C / C'. Mechanism charging status

D / D'. Closing (I) push button

E / E'. Opening (O) push button

F / F'. Switch position indicator (earth, closed or open)

⚠ CAUTION

HAZARD OF INCORRECT OPERATION ON THE MECHANISM

Do not press the Opening push button (E or E') in the following conditions:

- the switch position indicator (F or F') shows the open position
- the charging status (C or C') is yellow (spring loaded)

Failure to follow these instructions can result in injury or equipment damage.

The selector button (B) does not indicate the switch state, the switch state (earth, open or closed) is indicated by the switch position indicator (F or F').

The switch (N or S) can be in closed state in the following cases:

- the selector button (B) is in vertical position : this configuration can happen after an electrical closing order.
- the selector button (B) is on the left (switch N) position : this configuration can happen after a manual closing order (or operation)

The NSM cubicle can be controlled either remotely or manually as described in the following chapters.

Manual Switch Operations on NSM Cubicle

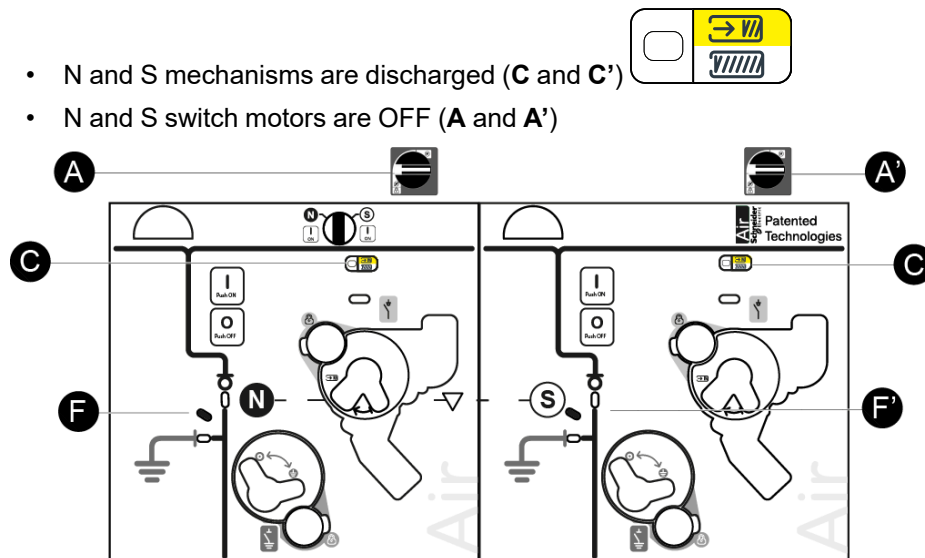
Energizing N Switch

Initial state:

- N and S switches are open (**F** and **F'**)

- N and S mechanisms are discharged (**C** and **C'**)

- N and S switch motors are OFF (**A** and **A'**)



1. Turn both On/Off motor buttons of N and S cubicles to I position (motor ON).



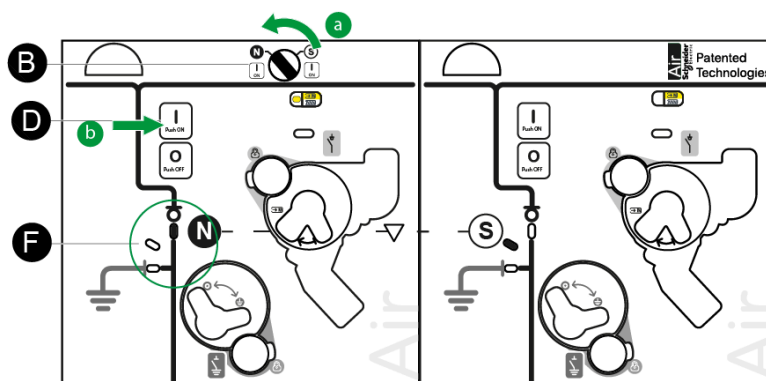
N and S switches charge automatically one after the other. Both charging status indicators (**C** and **C'**) indicate that the springs are loaded (yellow):



2. Close N switch as follows:

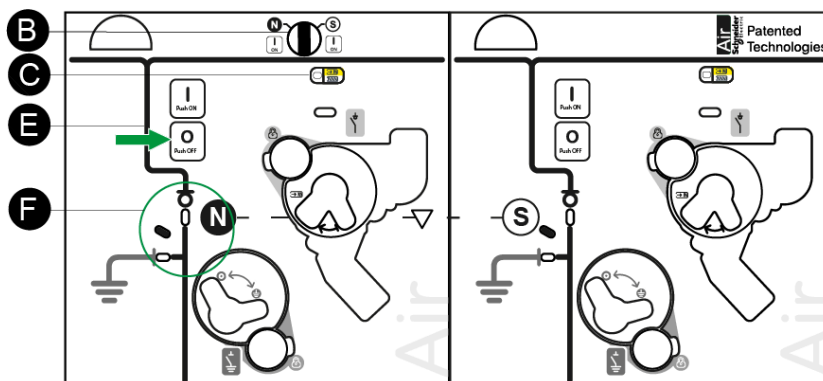
- a. Turn the selector button (**B**) to the left (anti-clockwise).
- b. Hold the selector button (**B**) to the left while pressing the I closing push button (**D**) of N mechanism.

The switch position indicator (**F**) shows the closed position.



Switching from N to S Mechanism

1. Open N switch by pressing O opening push button (**E**) of the N mechanism.
 - The switch position indicator (**F**) shows the open position.
 - The selector button (**B**) returns to the vertical position.
 - The charging status (**C**) shows discharged (white).

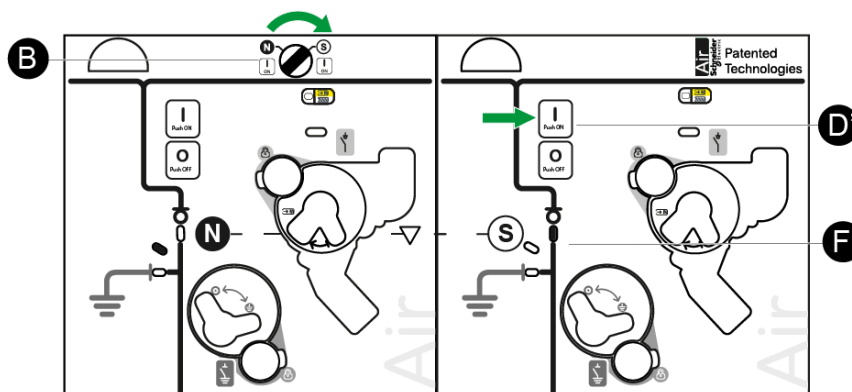


The N switch charges automatically. The charging status shows charged (yellow).



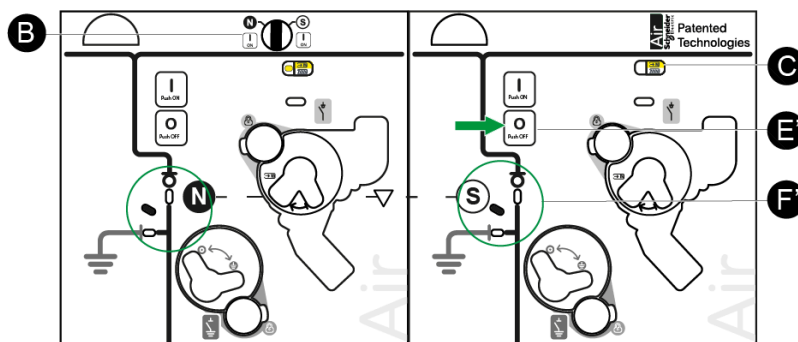
2. Close S switch as follows:
 - a. Turn the selector button (**B**) to the right (clockwise).
 - b. Hold the selector button (**B**) to the right while pressing the I closing push button (**D'**) of S mechanism.

The switch position indicator shows S switch closed (**F'**).



Switching from S to N Mechanism

1. Open S switch by pressing O opening push button (**E'**) of the S mechanism.
 - The switch position indicator (**F'**) shows the open position.
 - The selector button (**B**) returns to the vertical position.
 - The charging status (**C'**) shows discharged (white).

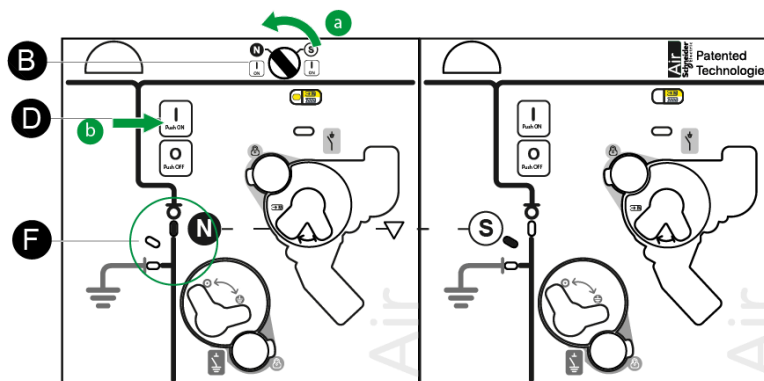


The S switch charges automatically and the S switch charging status shows charged (yellow).



2. Close N switch as follows:
 - a. Turn the selector button (**B**) to the left (anti-clockwise).
 - b. Hold the selector button (**B**) to the left while pressing the I closing push button (**D**) of N mechanism.

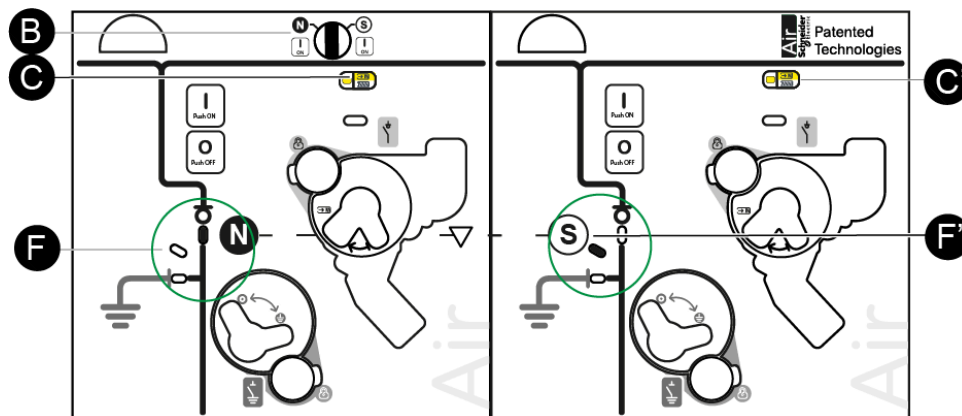
The switch position indicator shows N switch closed (**F**).



NSM Cubicle Operation on Fault

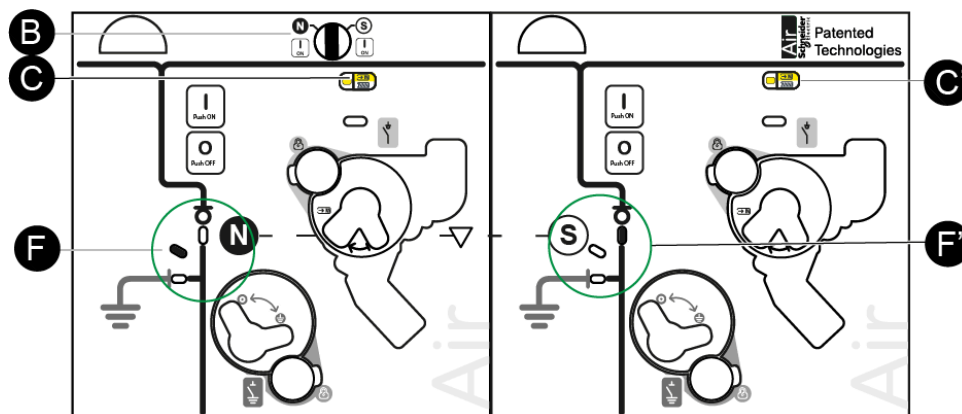
Initial status: N switch closed (**F**), S switch open (**F'**), N and S mechanisms charged (**C** and **C'**) and selector button (**B**) in the following possible positions:

- vertical position  : after an electrical closing order
- on N position  : after a manual closing order or operation



An electrical fault on the N circuit triggers the switch from N to S switch as follows:

- N switch opens automatically (**F**).
- S switch closes automatically (**F'**).
- N mechanism charges automatically.

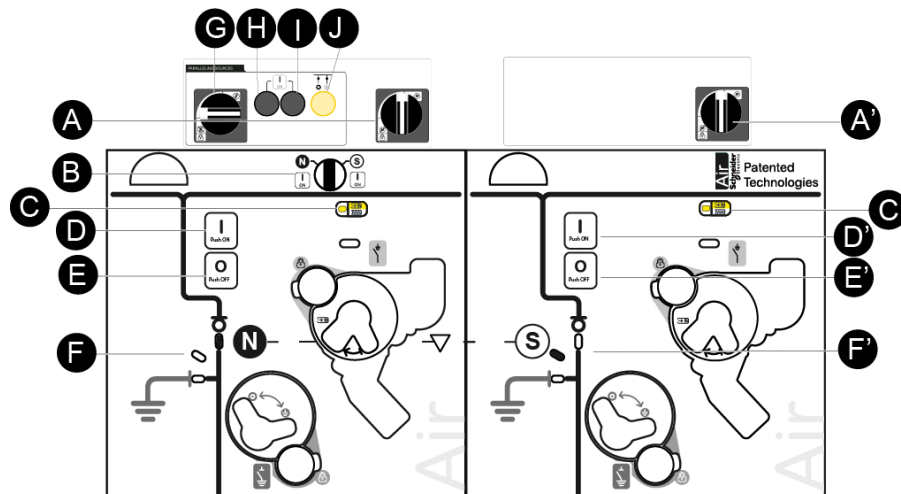


For the operator intervention, refer to Switching from S to N, page 27.

NSM in Parallel Mode (Option)

Description of the Parallel Mode

NSM parallel mode allows switches N and S to be closed together.



A / A'. Motor On/Off button, located on LV box

- Position 0 = OFF
- Position I = ON

B. Selector button: used to select the commissioning of either the N switch or the S switch

C / C'. Mechanism charging status

D / D'. Closing (I) push button

E / E'. Opening (O) push button

F / F'. Switch position indicator (earth, closed or open)

G. Parallel commutator (padlockable). Allows you to activate the push buttons (H and I) to close N and S switches together.

H: Push button to give the closing order to N and S switches.

I. Authorizes the passage of closing order.

J. Parallel mode indicator. Lights ON if both switches are closed together.

Initial Status

⚠ CAUTION

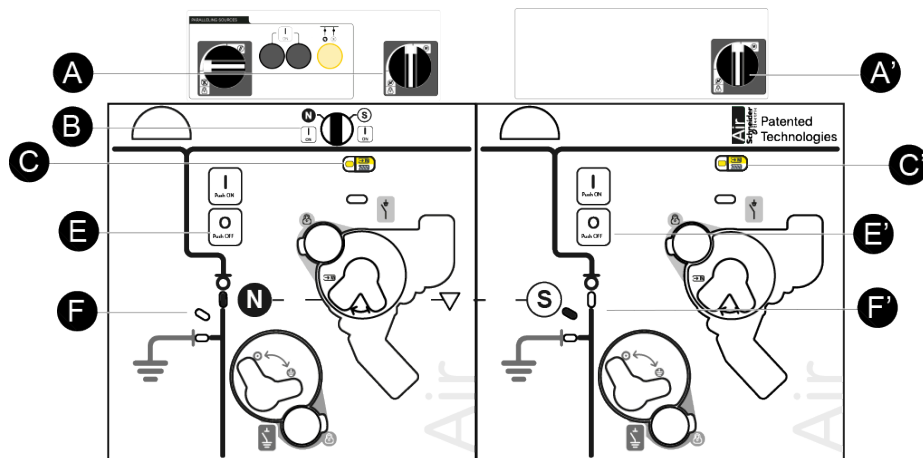
HAZARD OF INTERNAL FAILURE, SUDDEN NOISE IMPACT AND FUMES

Ensure the synchronization of the two supply networks (N and S) before switching in parallel mode.

Failure to follow these instructions can result in injury or equipment damage.

- Parallel commutator (**G**) is padlocked in horizontal position.
- The motor buttons (**A** and **A'**) are set on M (vertical position)
- At least one of the switches (N or S) is open (**F** or **F'**)
- N and S mechanisms are charged (**C** and **C'**)
- Selector button (**B**) is in vertical position (obligatory). If it is not the case, refer to instructions below.

In the following example, N switch is closed and S switch is open.



If the selector button (B) is not in vertical position, do as follows:

Open the closed switch (N or S) by doing one of the following action:

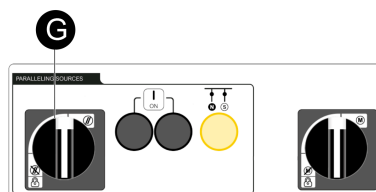
- by pressing manually the **O** opening push button of the closed switch (**E** or **E'**).
- by an electrical opening order from the monitoring and supervision equipment.

Selector button (B) turns in vertical position  (neutral position).

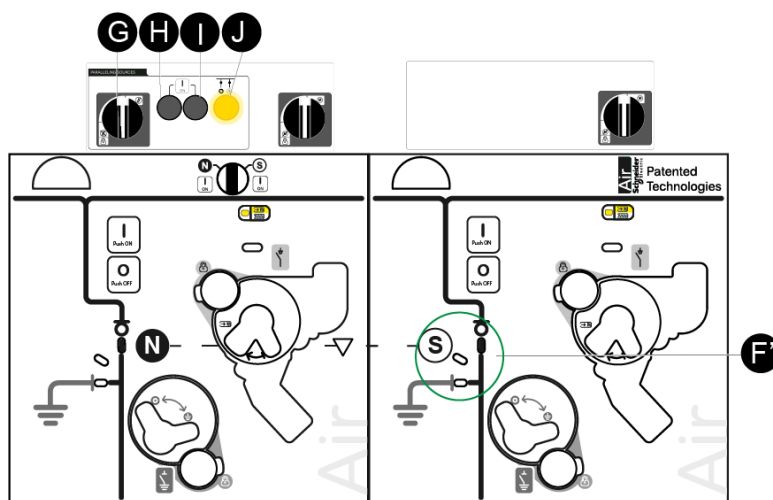
NOTE: Be aware that both switches are open at the end of this action.

Closing Switches in Parallel Mode

1. Unpadlock the parallel commutator (G) and turn it clockwise (in vertical position) . This means that the manual parallel setting option is activated.



2. Press both (H) and (I) buttons. Both switches are closed and the indicator (J) lights up.

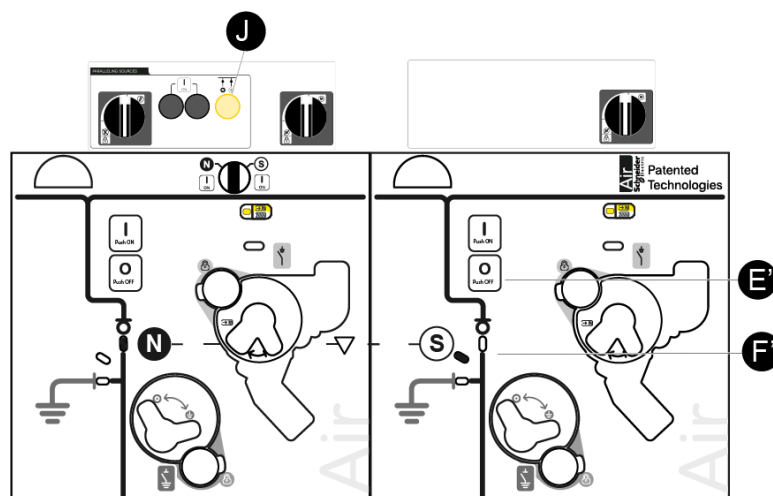


NOTE: Then, if you turn the parallel commutator (G) anti-clockwise (horizontal position), indicator (J) stays on. (J) indicator turns off when one of the switch is open. Refer to *Opening a switch (S or N) in parallel mode*, below.

Opening a Switch (S or N) In Parallel Mode

Open one of the closed switches (S or N) by pressing **O** opening push button (**E** or **E'**), or by an electrical opening order from the monitoring and supervision equipment.

Indicator (**J**) turns off.



In our example, S switch has been opened (**F'**).

Two possibilities for the next step:

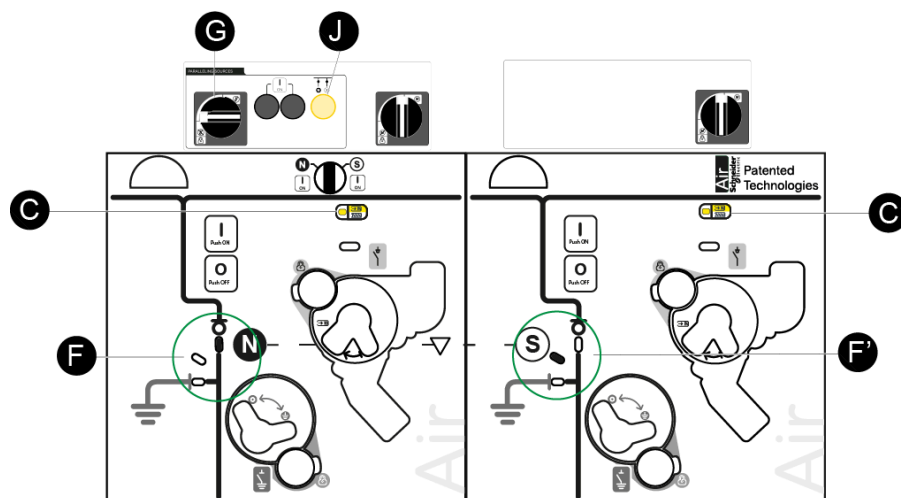
- Stay in parallel mode.
- Deactivate the parallel mode.

Deactivation of Manual Parallel Setting Option

Turn the parallel commutator (**G**) anti-clockwise (horizontal position) .

Final state:

- One of the switch is open, the other is closed
- N and S mechanisms are charged (**C** and **C'**)
- Indicator (**J**) is off



Operating DMVL-A / D / S Cubicles with EvoPacT Circuit Breaker

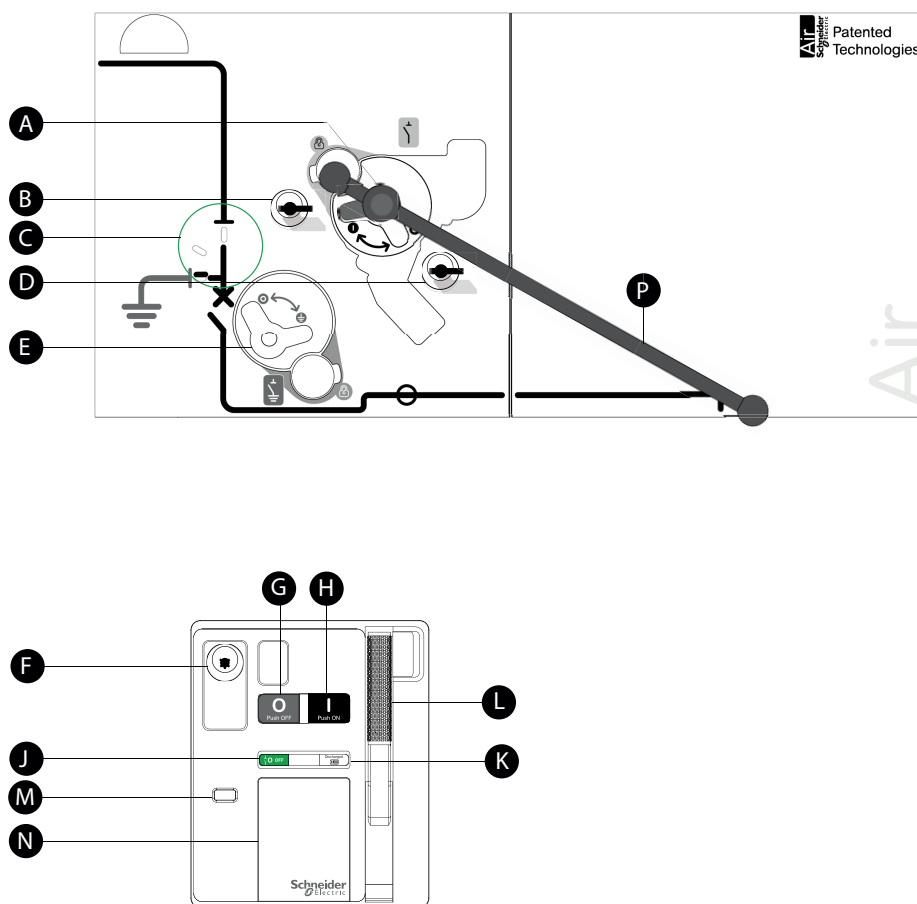
Description of the EvoPacT Circuit Breaker and the Operating Mechanism

The DMVL-A / D / S are circuit breaker cubicles composed of one disconnecter and a vacuum circuit breaker.

The EvoPacT™ vacuum circuit breaker enables the device to switch and helps to protect the distribution networks. When the EvoPacT vacuum circuit breaker is installed on a medium voltage cubicle, it helps to protect the downstream components from a short-circuit.

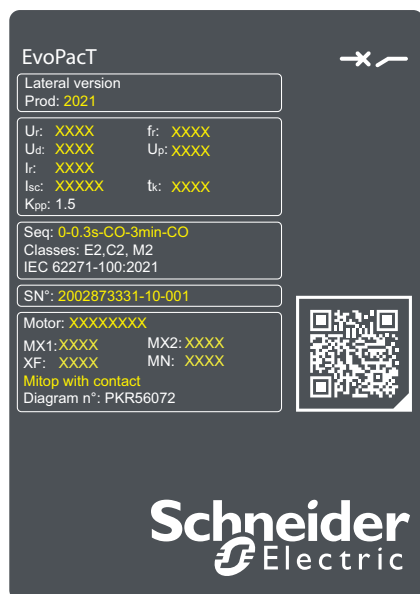
Description

NOTE: To facilitate the representation of the operations, only the DMVL-A front panel is shown as an example.



Part	ID	Item	Function
Disconnecter	A	Line disconnecter command	Insert the lever to operate the disconnecter.
	B	Open position lock	Lock the disconnecter in the open position.
	C	Disconnecter position indicator (earth/open/closed)	Show the disconnecter position.
	D	Closed position lock	Lock the disconnecter in the closed position.
	E	Earthing disconnecter command	Insert the lever to operate the earthing disconnecter.
EvoPacT vacuum circuit breaker, page 34	F	Circuit breaker lock	Lock the circuit breaker in the open position.
	G	Push OFF button	Power off the circuit breaker.
	H	Push ON button	Power on the circuit breaker.
	J	Status OFF:  ON: 	Show the status of the circuit breaker: open or closed.
	K	Charging status bar Charged:  Charged:  Discharged: 	Show the status of the charging operation. The mechanism closing spring is charged. The mechanism closing spring is charged. The mechanism closing spring is discharged.
	L	Charging handle	Charge the circuit breaker.
	M	Operation counter	Count the open/close cycle.
	N	Nameplate, page 34	Provide the circuit breaker characteristics.
Accessories	P	Operating lever	Operate the disconnecter.

EvoPacT Circuit Breaker Nameplate



The data in yellow depends on the product ordered.

Prod: year of production	
Ur: rated voltage	fr: rated frequency
Ud: rated short duration power frequency withstand voltage	Up: rated lightning impulse withstand voltage
Ir: rated normal current	—
Isc: rated short-circuit breaking current	—
Kpp: rated first pole-to-clear factor	tk: rated duration of short-circuit
Seq: rated operating sequence	
Classes: E2, C2, M2: classes of electrical endurance and of mechanical endurance	
IEC 62271-100:2021: standard with date of issue	
SN: Serial Number	
Motor: motor type	—
MX1: first trip release	MX2: second trip release
XF: closing release	MN: undervoltage release
Mitop with contact: empty if no Mitop	
Diagram n°: PKR56072: Electrical diagram reference	

EvoPacT Circuit Breaker Combination of Indicators

Circuit breaker indicators		Electrical status	Status description
Main contact-position indicator	Charging status bar		
			The circuit breaker is open. The mechanism is discharged.
			The circuit breaker is open. The mechanism is charged. The circuit breaker cannot be closed.
			The circuit breaker is open. The mechanism is charged. The circuit breaker is ready to closed.
			The circuit breaker is closed. The mechanism is discharged.
			The circuit breaker is closed. The mechanism is charged.

Terminology

- Captive key:** captive keys are only released after a specific sequence of actions. They help prevent the movement of mechanical parts and the operation of the device when not appropriate.
- Free key:** free keys are released with a turn.

Note About the Keys

The disconnecter locks (B) and (D), and the circuit breaker lock (F) are identical and use the same key.

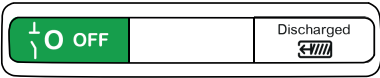
Operating the Lever

Refer to Operating Lever, page 16.

Energizing DMVL-A / D / S Cubicles

Initial state:

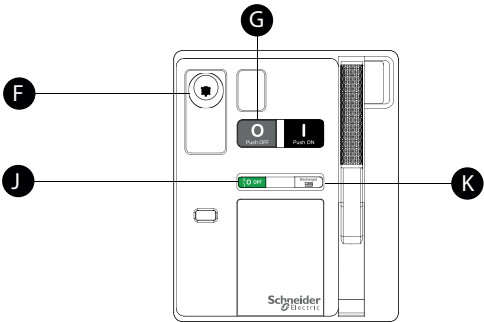
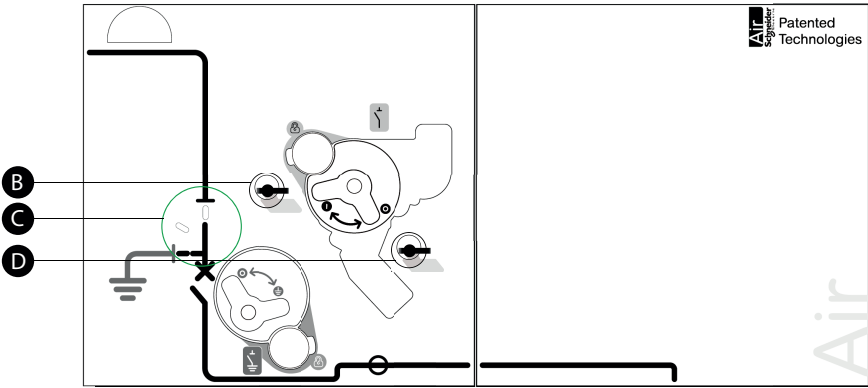
- The disconnecter position indicator (C) is in earth position.
- The circuit breaker is open (J) and discharged (K).



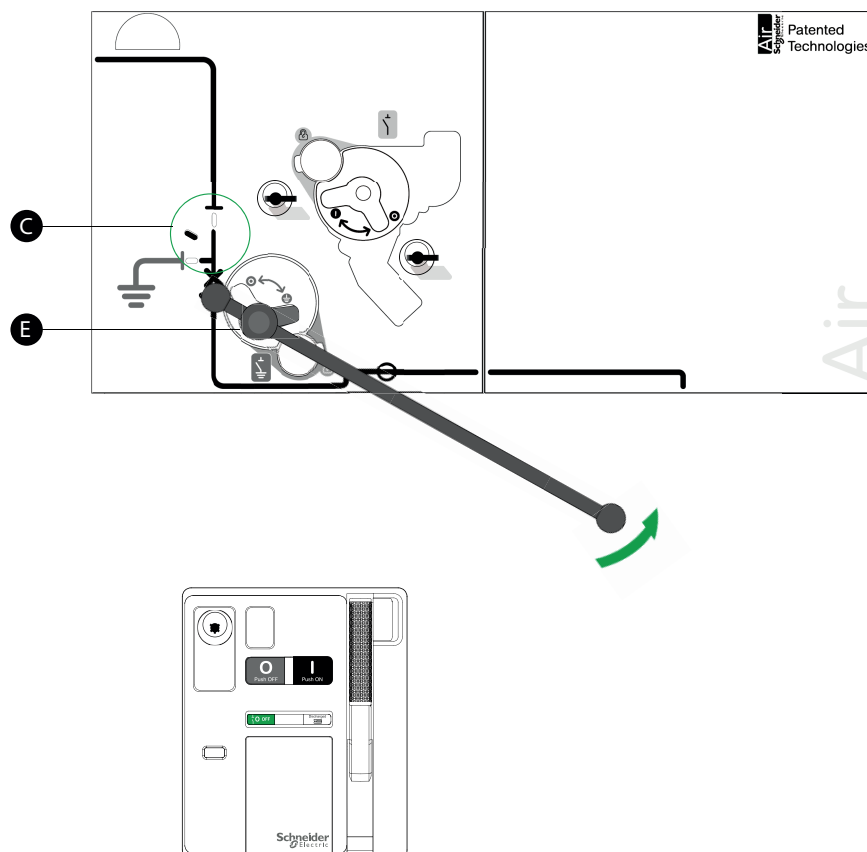
- The captive key is in lock (D).
- The free key is in lock (B).

NOTE: If the free key is not in (B), the key is in (F). To release the key from (F):

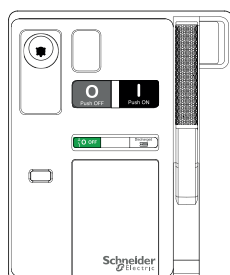
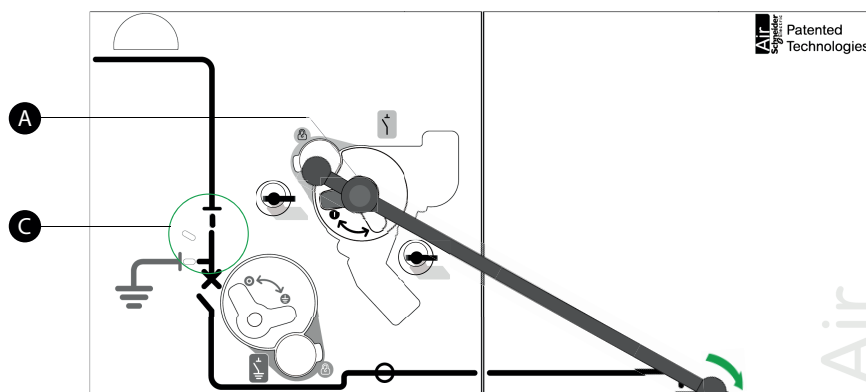
If	Then
The circuit breaker is open and discharged	Remove the key from (F) directly or with 1/4 turn anti-clockwise. Insert the key in (B).
The circuit breaker is closed and discharged	1. Press the circuit breaker Push OFF button (G). 2. Turn the key in (F) 1/4 turn anti-clockwise. 3. Remove the key and insert the key in (B).
The circuit breaker is closed and charged	1. Press the circuit breaker Push OFF button (G). 2. Press the circuit breaker Push ON button (H). 3. Press the circuit breaker Push OFF button (G). 4. Turn the key in (F) 1/4 turn anti-clockwise. 5. Remove the key and insert the key in (B).



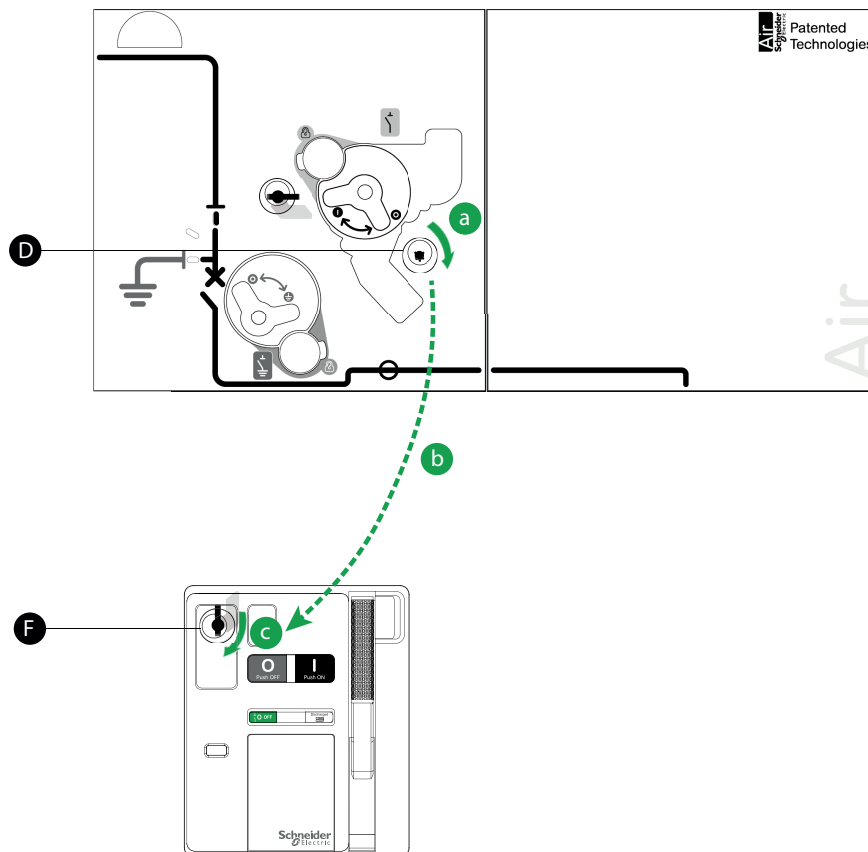
1. Open the disconnecter as follows:
 - a. Insert the operating lever in the earthing disconnecter command (**E**).
 - b. Turn anti-clockwise.
 - c. Check that the disconnecter position indicator (**C**) shows the open position.



2. Close the disconnecter as follows:
 - a. Insert the operating lever in the line disconnecter command (**A**).
 - b. Turn clockwise.
 - c. Check that the disconnecter position indicator (**C**) shows the closed position.

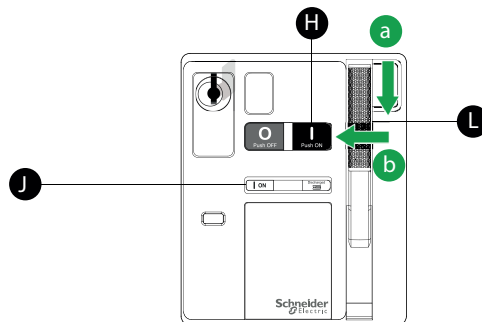
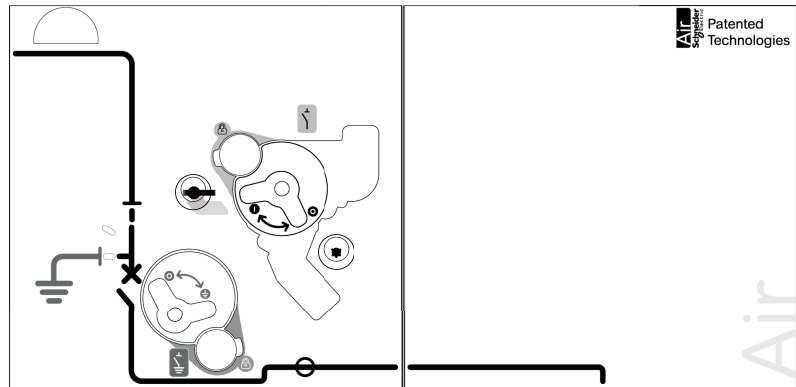
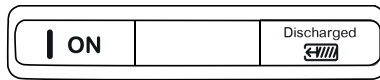


3. Move the key to the circuit breaker as follows:
- Release the key from lock (D) with 1/4 turn clockwise.
 - Insert the key horizontally in the circuit breaker lock (F).
 - Make a 1/4 turn clockwise to lock it.



4. Close the circuit breaker as follows:

- a. Pull down the charging handle (L) several times until the lever stops being maneuverable.
- b. Press the circuit breaker **Push ON** button (H).
- c. Check that the circuit breaker status bar (J) shows the closed position.



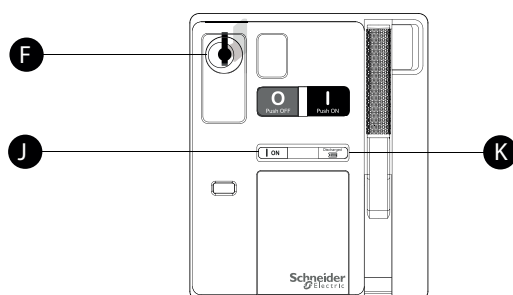
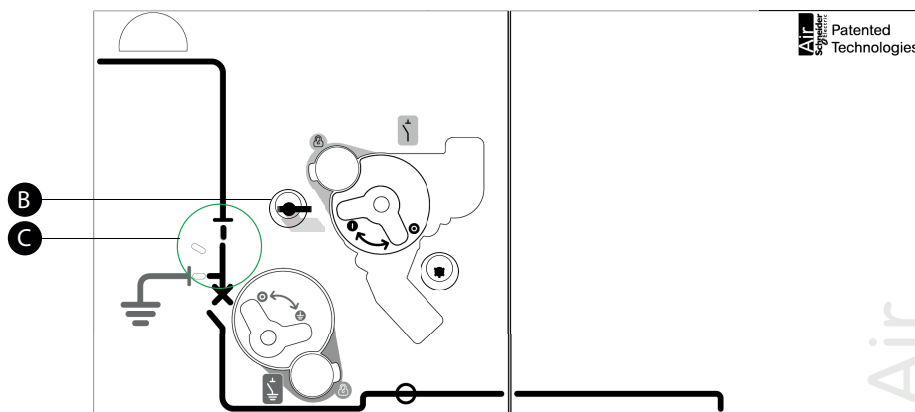
Final state:

- The disconnector position indicator (C) is in closed position.
- The circuit breaker is closed (J) and discharged (K).
- The 2 keys are captive in lock (B) and in circuit breaker lock (F).

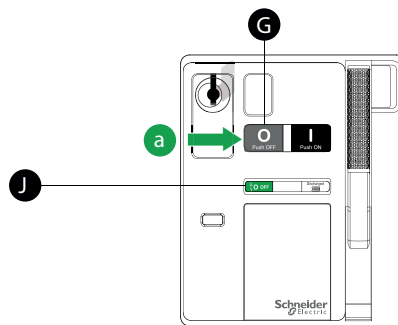
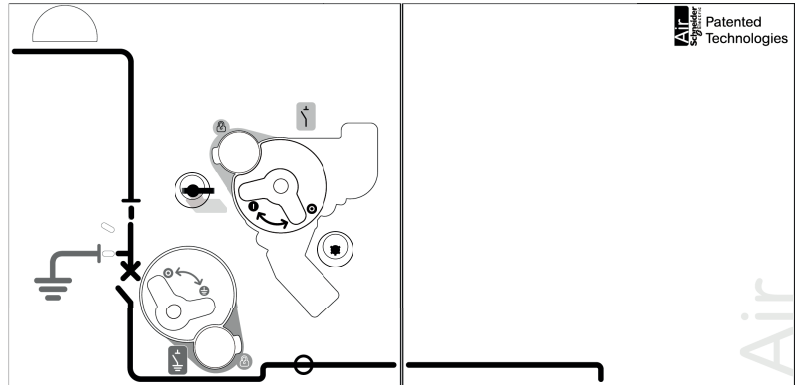
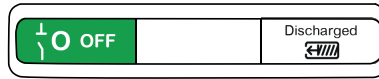
De-Energizing DMVL-A / D / S Cubicles

Initial state:

- The disconnecter position indicator (**C**) is in closed position.
- The circuit breaker is closed (**J**) and discharged (**K**).
- The 2 keys are captive in lock (**B**) and circuit breaker lock (**F**).

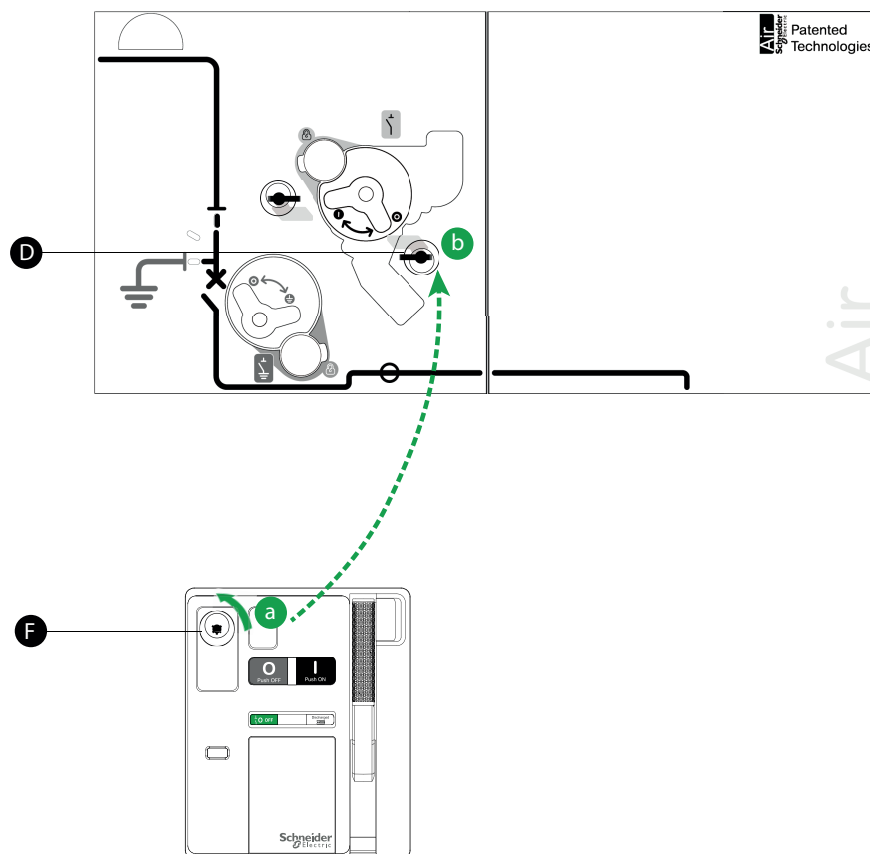


1. Open the circuit breaker as follows:
 - a. Open the circuit breaker by pressing the circuit breaker **Push OFF** button (G)
 - b. Check that the circuit breaker status bar (J) shows the open position.

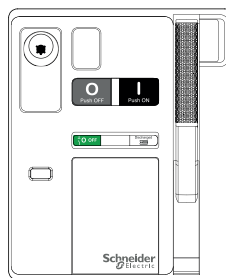
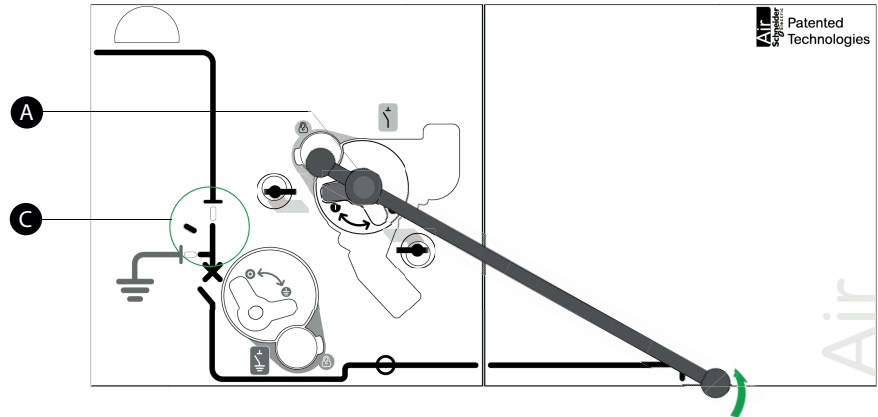


2. Move the key from the circuit breaker to the disconnecter as follows:

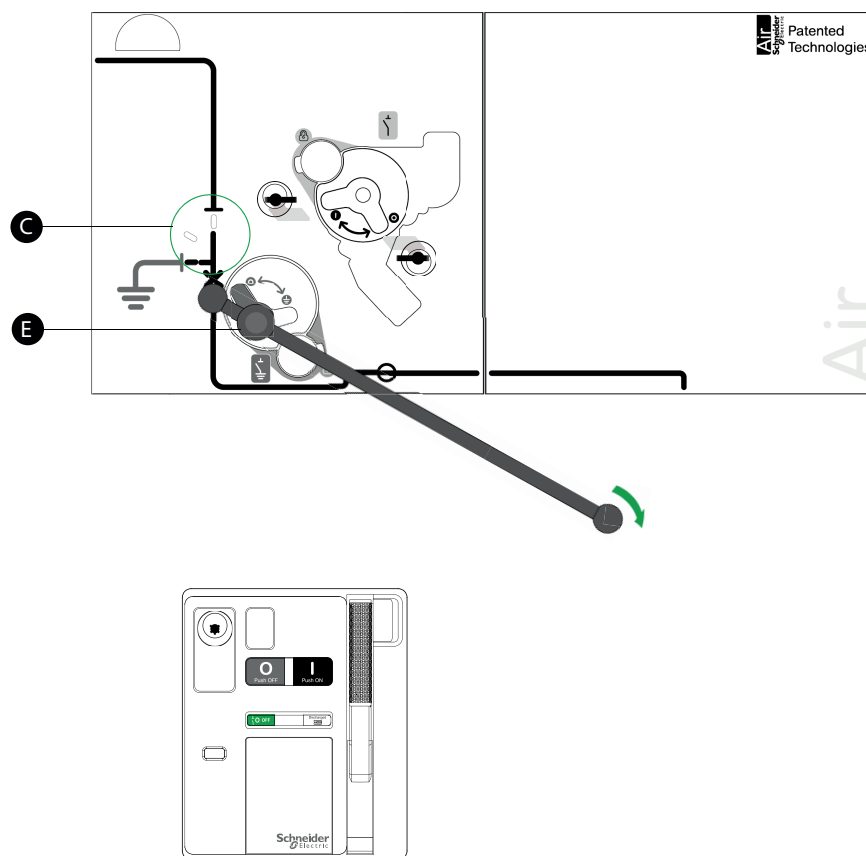
- a. Release the key from circuit breaker lock (**F**) with a 1/4 turn anti-clockwise.
- b. Insert the key vertically in lock (**D**). The key automatically makes a 1/4 turn anti-clockwise.



3. Open the disconnecter as follows:
 - a. Insert the operating lever in the line disconnecter command (**A**).
 - b. Turn anti-clockwise.
 - c. Check that the disconnecter position indicator (**C**) shows the open position.



4. Earth the disconnecter as follows:
 - a. Insert the operating lever in the earthing disconnecter command (**E**).
 - b. Turn clockwise.
 - c. Check that the disconnecter position indicator (**C**) shows the earth position.



Final state:

- The disconnecter position indicator (**C**) is in earth position.
- The circuit breaker is open (**J**) and discharged (**K**).
- The captive key is in lock (**D**).
- The free key is in lock (**B**).

The door can be open.

⚠ CAUTION

HAZARD OF INAPPROPRIATE HANDLING

When the door is open:

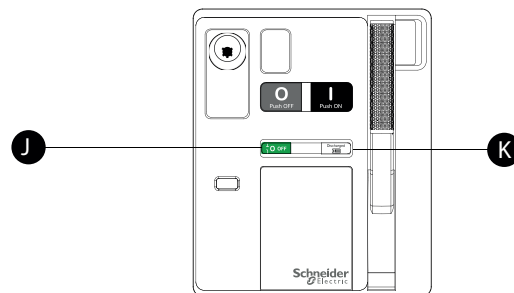
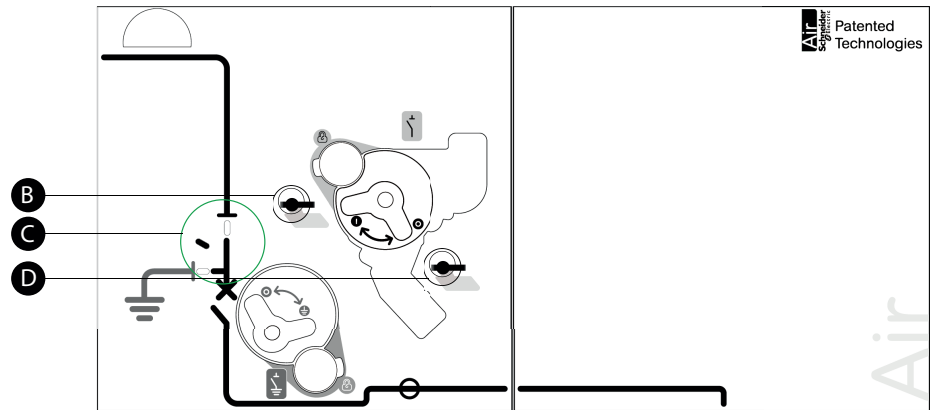
- Wear the appropriate personal protective equipment (PPE).
- Do not touch the circuit breaker mechanism.

Failure to follow these instructions can result in injury or equipment damage.

Off-Load Operations for DMVL-A / D / S Cubicles

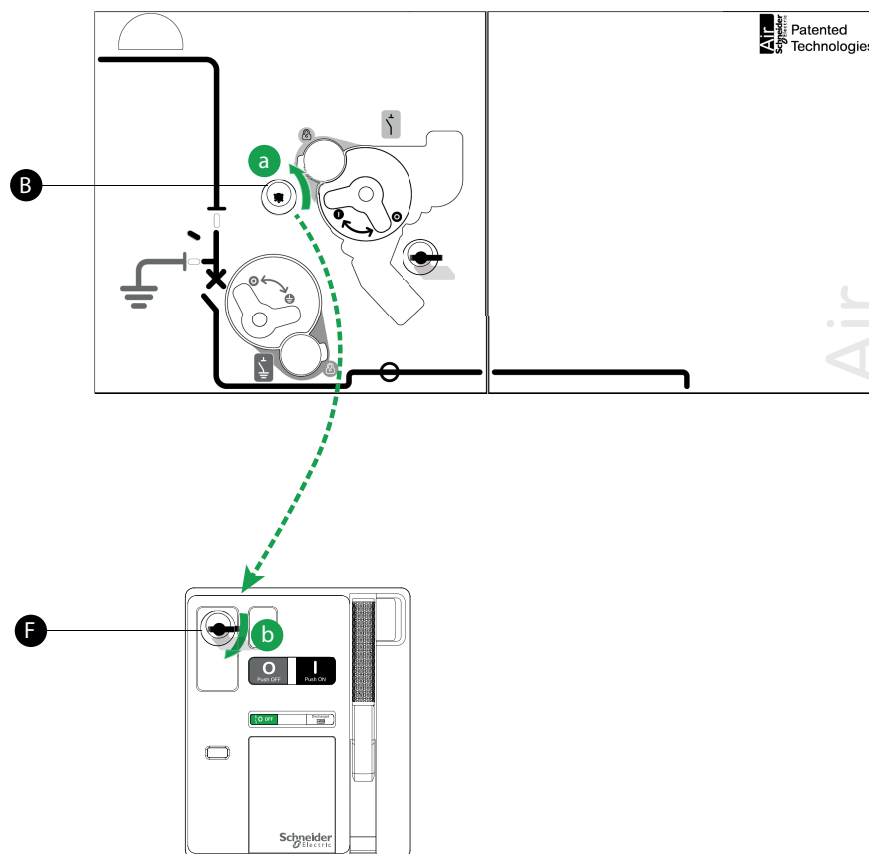
Initial state:

- The disconnecter position indicator (**C**) is in earth or open position.
- The circuit breaker is open (**J**) and discharged (**K**).
- The captive key is in lock (**D**).
- The free key is in lock (**B**).



1. Move the key from the disconnecter to the circuit breaker as follows:

- a. Release the key from lock **(B)** with 1/4 turn anti-clockwise.
- b. Insert the key horizontally in the circuit breaker lock **(F)**. Make 1/4 turn clockwise.



2. Operate the circuit breaker as follows:

- a. Pull down the charging handle **(L)** several times until the lever stops being maneuverable.
- b. Press the circuit breaker **Push ON** button **(H)** to close it. Refer to Step 4, page 40
- c. Press the circuit breaker **Push OFF** button **(G)** to open it. Refer to Step 1, page 42

⚠ CAUTION

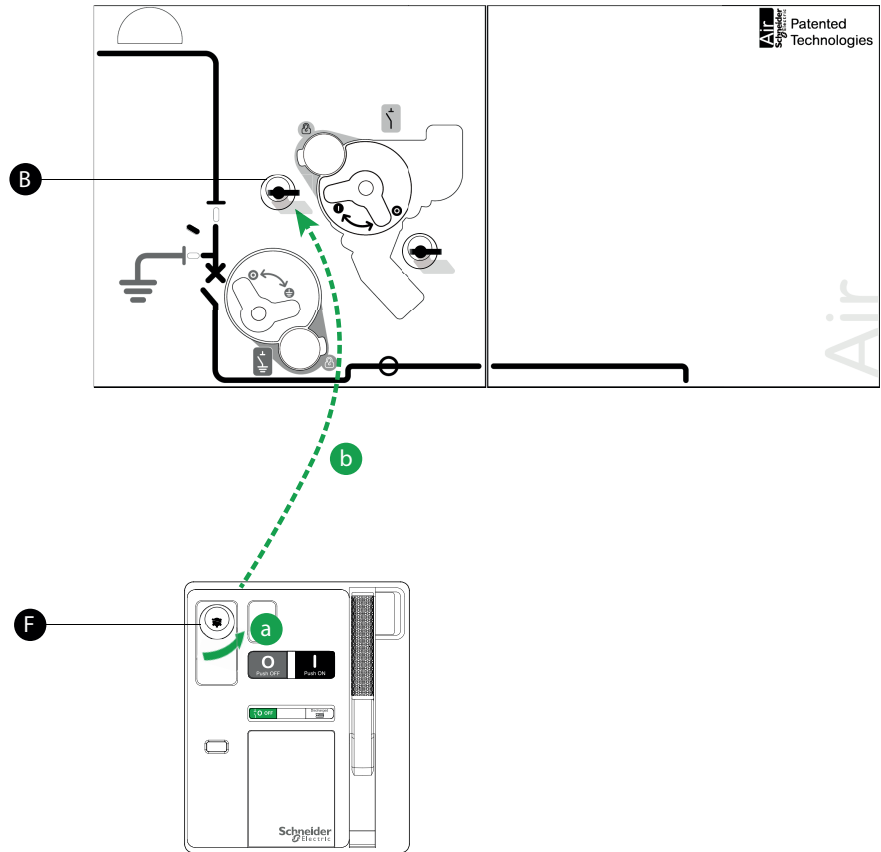
HAZARD OF INAPPROPRIATE HANDLING

If the door is open:

- Wear the appropriate personal protective equipment (PPE).
- Do not touch the circuit breaker mechanism.

Failure to follow these instructions can result in injury or equipment damage.

3. Move the key from the circuit breaker to the disconnect as follows:
- Release the key from lock (**F**) with 1/4 turn anti-clockwise.
 - Insert the key in the lock (**B**). The key automatically makes a 1/4 turn clockwise.



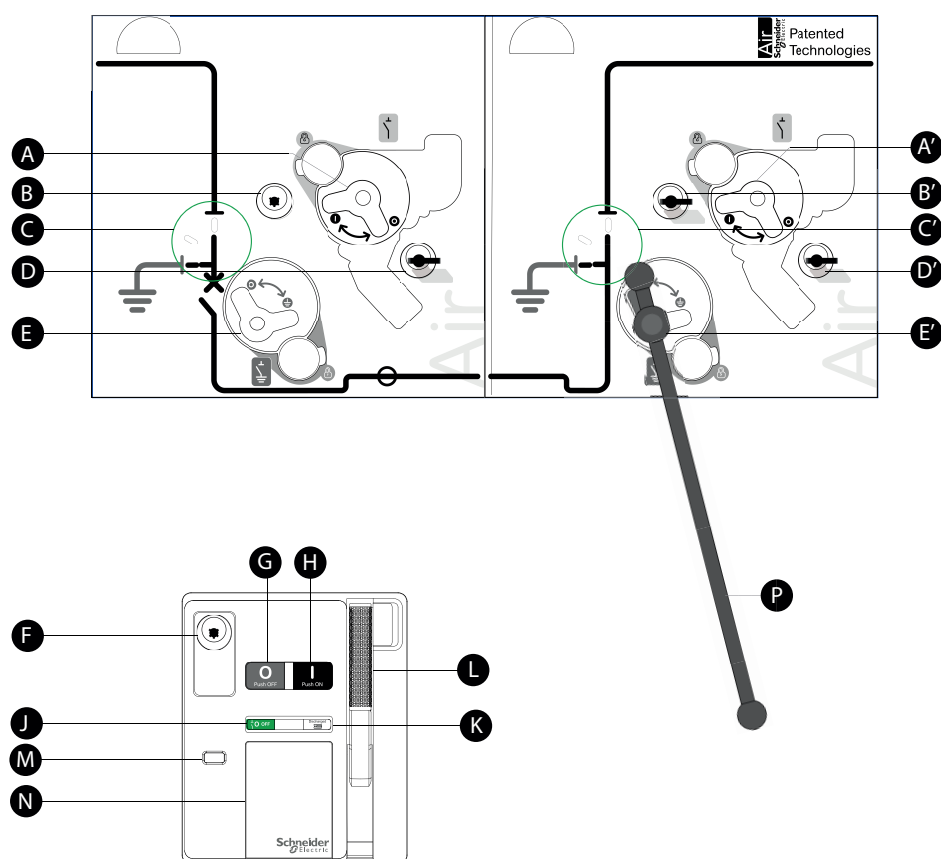
Operating DM2 Cubicle with EvoPacT Vacuum Circuit Breaker

Description of the EvoPacT Circuit Breaker and the Operating Mechanism

The DM2 cubicle is a circuit breaker cubicle composed of two disconnectors and a vacuum circuit breaker.

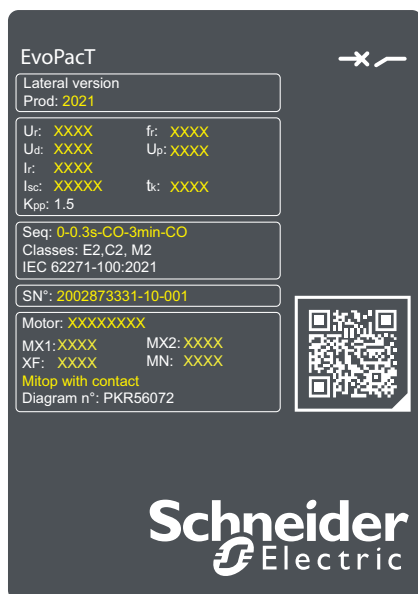
The EvoPacT™ vacuum circuit breaker enables the device to switch and helps to protect the distribution networks. When the EvoPacT vacuum circuit breaker is installed on a medium voltage cubicle, it helps to protect the downstream components from a short-circuit.

Description



Part	Left side	Right side	Item	Function
Disconnecter	A	A'	Line disconnecter command	Insert the lever to operate the disconnecter.
	B	B'	Open position lock	Lock the disconnecter in the open position.
	C	C'	Disconnecter position indicator (earth/open/closed)	Show the disconnecter position.
	D	D'	Closed position lock	Lock the disconnecter in the closed position.
	E	E'	Earthing disconnecter command	Insert the lever to operate the earthing disconnecter.
EvoPacT vacuum circuit breaker, page 51	F		Circuit breaker lock	Lock the circuit breaker in the open position.
	G		Push OFF button	Power off the circuit breaker.
	H		Push ON button	Power on the circuit breaker.
	J		Status OFF:  ON: 	Show the status of the circuit breaker: open or closed.
	K		Charging status bar Charged:  Charged:  Discharged: 	Show the status of the charging operation. The mechanism closing spring is charged. The mechanism closing spring is charged. The mechanism closing spring is discharged.
	L		Charging handle	Charge the circuit breaker.
	M		Operation counter	Count the open/close cycle.
	N		Nameplate, page 51	Provide the circuit breaker characteristics.
Accessories	P		Operating lever	Operate the disconnecter.

EvoPacT Circuit Breaker Nameplate



The data in yellow depends on the product ordered.

Prod: year of production	
Ur: rated voltage	fr: rated frequency
Ud: rated short duration power frequency withstand voltage	Up: rated lightning impulse withstand voltage
Ir: rated normal current	—
Isc: rated short-circuit breaking current	—
Kpp: rated first pole-to-clear factor	tk: rated duration of short-circuit
Seq: rated operating sequence	
Classes: E2, C2, M2: classes of electrical endurance and of mechanical endurance	
IEC 62271-100:2021: standard with date of issue	
SN: Serial Number	
Motor: motor type	—
MX1: first trip release	MX2: second trip release
XF: closing release	MN: undervoltage release
Mitop with contact: empty if no Mitop	
Diagram n°: PKR56072: Electrical diagram	

EvoPacT Circuit Breaker Combination of Indicators

Circuit breaker indicators		Electrical status	Status description
Main contact-position indicator	Charging status bar		
			The circuit breaker is open. The mechanism is discharged.
			The circuit breaker is open. The mechanism is charged. The circuit breaker cannot be closed.
			The circuit breaker is open. The mechanism is charged. The circuit breaker is ready to closed.
			The circuit breaker is closed. The mechanism is discharged.
			The circuit breaker is closed. The mechanism is charged.

Terminology

- **Captive key:** captive keys are only released after a specific sequence of actions. They help prevent the movement of mechanical parts and the operation of the device when not appropriate.
- **Free key:** free keys are released with a turn.

Note About the Keys

- The disconnecter locks (**B**) and (**D'**) are identical and use the same key.

- The disconnector locks (**B'**) and (**D**), and the circuit breaker lock (**F**) are identical and use the same key.

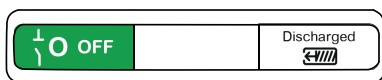
Operating the Lever

Refer to Operating Lever, page 16.

Energizing DM2 Cubicle with EvoPacT Vacuum Circuit Breaker

Initial state:

- The disconnecter position indicators (**C**) and (**C'**) are in earth position.
- The circuit breaker is open (**J**) and discharged (**K**).

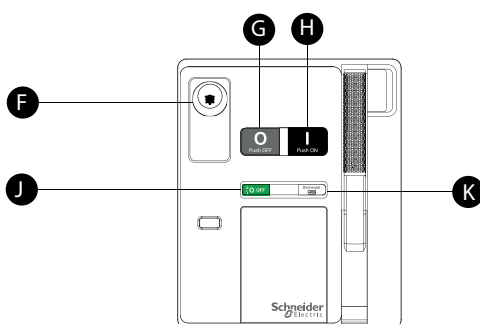
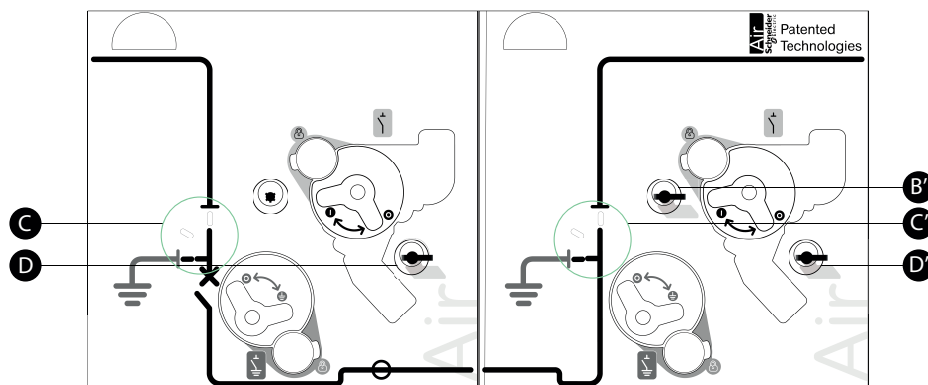


- The two captive keys are in locks (**D**) and (**D'**).
- The free key is in lock (**B'**).

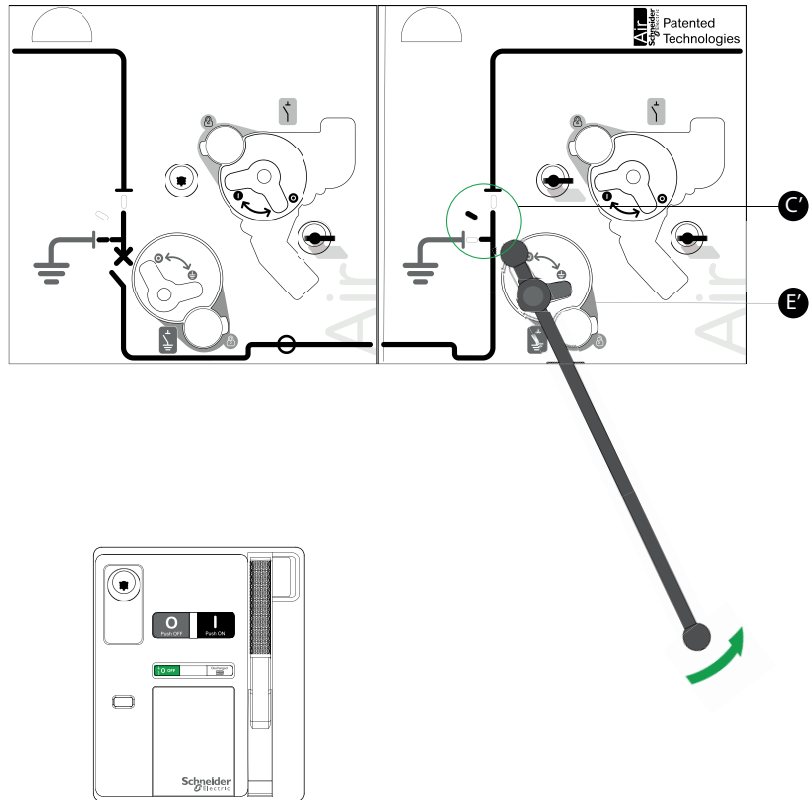
NOTE: If the free key is not in (**B'**), the key is in (**F**).

To release the key from (**F**):

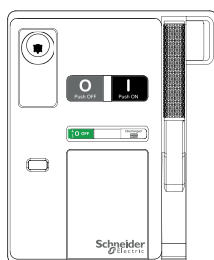
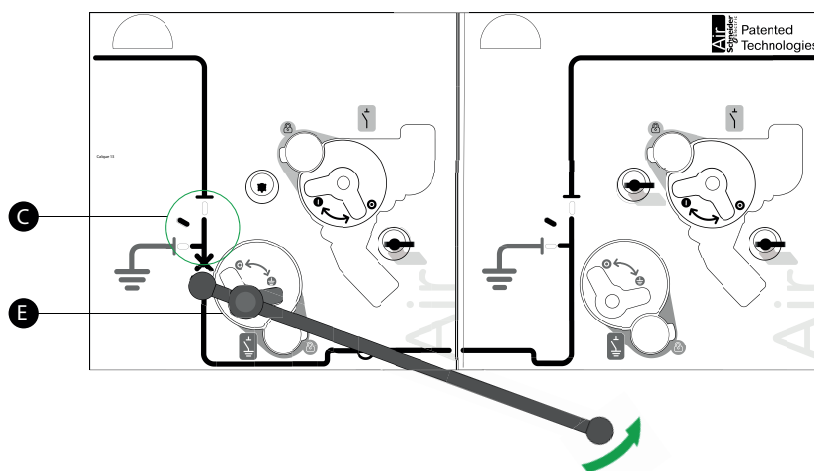
If	Then
The circuit breaker is open and discharged	Remove the key from (F) directly or with 1/4 turn anti-clockwise. Insert the key in (B').
The circuit breaker is closed and discharged	1. Press the circuit breaker Push OFF button (G). 2. Turn the key in (F) 1/4 turn anti-clockwise. 3. Remove the key and insert the key in (B').
The circuit breaker is closed and charged	1. Press the circuit breaker Push OFF button (G). 2. Press the circuit breaker Push ON button (H). 3. Press the circuit breaker Push OFF button (G). 4. Turn the key in (F) 1/4 turn anti-clockwise. 5. Remove the key and insert the key in (B').



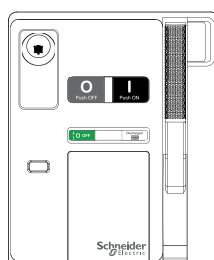
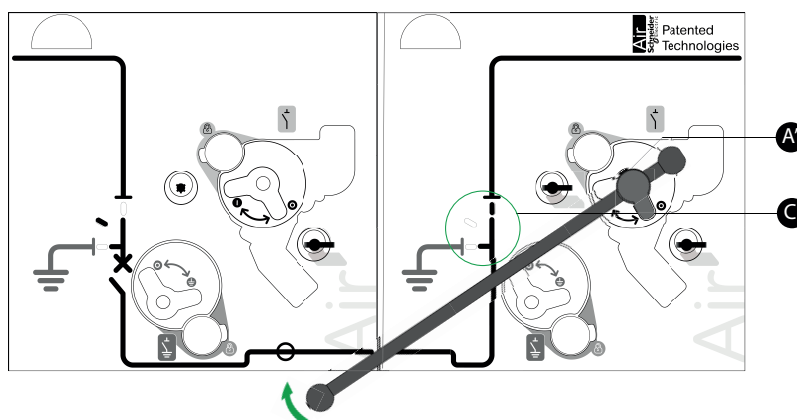
1. Open the disconnecter on the right as follows:
 - a. Insert the operating lever in the earthing disconnecter command (**E'**).
 - b. Turn anti-clockwise.
 - c. Check that the disconnecter position indicator (**C'**) shows the open position.



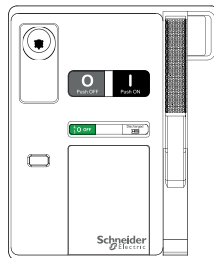
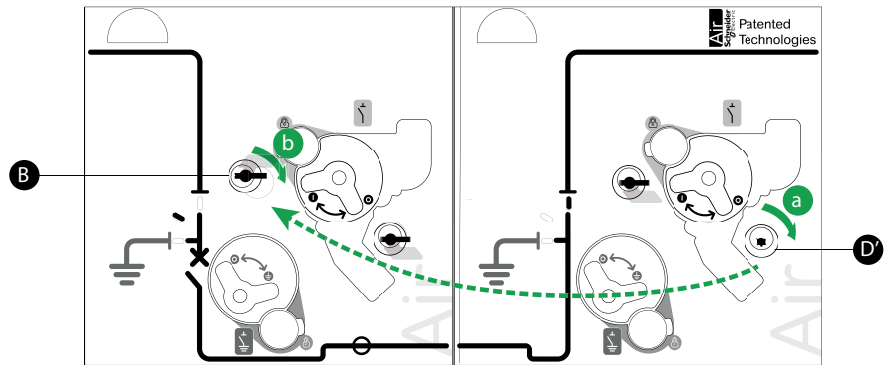
2. Open the disconnecter on the left as follows:
 - a. Insert the operating lever in the earthing disconnecter command (**E**).
 - b. Turn anti-clockwise.
 - c. Check that the disconnecter position indicator (**C**) shows the open position.



3. Close the disconnecter on the right as follows:
 - a. Insert the operating lever in the line disconnecter command (**A'**).
 - b. Turn clockwise.
 - c. Check that the disconnecter position indicator (**C'**) shows the closed position.

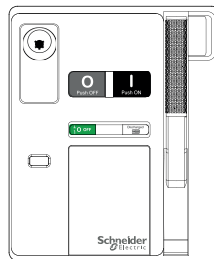
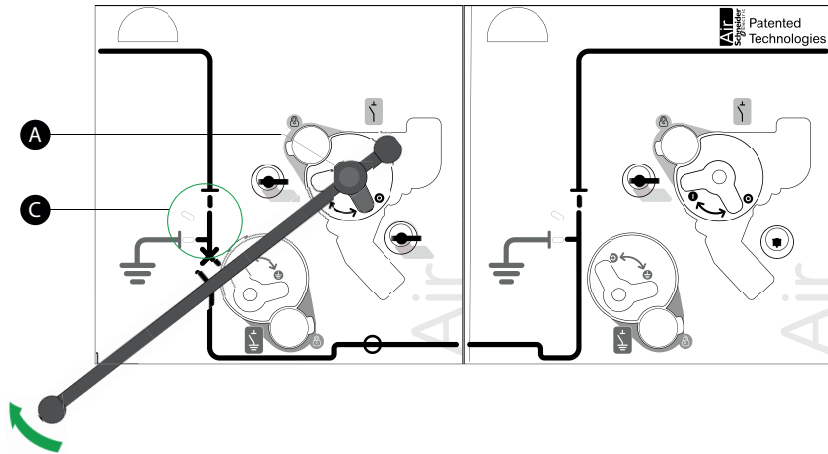


4. Move the key on the disconnect as follows:
- Release the key from lock (**D'**) with 1/4 turn clockwise.
 - Insert the key in lock (**B**). The key automatically makes a 1/4 turn.

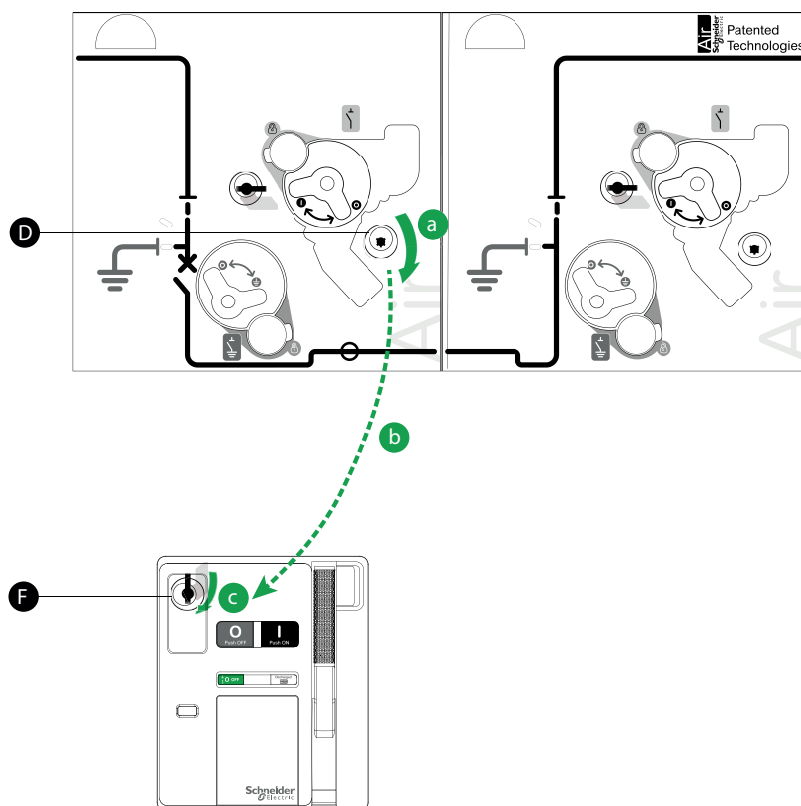


5. Close the disconnecter on the left as follows:

- a. Insert the operating lever in the line disconnecter command (**A**).
- b. Turn clockwise.
- c. Check that the disconnecter position indicator (**C**) shows the closed position.

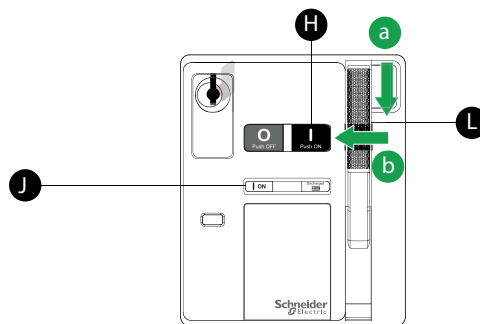
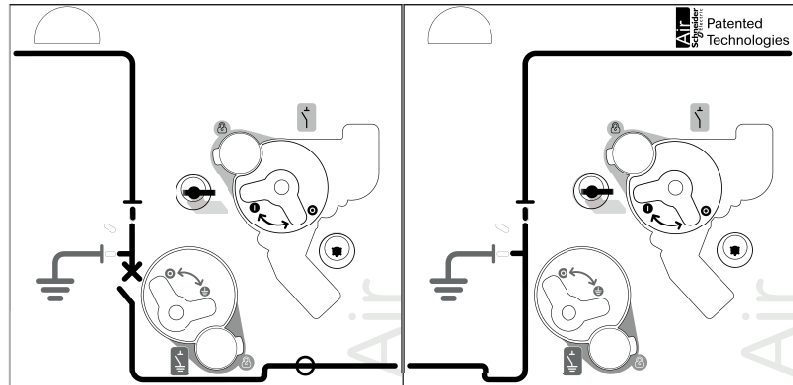
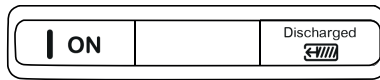


6. Move the key from the disconnecter to the circuit breaker as follows:
- Release the key from lock (D) with 1/4 turn clockwise.
 - Insert the key horizontally in the circuit breaker lock (F).
 - Make 1/4 turn clockwise.



7. Close the circuit breaker as follows:

- Pull down the circuit breaker lever (**L**) several times until the lever stops being maneuverable.
- Press the circuit breaker **Push ON** button (**H**).
- Check that the circuit breaker status bar (**J**) shows the closed position.



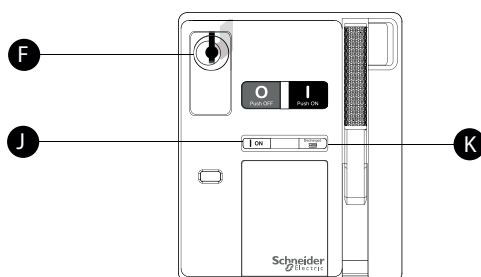
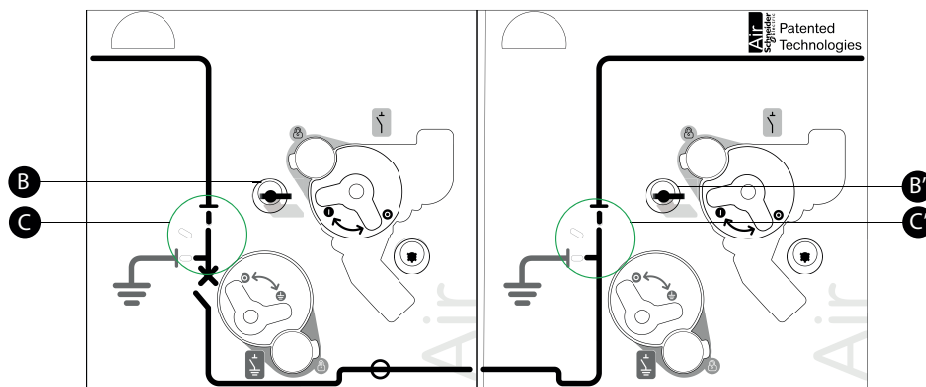
Final state:

- The disconnecter position indicators (**C**) and (**C'**) are in closed position.
- The circuit breaker is closed (**J**) and discharged (**K**).
- The 3 keys are captive in locks (**B**), (**B'**), and in circuit breaker lock (**F**).

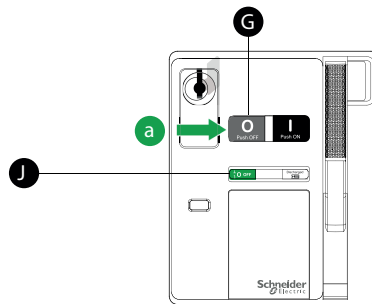
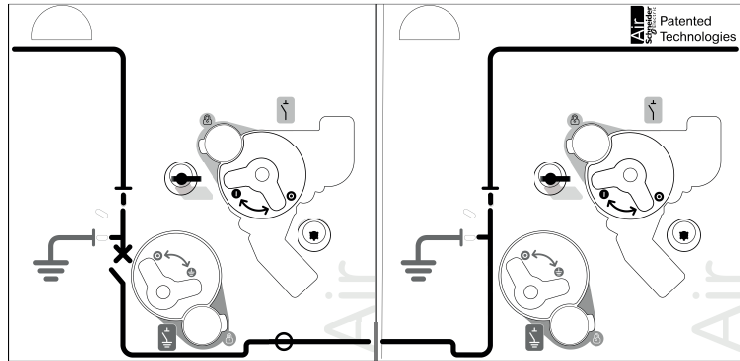
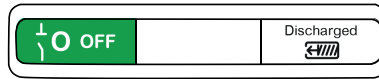
De-Energizing DM2 Cubicle with EvoPacT Vacuum Circuit Breaker

Initial state:

- The disconnecter position indicators (**C**) and (**C'**) are in closed position.
- The circuit breaker is closed (**J**) and discharged (**K**).
- The 3 keys are captive in locks (**B**), (**B'**), and in circuit breaker lock (**F**).

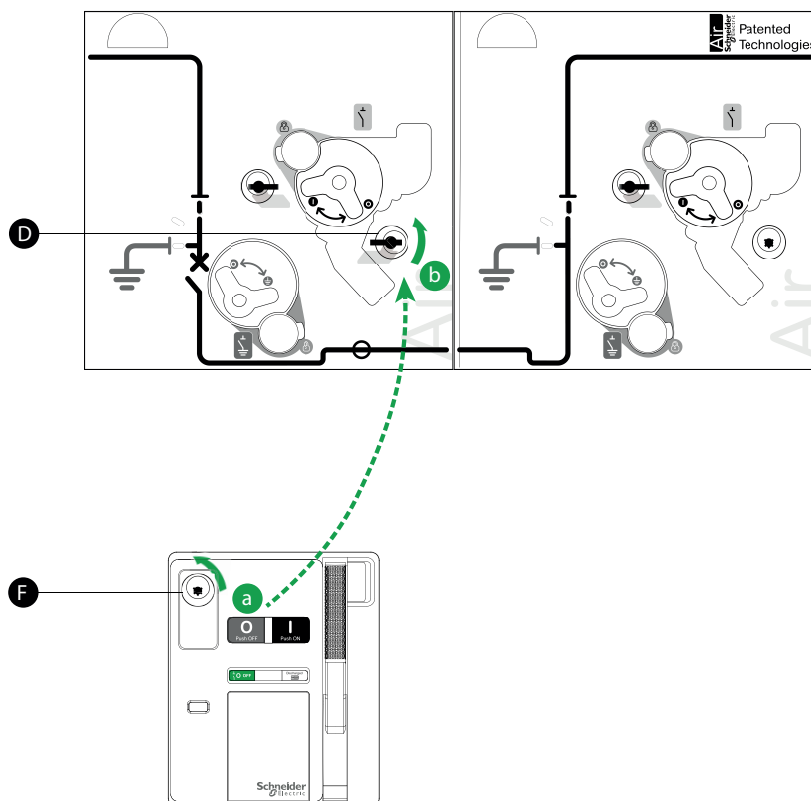


1. Open the circuit breaker as follows:
 - a. Press the circuit breaker **Push OFF** button (G).
 - b. Check that the circuit breaker status bar (J) shows the open position.

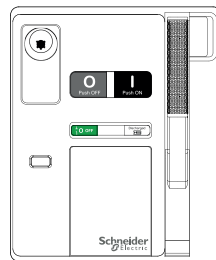
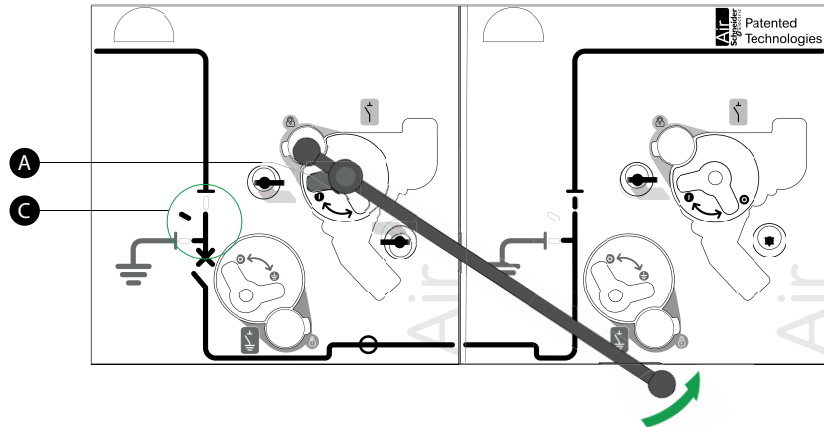


2. Move the key from the circuit breaker to the disconnecter as follows:

- a. Release the key from circuit breaker lock (**F**) with a 1/4 turn anti-clockwise.
- b. Insert the key vertically in lock (**D**). The key automatically makes a 1/4 turn anti-clockwise.

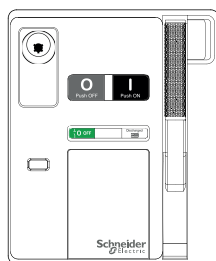
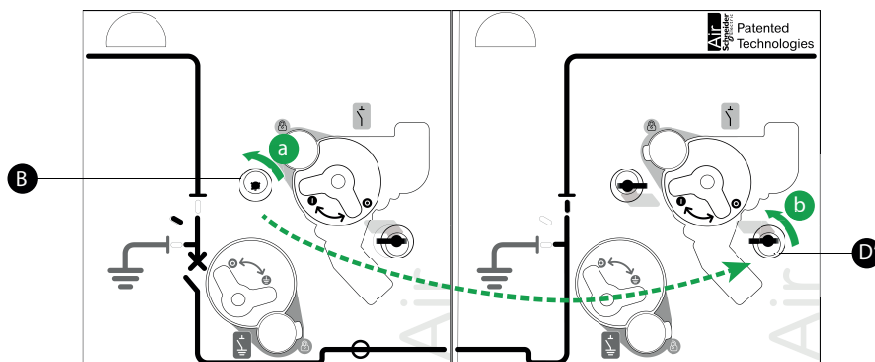


3. Open the disconnecter on the left as follows:
 - a. Insert the operating lever in the line disconnecter command (**A**).
 - b. Turn anti-clockwise.
 - c. Check that the disconnecter position indicator (**C**) shows the open position.

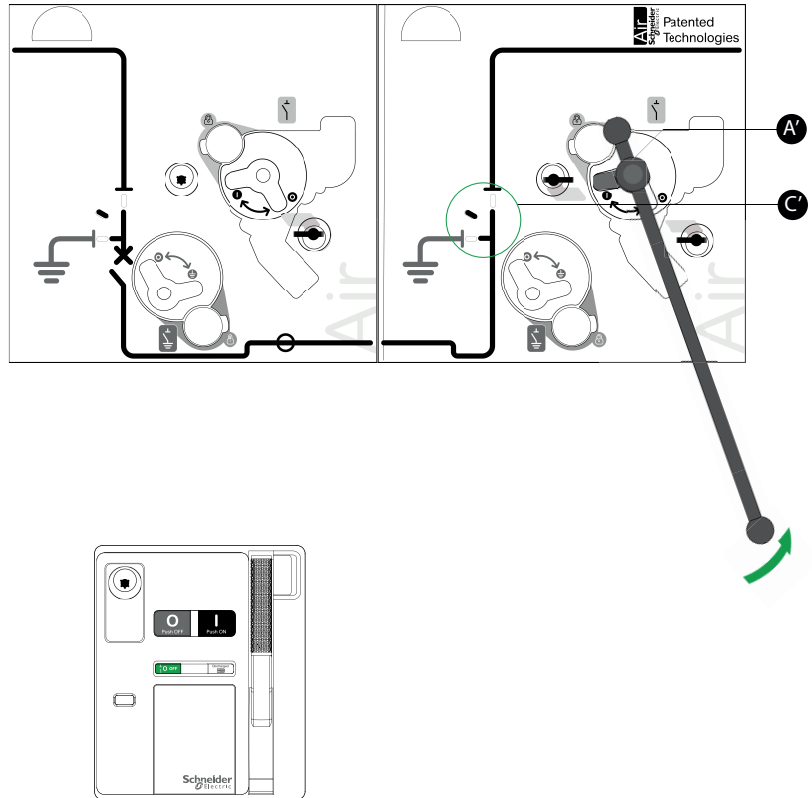


4. Move the key on the disconnect as follows:

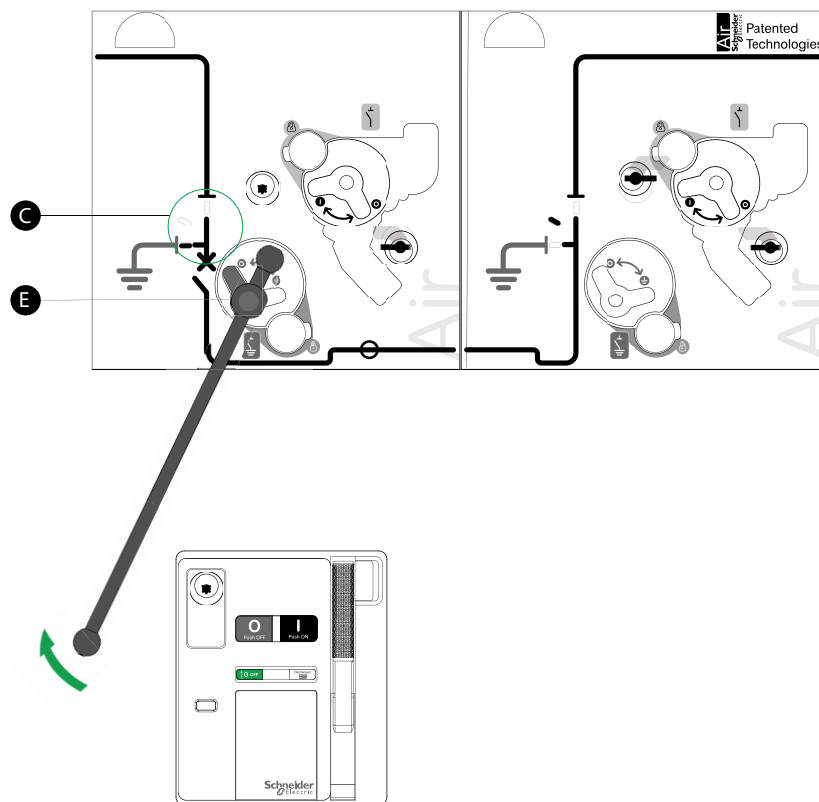
- a. Release the key from lock **(B)** with 1/4 turn anti-clockwise.
- b. Insert the key in lock **(D')**. The key automatically makes a 1/4 turn anti-clockwise.



5. Open the disconnecter on the right as follows:
- Insert the operating lever in the line disconnecter command (**A'**).
 - Turn anti-clockwise.
 - Check that the disconnecter position indicator (**C'**) shows the open position.

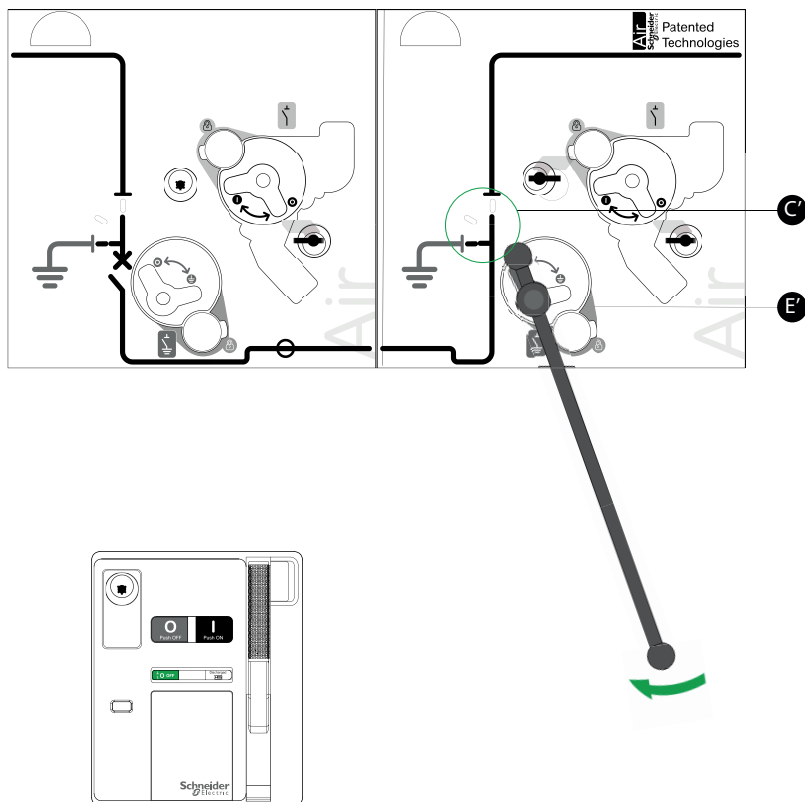


6. Earth the disconnector on the left.
 - a. Insert the operating lever in earthing disconnector command (**E**).
 - b. Turn clockwise.
 - c. Check that the disconnector position indicator (**C**) shows the earth position.



7. Earth the disconnecter on the right as follows:

- Insert the operating lever in earthing disconnecter command (**E'**).
- Turn clockwise.
- Check that the disconnecter position indicator (**C'**) shows the earth position.



Final state:

- The disconnecter position indicators (**C**) and (**C'**) are in earth position.
- The circuit breaker is open (**J**) and discharged (**K**).
- The two captive keys are in locks (**D**) and (**D'**).
- The free key is in lock (**B'**).

The door can be open.

⚠ CAUTION
HAZARD OF INAPPROPRIATE HANDLING When the door is open: • Wear the appropriate personal protective equipment (PPE). • Do not touch the circuit breaker mechanism. Failure to follow these instructions can result in injury or equipment damage.

Locking with Padlocks (Optional)

Introduction to Padlocking

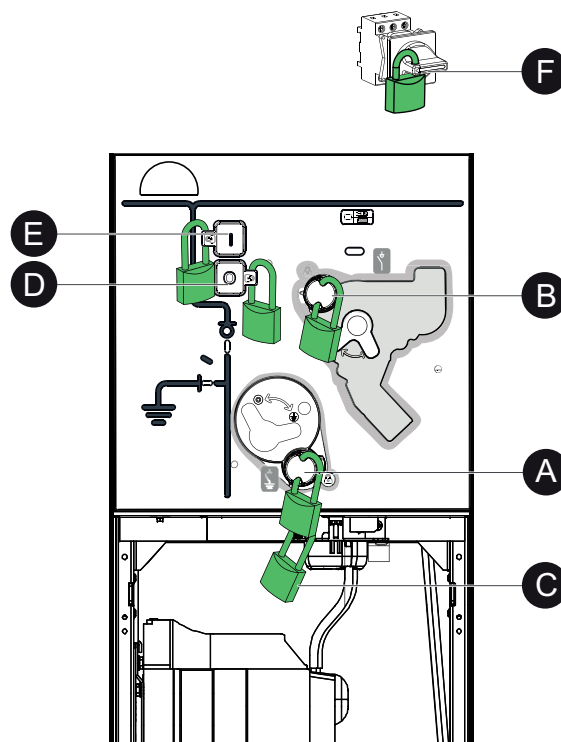
For security purposes, local operations of the equipment can be prohibited by using padlocks with shackle diameter between 6 mm and 8 mm.

The padlocks are used for local consignment and can, in some cases, lock the remote operation of the motorized operating mechanism.

When the front panel is removed, you can prohibit reinstallation by using a padlock.

Padlocks are not supplied.

Padlocks can be installed on the following items:



A. Shutter blanking for the earthing switch.

B. Shutter blanking for the switch-disconnector.

C. Front panel (access to the cable compartment).

D. Opening push button.

E. Closing push button.

F. Motor On/Off button (if present).

If it is required to put several padlocks, you can use a multi-padlock accessory (not supplied by Schneider Electric). The hasp of the padlock which passes through the part to be padlocked, must have a diameter of between 6 to 8 mm, or a section between 6 x 6 to 8 x 8 mm.

Position of Padlocks according to Operating Mechanism

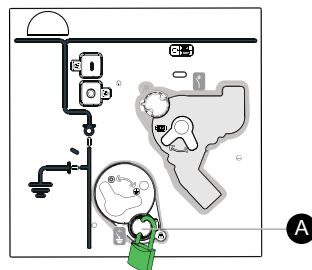
Operating mechanism	Padlock position					
	A	B	C	D	E	F
CDT / CDTS	X	X	X	—	—	—
CD1	X	X	X	X	—	—
CD2	X	X	X	X	X	X

Padlocking the Earthing Switch

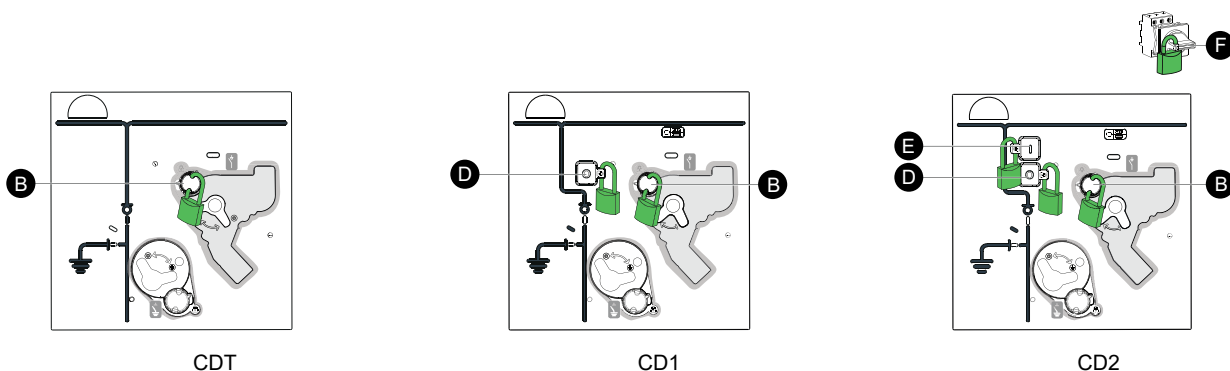
Padlocking the earthing switch helps prevent the following operations:

- The three-position earthing switch.
- The downstream earthing switch (for CDTS operating mechanism).

The earthing switch can be padlocked on (A) in open or closed position.



Padlocking the Switch-Disconnecter



NOTICE

HAZARD OF REMOTE OPERATION

In case of a remote operation after padlocking the switch-disconnector, refer to the new position of the switch-disconnector in the table to put another padlock if needed.

Failure to follow these instructions can result in equipment damage.

For Manual Operating Mechanism

Operating Mechanism	Switch-disconnector position	Function to be prohibited	Padlock position	Possible remote operation after padlocking
CDT / CDTS	Open	Closing of the switch	B	—
	Closed	Opening of the switch		—
CD1	Open	Closing of the switch	D	No
	Closed	Opening of the switch		Yes
CD2	Open and spring discharged	Spring charging, then, Closing of the switch	B	Yes
	Open and spring charged	Closing of the switch	E	Yes
		Off-load operation	D	Yes
	Closed	Opening of the switch	D	Yes

NOTICE**HAZARD OF INCORRECT OPERATION**

Do not padlock the shutter blanking of the switch if the gear is assembled.

Failure to follow these instructions can result in equipment damage.

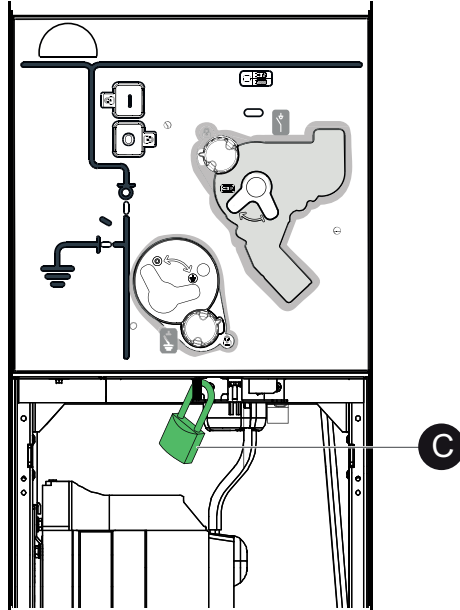
For Motorized Operating Mechanism

Operating Mechanism	Switch-disconnector position	Function to be prohibited	Padlock position Installation steps required	Possible remote operation after padlocking
CDT	Open	Closing of the switch	1. Remove the gear. ¹ 2. Put padlock on B	No
	Closed	Opening of the switch	1. Remove the gear. ¹ 2. Put padlock on B	No
CD1	Open	Closing of the switch	1. Remove the gear. ¹ 2. Put padlock on B	No
	Closed	Opening of the switch	D	Yes
CD2	Open and spring discharged	Spring charging, then, Closing of the switch	1. Put padlock on F (inhibits electrical charging) 2. Put padlock on B (inhibits mechanical charging)	No
	Open and spring charged	Closing of the switch	E	Yes
		Off-load operation	D	Yes
	Closed	Opening of the switch	D	Yes

(1) Refer to the instruction sheet *JYT6198401* for description of the gear removing.

Padlocking the Front Panel

The padlock (C), installed on the front panel interlock, helps prevent the reinstallation of the front panel.

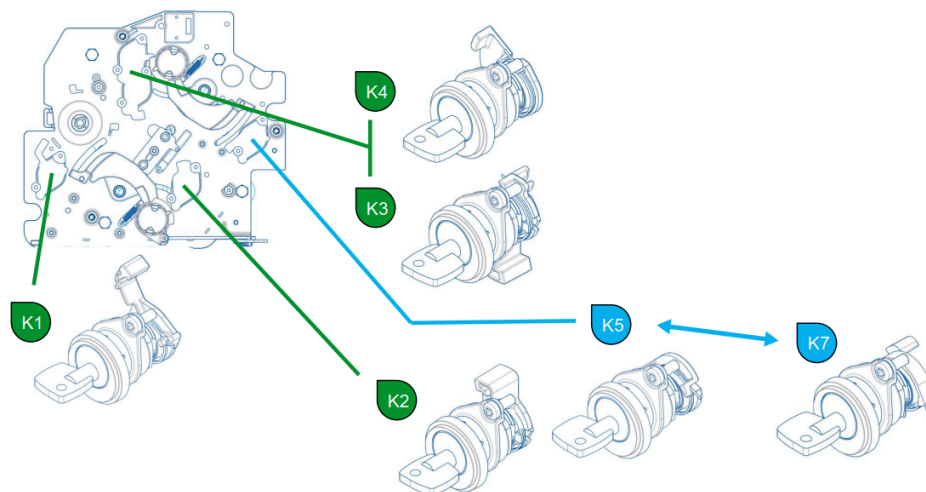


Locking with Keylocks (Optional)

The switch-disconnector and earthing switch can be locked using keylocks.

Keylock supports and cams are supplied by Schneider Electric. Keylocks and keys are not supplied and shall be ordered separately in accordance with the complete switchboard keylocking.

Refer to *Keylock installation and operation instructions* (reference JYT4515901) to install a keylock on the operating mechanism. If the keylock option was not specified with the order, contact Schneider Electric.



Function	IM	IM & QM		DMVL
Operating mechanism	CDT	CD1	CD2	CDTS
K1. Keylock Earthing switch in closed position	X	X	X	X
K2. Keylock Earthing switch in open position	X	X	X	X
K3. 1 st Keylock switch-disconnector on open position	X	—	—	X
K4. 2 nd Keylock switch-disconnector in open position	X	—	—	X
K5. Keylock switch-disconnector in closed position	X	—	—	X
K7. Keylock switch-disconnector in open position	—	X	X	—

Operating Safety

- Operations of the disconnecter are impossible when the circuit breaker is closed.
- Line disconnecter is in the open or closed position.
It is impossible to remove the front panel.

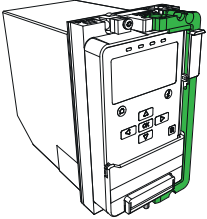
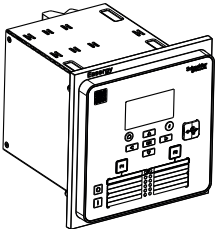
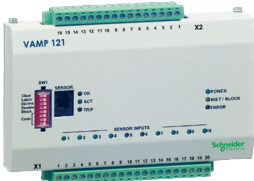
NOTE: The front panel can only be removed or fitted when the line disconnecter is in the earth position.

NOTE: Once the front panel has been removed, you can move the line disconnecter to the open position. However, you cannot move it to the closed position.

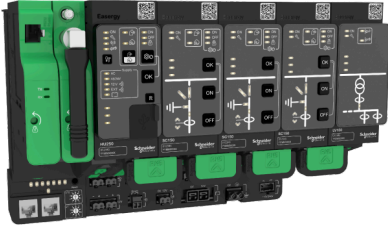
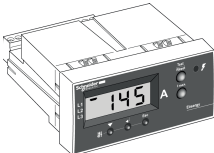
Protection, Monitoring and Control

Cubicles can be equipped with various optional equipment for protection, monitoring and control. The tables below provide a non-exhaustive list of these options. For more information, refer to the references in the tables below, and the Schneider Electric website.

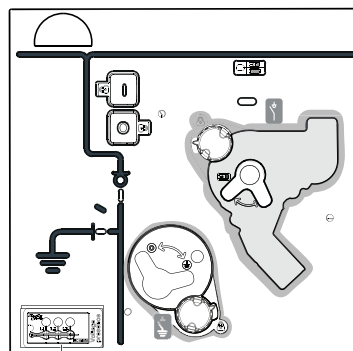
Protection

		Document reference
Easergy P5		User Manual P5/EN M/44A For more information, refer to the catalog NRJED313567EN.
Easergy P3		For more information, refer to the catalog NRJCAT17764EN.
SEPAM		For more information, refer to the catalog SEPED303005EN-08.
Easergy VAMP		User manual VAMP 221: V221/EN M/B021 User manual VAMP 321: V321/EN M/D011
VIP Relays: VIP 40/45 and VIP400/410		User manual VIP 40/45: NRJED311207EN User manual VIP 400/410: NRJED311206EN

Monitoring and Control

		Document reference
Easergy TH110		Quick Start Guide MFR7128801 Installation and Operation Manual NVE62740
Easergy CL110		Installation and Operation Manual QGH40088
Easergy T300		User Manual NT00378
Easergy Flair 2xD		Data sheet GDE70881 providing links to user manual

Unit with Voltage Presence/Detection Indicating System (VPIS/VDIS)



A
A. VPIS/VDIS

VPIS/VDIS Presentation

VPIS (Voltage Presence Indicating System) / **VDIS** (Voltage Detection Indicator System): provides indication of MV voltage presence with 3 built-in LEDs.

Identify the **VPIS/VDIS** version installed in the unit.

VPIS-V2 / VPIS-V2-VO



VPIS-V3 / VPIS-V3-VO



VDIS



VPIS: complying with IEC 62271-206, relative to voltage presence indicating systems.

VDIS: complying with IEC 62271-213, relative to voltage presence indicating systems

⚡ ⚠ DANGER

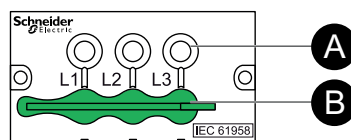
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not rely only on the indication provided by a VPIS/VDIS to check that the system is de-energized.

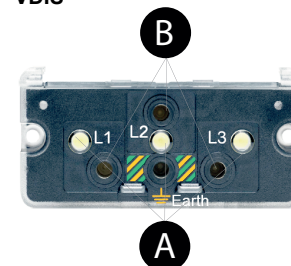
Failure to follow these instructions will result in death or serious injury.

NOTE: When the ambient lighting is particularly bright, it may be necessary to improve visibility by protecting the indication.

VPIS



VDIS



A. Voltage presence indicator light (one for each phase)

B. Connection point designed for phase concordance unit (one for each phase)

Voltage Presence Detection and Phase Concordance

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Check voltage presence detection with one of the following device:

- a VPIS, by following the test procedure *NT0021401 – VPIS Phase Concordance Unit and Test*.
- a VDIS, by following the test procedure *PKR8700602 – VDIS Phase concordance Unit and Test Notice*

Failure to follow these instructions will result in death or serious injury.

NOTICE

HAZARD OF INCORRECT OPERATION CONDITIONS

Check correct phase concordance according to one of the following device:

- a VPIS, by following the test procedure *NT0021401 – VPIS Phase Concordance Unit and Test*.
- a VDIS, by following the test procedure *PKR8700602 – VDIS Phase concordance Unit and Test Notice*.

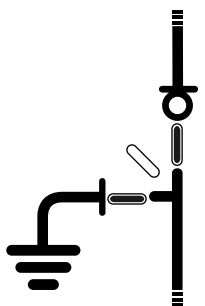
Failure to follow these instructions can result in equipment damage.

Maintenance

Discharging a CD2 Operating Mechanism when the Switch-Disconnecter is in Open Position

Discharging the spring energy of the CD2 operating mechanism is required for maintenance operations.

Initial Conditions



Switch-disconnector Open



Spring charged

Recommended Operation

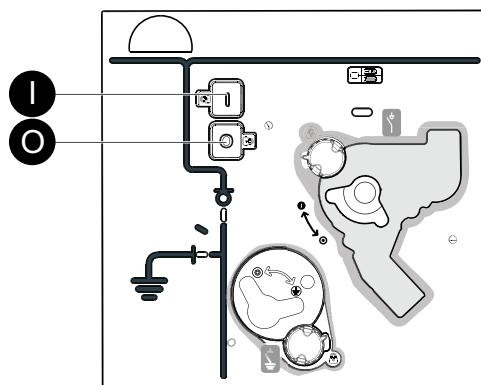
⚠ WARNING

HAZARD OF INCORRECT OPERATION

Discharge operation must be carried out with the switchboard out of service (de-energized).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Close the switch with push button **I** then open it with the push button **O**.



Alternative Operation

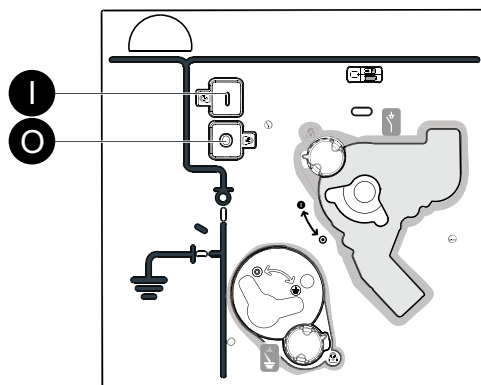
⚠ CAUTION

HAZARD OF DAMAGE TO OPERATING MECHANISM

- Discharge the spring energy of a CD2 operating mechanism only when strictly necessary.
- This discharging operation is limited to a maximum of 50 operations.

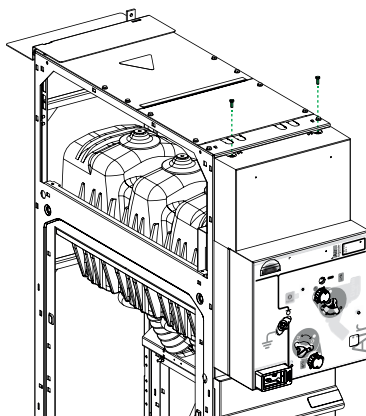
Failure to follow these instructions can result in injury or equipment damage.

Press the Opening push button **O**.

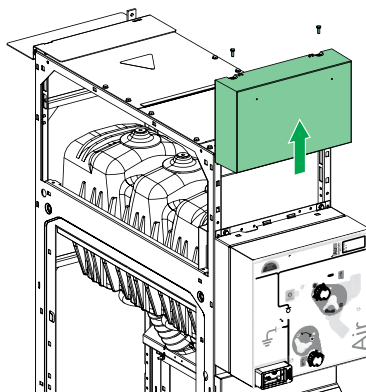


Removing the Low Voltage Box Cover

1. Remove the two screws of the LV cover.

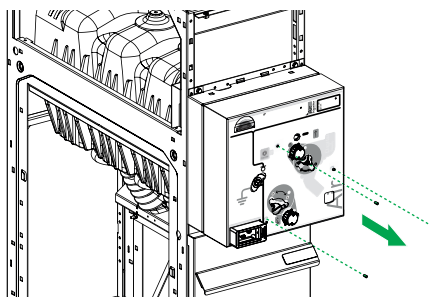


2. Remove the LV cover.

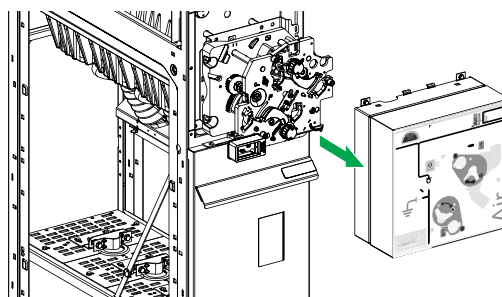


Removing the Front Cover

1. Remove the three screws of the front cover.



2. Remove the front cover.



Maintenance Overview

Introduction

The maintenance organization around SM AirSeT depends mainly by its usage, by the environmental conditions and whether the SM AirSeT is connected or not to the Schneider Electric cloud.

When the SM AirSeT is not connected to the cloud, all the maintenance actions are time based and have a fixed periodicity.

When the SM AirSeT is connected to the cloud, the maintenance periodicity for the manufacturer maintenance is condition-based allowing a periodicity extension of up to 2 years. Considering that assets under monitoring enable live monitoring, the manufacturer maintenance date is rescheduled at the right moment enabling the dynamic condition-based maintenance. This dynamic stage is driven by the Maintenance Index computed in EcoStruxure Asset Advisor.

Preventive Periodic Maintenance

There are three levels of maintenance:

- Routine maintenance, performed yearly
- Intermediate maintenance, performed every 2 years
- Manufacturer maintenance, performed in average every 3 years.

Routine maintenance can be performed by end users, intermediate maintenance can be performed by skilled personnel, such as facility managers and partners.

Manufacturer maintenance is reserved to Schneider Electric After Sale Service.

Manufacturer maintenance periodicity of 3 years is the average in standard operation conditions.

When the intermediate maintenance is executed, the actions for the routine maintenance are also performed. When the manufacturer maintenance is executed, the intermediate maintenance is executed as well.

This periodicity can be reduced depending on environmental conditions, and on equipment usage conditions.

Environmental factors	Normal all criteria to be fulfilled	Severe from one criterion checked
Temperature average annual around / out of switchboard	$T^{\circ} < 35^{\circ}\text{C}$	$T^{\circ} > 35^{\circ}\text{C}$
Humidity relative	$H < 85\%$	$H > 85\%$
Salinity site distance from seaside & room with no protected atmosphere	Low salt mist $D > 10\text{km}$	High salt mist $D < 10\text{km}$
Dust Level of dust depending on the presence of a filtration and/or ventilation system	Low level of dust with a filtration and/or ventilation system	High level of dust with No filtration/ventilation system
Maintenance cycle	$T = 3 \text{ years}$	$T = 2 \text{ years}$

Manufacturer Maintenance when Connected to the Cloud

If SM AirSeT product is connected to Schneider Electric cloud, it is monitored in live.

The manufacturer maintenance is then scheduled at the right date depending on the operation conditions.

If SM AirSeT product is connected to Schneider Electric cloud, maintenance periodicity is condition-based allowing a periodicity extension up to 2 years for the Manufacturer maintenance.

This dynamic condition-based maintenance is managed by a "Maintenance index" computed in the Schneider Electric EcoStruxure Asset Advisor cloud. The Manufacturer maintenance interval can be extended to 4 or 5 years depending upon the type of Ecostruxure Asset Advisor:

- **Preventive:** up to 4 years further to operating/services conditions continuously monitored.
- **Predictive:** up to 5 years further to operating/services conditions continuously monitored and asset health computation.

NOTE: Between two manufacturer maintenance, routine and intermediate maintenance are still required.

Maintenance Operations

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA70E or CSAZ462 or local equivalent.
- This equipment must be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before performing maintenance inspections. Assume that all circuits are live until they are de-energized, tested, grounded, and tagged. Consider all sources of power, including the possibility of backfeeding and control power.
- Always use a properly rated voltage sensing device to confirm that power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.
- Beware of potential hazards and carefully inspect the work area for tools and objects that may have been left inside the equipment.

Failure to follow these instructions will result in death or serious injury.

Maintenance operations (routine, intermediate or manufacturer) are listed for each type of cubicle:

- Switch Cubicles, page 82
- Switch-fuse Cubicles, page 84
- Circuit Breaker Disconnectable Cubicles, page 87

Maintenance Tasks for Switch Cubicles

CAUTION

HAZARD OF UNADAPTED CLEANING

Do not use solvents or alcohol for cleaning the equipment.

Failure to follow these instructions can result in injury or equipment damage.

Routine Maintenance (Performed every year)	
Part	Procedure
Whole cubicle	Visual inspection.
	Clean and remove dust.
	Check voltage presence / indication devices.
	Check windows if present (no crack / no tarnishing).
	Operating mechanism compartment visual inspection.
	LV control compartment visual inspection.
	Check keylocks and padlocks if applicable.
Cables compartment	Visual inspection.
Busbars compartment	Visual inspection.
Switch	Check pressure indication if applicable.
	Operate the switch manually.
	Operate the switch electrically if applicable.

Intermediate Maintenance (performed every 2 years)	
Part	Procedure
Whole cubicle	Remove covers (LV compartment, operating mechanism, cables connection).
	Check presence of voltage.
	Operating mechanism compartment visual inspection.
	LV control compartment visual inspection.
	Inspection of enclosure (chalking, cracking, signs of heating).
	Reassemble covers (LV compartment, operating mechanism, cables connection).
Cables compartment	Clean and remove dust.
	Inspection of cables (chalking, heating signs) & connections (tightening, fixing).
	Inspection of voltage transformers (chalking, cracking, signs of heating) if present.
	Inspection of current transformers / toroids (chalking, signs of heating) if present.
	Inspection of cables connection heads.
	Inspection of isolators (chalking, signs of heating).
Busbars compartment	Clean compartment.
	Inspection of enclosure (chalking, cracking, signs of heating).
	Inspection of busbars (signs of heating, tightening).
Switch	Check mechanical operation of the switch.
	Check electrical opening / closing of the switch if applicable.
	Inspection of operating mechanism electrical connections (tightening, fixing), microcontacts.
	Measure spring charging time if applicable.
	Check motorization auxiliary contacts.

Manufacturer Maintenance (performed in average every 3 years)	
Part	Procedure
Whole cubicle	Extended inspection of auxiliaries (weldings, triggers, motors, ...).
	Extended inspection of lockings.
	Extended inspection of latchings.
	Perform a ProDiag Corona diagnosis* to assess the condition of MV devices to detect partial discharges.
Cables compartment	Clean earthing switch operating mechanism mechanical links (do NOT grease).
Switch	Extended Inspection of operating mechanism electrical connections (tightening, fixing), microcontacts.
(*) Schneider Electric proprietary tool: the ProDiag SE Services tool suite is composed of ProDiag Breaker, ProDiag Fuse, and ProDiag Corona. The purpose of each test is listed below: • The purpose of ProDiag Breaker diagnosis is to deeply diagnose the status of the circuit breaker and to detect drifts from its optimum state. • The purpose of ProDiag Fuse diagnosis is to mitigate the outage risks because of undetected premature aging of medium voltage fuses. • The purpose of ProDiag Corona diagnosis is an early detection of insulation deterioration of components in medium voltage switchgear.	

Maintenance Tasks for Switch-Fuse Cubicles

CAUTION

HAZARD OF UNADAPTED CLEANING

Do not use solvents or alcohol for cleaning the equipment.

Failure to follow these instructions can result in injury or equipment damage.

Routine Maintenance (Performed every year)	
Part	Procedure
Whole cubicle	Visual inspection.
	Clean and remove dust.
	Check voltage presence / indication devices.
	Check windows if present (no crack / no tarnishing).
	Operating mechanism compartment visual inspection.
	LV control compartment visual inspection.
	Check keylocks and padlocks if applicable.
Cables and Fuses compartment	Visual inspection.
	Fuse chambers and caps visual inspection.
	Tripping mechanism visual inspection.
Busbars compartment	Visual inspection.
Switch-fuse	Check pressure indication if applicable.
	Operate the switch manually.
	Operate the switch electrically if applicable.

Intermediate Maintenance (performed every 2 years)	
Part	Procedure
Whole cubicle	Remove covers (LV compartment, operating mechanism, cables connection).
	Check presence of voltage.
	Operating mechanism compartment visual inspection.
	LV control compartment visual inspection.
	Inspection of enclosure (chalking, cracking, signs of heating).
	Reassemble covers (LV compartment, operating mechanism, cables connection).
Cables and Fuses compartment	Clean and remove dust.
	Clean earth disconnector splitters.
	Grease earth disconnector clusters / links / contacts.
	Inspection of earth disconnector (cluster strength / tightening, mechanical operation).
	Inspection of cables (chalking, heating signs) & connections (tightening, fixing).
	Inspection of voltage transformers (chalking, cracking, signs of heating) if present.
	Inspection of current transformers / toroids (chalking, signs of heating) if present.
	Inspection of cables connection heads.
	Inspection of isolators (chalking, signs of heating).
	Remove and inspect MV fuses.
	Inspection of fuse chambers (chalking, cracking, signs of heating).
	Inspection of tripping system.
Busbars compartment	Clean compartment.
	Inspection of enclosure (chalking, cracking, signs of heating).
	Inspection of busbars (signs of heating, tightening).
Switch-fuse	Check mechanical operation of the switch.
	Check electrical opening / closing of the switch if applicable.
	Inspection of operating mechanism electrical connections (tightening, fixing), microcontacts.
	Measure spring charging time if applicable.
	Check motorization to verify the behavior of the switch (if any).

Manufacturer Maintenance (performed in average every 3 years)	
Part	Procedure
Whole cubicle	Extended inspection of auxiliaries (weldings, triggers, motors, ...).
	Extended inspection of lockings.
	Extended inspection of latchings.
	Perform a ProDiag Corona diagnosis* to assess the condition of MV devices to detect partial discharges.
Cables and Fuses compartment	Clean earthing switch operating mechanism mechanical links (do NOT grease).
	Extended inspection of earth disconnecter (cluster strength / tightening, mechanical operation).
	Extended inspection of earthing interlock disconnecter operating mechanism.
	Extended inspection of clusters contact pressure if applicable.
	Extended check of fuse tripping system.
	Perform a ProDiag Fuse diagnosis* to evaluate the external condition of fuses and their internal resistance.
Switch	Extended Inspection of operating mechanism electrical connections (tightening, fixing), microcontacts.
(*) Schneider Electric proprietary tool: the ProDiag SE Services tool suite is composed of ProDiag Breaker, ProDiag Fuse, and ProDiag Corona. The purpose of each test is listed below: • The purpose of ProDiag Breaker diagnosis is to deeply diagnose the status of the circuit breaker and to detect drifts from its optimum state. • The purpose of ProDiag Fuse diagnosis is to mitigate the outage risks because of undetected premature aging of medium voltage fuses. • The purpose of ProDiag Corona diagnosis is an early detection of insulation deterioration of components in medium voltage switchgear.	

Maintenance Tasks for Circuit Breaker Disconnectable Cubicles

CAUTION

HAZARD OF UNADAPTED CLEANING

Do not use solvents or alcohol for cleaning the equipment.

Failure to follow these instructions can result in injury or equipment damage.

Routine Maintenance (Performed every year)	
Part	Procedure
Whole cubicle	Visual inspection.
	Clean and remove dust.
	Check voltage presence / indication devices.
	Check windows if present (no crack / no tarnishing).
	Operating mechanism compartment visual inspection.
	LV control compartment visual inspection.
	Check keylocks and padlocks if applicable.
Cables compartment	Visual inspection.
Busbars compartment	Visual inspection.
Switch	Check pressure indication if applicable.
	Operate the switch manually.
	Operate the switch electrically if applicable.
Circuit Breaker	Visual inspection.
	Operate the CB manually.
	Operate the CB electrically if applicable.
	Check CB number of operations.

Intermediate Maintenance (performed every 2 years)	
Part	Procedure
Whole cubicle	Remove covers (LV compartment, operating mechanism, cables connection).
	Check presence of voltage.
	Operating mechanism compartment visual inspection.
	LV control compartment visual inspection.
	Inspection of enclosure (chalking, cracking, signs of heating).
	Reassemble covers (LV compartment, operating mechanism, cables connection).
Cables compartment	Clean and remove dust.
	Clean earth disconnecter splitters.
	Grease earth disconnecter clusters / links / contacts.
	Inspection of earth disconnecter (cluster strength / tightening, mechanical operation).
	Inspection of cables (chalking, heating signs) & connections (tightening, fixing).
	Inspection of voltage transformers (chalking, cracking, signs of heating) if present.
	Inspection of current transformers / toroids (chalking, signs of heating) if present.
	Inspection of cables connection heads.
	Inspection of isolators (chalking, signs of heating).
Busbars compartment	Clean compartment.
	Inspection of enclosure (chalking, cracking, signs of heating).
	Inspection of busbars (signs of heating, tightening).
Switch	Check mechanical operation of the switch.
	Check electrical opening / closing of the switch if applicable.
	Inspection of operating mechanism electrical connections (tightening, fixing), microcontacts.
	Measure spring charging time if applicable.
	Check motorization to verify the behavior of switch (if any).
Circuit Breaker	Check mechanical operation of the circuit breaker.
	Check electrical operation of the circuit breaker if applicable.
	Measure circuit breaker spring charging time if applicable.
	Inspection of circuit breaker operating coils.
	Inspection of circuit breaker charging motor.
	Inspection of circuit breaker operating mechanism electrical connections (tightening, fixing), auxiliaries contacts.
	Inspection of circuit breaker power connections (chalking, cracking, signs of heating, tightening, fixing).
	Inspection of circuit breaker poles (chalking, cracking, signs of heating).
	Inspection of circuit breaker leverages and mechanical connections.

Manufacturer Maintenance (performed in average every 3 years)	
Part	Procedure
Whole cubicle	Extended inspection of auxiliaries (weldings, triggers, motors, ...).
	Extended inspection of lockings.
	Extended inspection of latchings.
	Perform ProDiag Corona* for partial discharges detection.
Cables compartment	Extended inspection of the earth disconnector (cluster strength / tightening, mechanical operation).
	Extended inspection of the earthing interlock disconnector operating mechanism.
	Clean the earthing switch operating mechanism mechanical links (do NOT grease).
Switch	Extended Inspection of operating mechanism electrical connections (tightening, fixing), microcontacts.
Circuit Breaker	Perform ProDiag Breaker diagnosis* if applicable.
(*) Schneider Electric proprietary tool: the ProDiag SE Services tool suite is composed of ProDiag Breaker, ProDiag Fuse, and ProDiag Corona. The purpose of each test is listed below: • The purpose of ProDiag Breaker diagnosis is to deeply diagnose the status of the circuit breaker and to detect drifts from its optimum state. • The purpose of ProDiag Fuse diagnosis is to mitigate the outage risks because of undetected premature aging of medium voltage fuses. • The purpose of ProDiag Corona diagnosis is an early detection of insulation deterioration of components in medium voltage switchgear.	

NOTE: Contact Schneider Electric for other cubicle types and any other detail on maintenance actions.

Corrective Maintenance

NOTICE
HAZARD OF WRONG MAINTENANCE CONDITIONS On replacement, all the following accessories must be replaced with new equipment: • Self-locking nut • Contact washer • Locking ring • Mechanical pin Failure to follow these instructions can result in equipment damage.

Loss of Pressure in the Tank

⚠️⚠️ DANGER
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH If the needle of the manometer is in the red zone: • Do not refill the tank. • Do not perform any operation on the cubicle. • Contact Schneider Electric Services Center immediately. Failure to follow these instructions will result in death or serious injury.

Assembling or Replacing MV Fuses (for All IAC Versions)

Initial conditions:

⚡⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The cubicle must be de-energized.
- The disconnecter must be open.
- The earthing switch must be closed.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

HAZARD OF USING DAMAGED FUSES

- When changing a fuse, change all 3 fuses.
- Do not re-use fuses that have already been used.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

For more information refer to Standard IEC 60282-1.

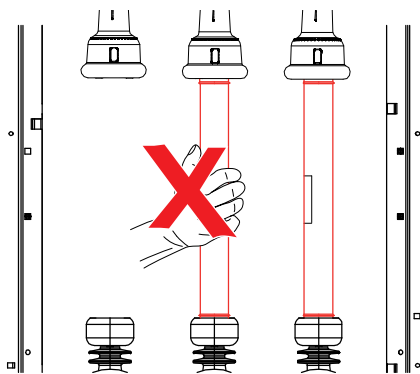
Replacing the MV Fuses in CM, CM2, PM, QM and QMB Cubicles

NOTICE

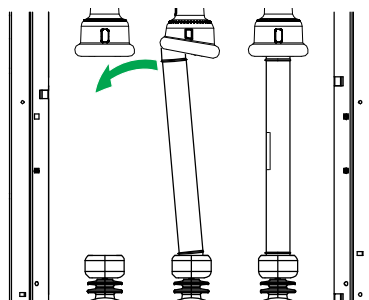
HAZARD OF NOT RESPECTING FUSE HANDLING INSTRUCTION

Do not hold the fuse in the middle.

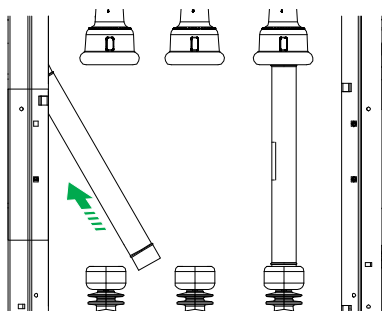
Failure to follow these instructions can result in equipment damage.



1. Remove the top of the fuse.



2. Support and remove it completely.



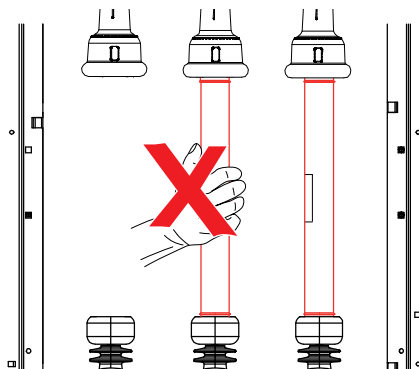
Assembling Fuses for CM, CM2, PM, QM, QMB Cubicles

NOTICE

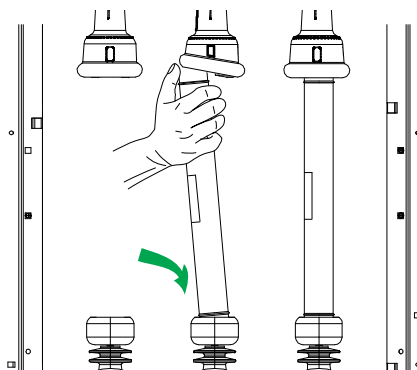
HAZARD OF NOT RESPECTING FUSE HANDLING INSTRUCTIONS

Do not hold the fuse in the middle.

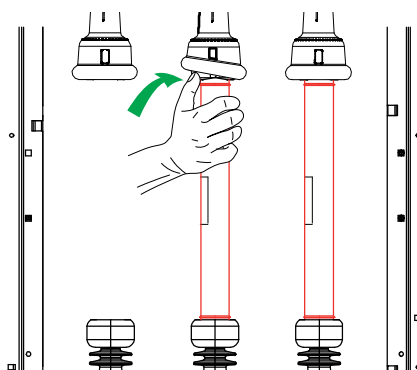
Failure to follow these instructions can result in equipment damage.



1. Insert the bottom of the fuse to the stop into the lower annular contact.



2. Then put the top of the fuse in the upper contact.

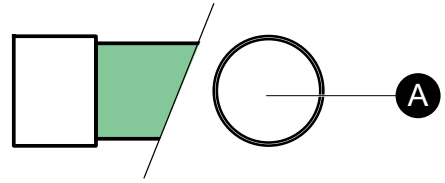


3. Check that the upper field repartitor is properly placed.
4. Turn the fuse so that the label appears in front.

Striker fuse mounting direction

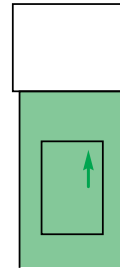
- Install the striker fuses which trip the switch when they blow.

The end of the fuse with indication of the striker pin in (A) is shown beside.



- The specifications and the mounting orientation of the fuse are printed on the fuse body.

Turn the label to face the front (striker pin at the top).



VPIS/VDIS Maintenance Operations

Refer to one of the following document:

- VPIS Installation (JYT3626301)
- Replacement of a VPIS or VDIS with a VDIS (GEX2912700)
- VPIS Phase Concordance Unit and Test Notice (NT0021401)
- VDIS Phase concordance Unit and Test Notice (PKR8700602)

Anomalies and Solutions

Anomalies and Solutions Table

Anomalies	Solutions
Voltage indicator is not lit.	- Check that the incoming cables or busbars are energized. - Check the voltage presence/detection indicating system (VPIS/VDIS) and refer to Unit with Voltage Presence/ Detection Indicating System (VPIS/VDIS), page 75. - Check that the switch is closed. - Check that the circuit-breaker is closed. - Check that the fuses are present or the state of the fuses.
Front panel cannot be opened or closed.	- Check that the earthing switch is closed. - Check K1 keylock, page 73.
Earthing switch cannot be operated.	- Check that the switch or disconnecter is open. - Check keylocks, page 73.
Switch or Disconnecter cannot be operated.	- Check that the earthing switch is open. - Check that the operating mechanism does not have a padlock. Refer to Locking with Padlocks, page 69. - Check that the door is present and correctly positioned.
The operating mechanism cannot be operated.	Check the locks are locked.
The position indicator (Closed, Open or Earthed) does not show a stable or clear position.	Contact SE services.
The manometer needle is not in the green zone.	Contact SE services.
The blown-fuse indicator does not reset and remains red when the fuse is removed to be replaced (for QM, CM cubicles).	Contact SE services.
Impossible to load the operating mechanism (for the cubicles with MN coil).	Check the supply of the MN coil.
When loading the operating mechanism, it opens automatically (for QM cubicles).	- Check the state of the fuses. - Check the state of the protection relay.
The selector button used to select the commissioning of either the N or S switch, is blocked (for NSM cubicles).	Refer to Operating NSM cubicles, page 24.
Impossible to operate the circuit breaker (for DMVL-x, DM2 cubicles).	- Check locks and interlocks. Refer to Operating DMVL-x , page 32/ Operating DM2 cubicles, page 49. - Check the supply of the MN coil. - Check the state of the protection relay.
Anomalies with motor mechanism and/or coils.	- Refer to Motorization Guide (JYT6198401) - Refer to Control Terminal Block (CTB) guides (JYT3482501 and JYT4108701) - Refer to T300 User Manual (NT00378) or other monitoring equipment.

Environmental Conservation

Product Overview

The main function of the SM AirSeT range is to switch and break from 1 kV to 24 kV.

This range consists of: up to 24 kV (Ur), 630 A (Ir) 20 kA-3 s (Ik/tk), and 12.5 kA/ 1 s Internal Arc Withstand at 50/60 Hz.

The representative product used for the analysis are IM and QM (without fuses) cubicles.

The environmental impacts of this referenced product are representative of the impacts of the other products of the range which are developed with the same technology.

The environmental analysis was performed in conformity with ISO 14040 *Environmental management - Life cycle assessment - Principles and framework*.

This analysis takes the stages in the life cycle of the product into account.

Manufacturing

The SM AirSeT range is manufactured at a Schneider Electric production site on which an ISO 14001 certified environmental management system has been established.

Distribution

The weight and volume of the packaging have been reduced, in compliance with the European Union packaging directive.

For example, the IM and QM packaging weight is 7 kg. It consists of wooden pallet (4.8 kg), carton (1.6 kg), nails (0.4 kg), polystyrene (0.1 kg), band strapping (0.1 kg).

The product distribution flows have been optimized by setting up local distribution centers close to the market areas.

Utilization

The products of the SM AirSeT range do not generate environmental pollution requiring special precautionary measures (for example, noise, emissions).

For consuming products, indicate following mention: the dissipated power depends on the conditions under which the product is implemented and used.

The electrical power consumed by the SM AirSeT range spreads out between 8.6 W and 78.2 W:

- It is 8.6 W in active mode and 0% in standby mode for the referenced IM and QM cubicles.

This consumed power represents less than 30% of the total power which passes through this product.

For dissipating products, indicate following mention: the dissipated power depends on the conditions under which the product is implemented and used. This

dissipated power spreads out between 100 W and 850 W, for the SM AirSeT product range.

For a utilisation rate of 100%:

- It is 100 W for the referenced IM and QM cubicles.

This thermal dissipation represents less than $0,2 \times 10^{-3}$ % for IM and QM of the power which passes through the product.

Environmental Impacts

The EIME (Environmental Impact and Management Explorer) software, version V3, and its database, version 5.4 were used for the life cycle assessment (LCA).

The assumed service life of the product is 40 years with an utilization rate of the installation of 100% and the electrical power model used is European.

The scope of the analysis was limited to a IM and QM cubicles.

The environmental impacts were analyzed for all phases of the product life, from Manufacturing (M) phases up to the end of life.

Product Overview

Products of this range are designed in conformity with the requirements of the RoHS directive (European Directive 2011/65/EU of 2 January 2013, amended in March 2015, 2015/863/EU and in November 2017, 2017/2102/EU). They can be incorporated without any restriction within an assembly or an installation submitted to this Directive.

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As standards, specifications, and design change from time to time,
please ask for confirmation of the information given in this publication.

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