EvoPacT HVX 24kV Vacuum Circuit Breaker

The Next Generation of EvoPacT HVX Digital MV Circuit Breaker

User, Integration and Maintenance Guide

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www.se.com

Legal Information

The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

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As part of a group of responsible, inclusive companies, we are updating our communications that contain non-inclusive terminology. Until we complete this process, however, our content may still contain standardized industry terms that may be deemed inappropriate by our customers.

Table of Contents

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

Safety Rules

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Make sure that the operating mechanism is in the discharged status.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See the NFPA 70E or CSA Z462 standard.
- This equipment must only be installed and serviced by qualified electrical personnel.
- NEVER work alone.
- Turn off all power supplies of the equipment before working on or inside the equipment. Consider all sources of power, including the possibility of backfeeding.
- Always use an appropriate voltage detection device to confirm the absence of voltage.
- Put all devices, doors, and covers back into place before turning on power to the equipment.
- Beware of potential hazards, and carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Never go behind the cubicle when it is energized.
- Respect the LOTO (Lock Out Tag Out) procedure.

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

Cleaning Instructions

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Do not use solvents or alcohol for cleaning the equipment.
- Do not use chlorine cleaners to clean the device.
- Do not use high-pressure cleaner for cleaning the equipment.

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

Disposal of the Equipment at End-of-Life

This equipment contains compressed springs. Before carrying out the disassembly operation, make sure that the circuit breaker is in the open position and that the operating mechanism is fully discharged.

⚠WARNING

HAZARD OF MECHANICAL IMPACT

- Apply appropriate personal protective equipment (PPE) and follow safe work practices.
- This equipment must only be dismantled by qualified personnel.

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

- Do not carry out any dismantling operations unless authorized.
- Penalties may apply according to local regulations and rules.

Schneider Electric offers a complete service to dismantle and recycle Medium Voltage equipment at end-of-life. This service is compliant with IEC 62271-4:2022 and IEC 62271-200:2021 standards, and conforms to local regulations.

For more detail, please contact the Schneider Electric.

About the Book

Document Scope

This user guide is an integral part of the device. It describes the operation and use of the EvoPacT HVX circuit breaker, as well as its storage and handling conditions. This document should be available at all times to those required to use or work on the circuit breaker.

This integration guide is an integral part of the device. It gives recommendations for integration of the EvoPacT HVX circuit breaker in different environments. Only general dimensions are identified in this guide. Detailed information is contained in technical files; their references are provided further in this document.

It is advisable to read this manual carefully and follow its recommendations. However, this manual cannot describe every single condition of use or every variant specific to the customer.

Validity Note

This manual applies to EvoPacT HVX circuit breaker.

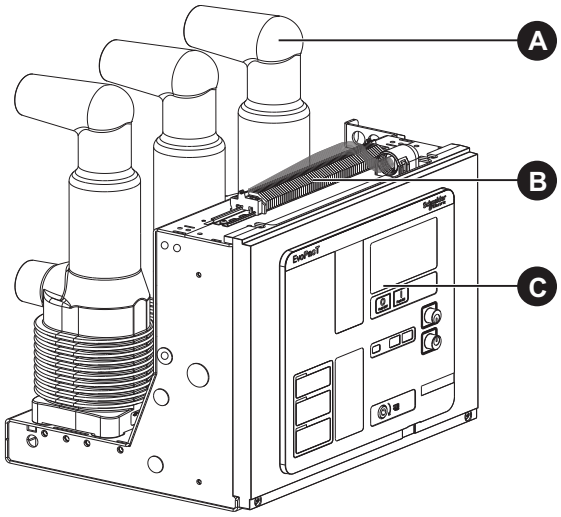
The information contained in this document is likely to be updated at any time. Schneider Electric strongly recommends that you have the most up-to-date version. You can download updated documentation from your local Schneider Electric Website or contact your local Schneider Electric representative for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

Introduction to the EvoPacT HVX Circuit Breaker

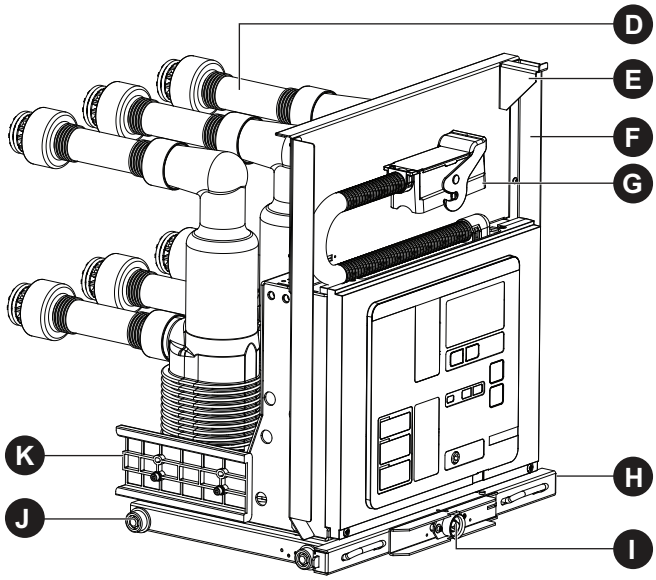
Presentation of the Circuit Breaker

View of the Circuit Breaker

Fixed circuit breaker

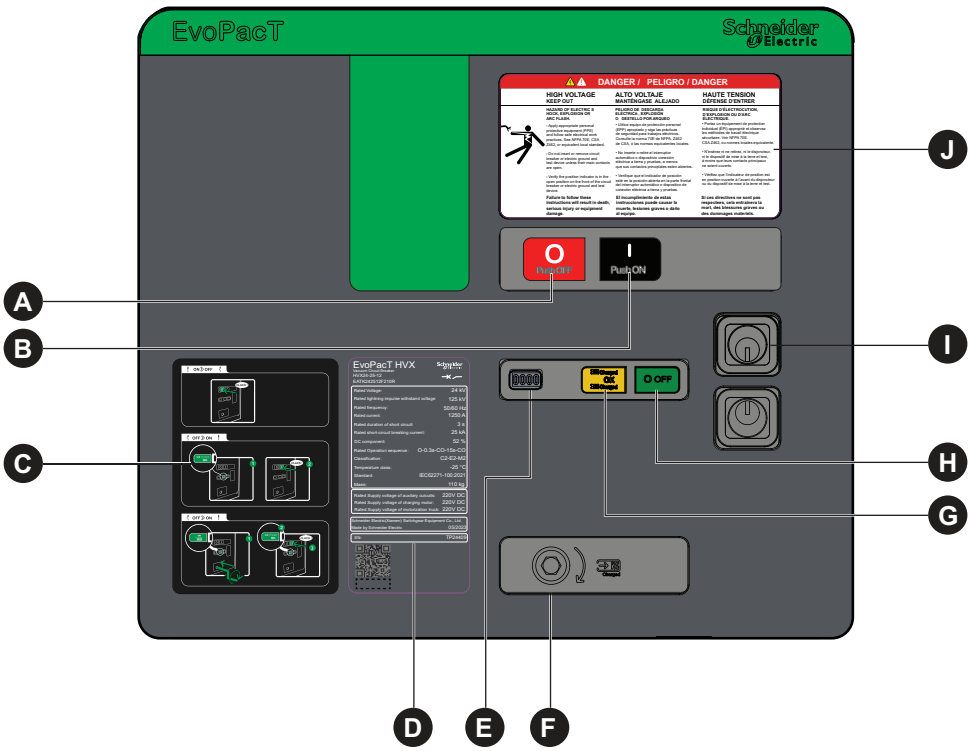


Withdrawable circuit breaker



A. Circuit breaker poles
B. Secondary terminal blocks
C. Operation interface
D. Conductor bar terminal/Tulip type contact
E. Low voltage plug locking rail
F. IP sheet
G. Low voltage plug
H. Racking truck
I. Racking truck handle insertion interface
J. Wheel
K. Shutter driver

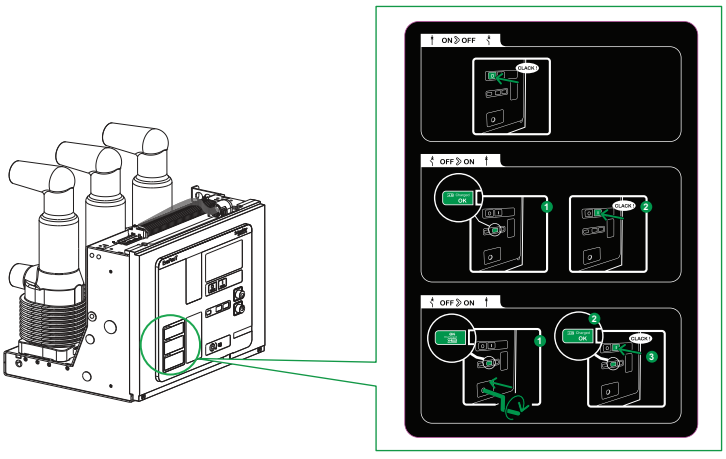
Operation Interface



A. Opening push button (Push button “O”)
B. Closing push button (Push button “I”)
C. Operating instruction label
D. Nameplate (QR code included)
E. Operation counter
F. Insertion opening for manual charging of the operating mechanism
G. Spring charged indicator
H. Position indicator of the circuit breaker
I. Keylock (optional)
J. Safety information

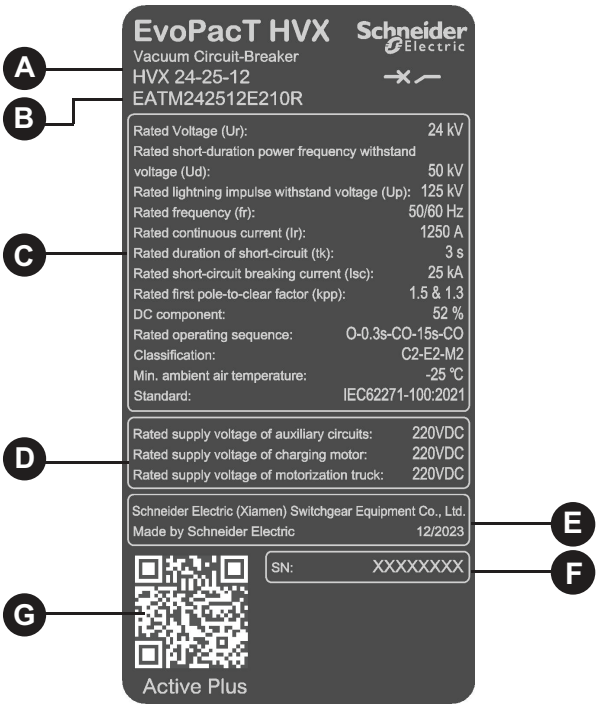
Operation Instruction

The operation instruction label of the circuit breaker is located on the front cover of the circuit breaker. It recaptulates the use of the local mechanical controls, including the transition from the open to closed states and manual charging.



Nameplate

The product nameplate is located on the front of the EvoPacT HVX circuit breaker.



A. Type designation

HVX □□-□□-□□

1 2 3

1. Rated voltage (kV)
2. Rated short circuit breaking current (kA)
3. Rated current (A)

B. Product code

□□□ □ □□ □□ □□ □ □□□ □

1 2 3 4 5 6 7 8

1. EAT: Circuit Breaker EvoPacT HVX
2. Cubicle type: K — panel buider cubicle; M — MC set cubicle.
3. Rating voltage (kV) (expressed in ten and single digits)(1)
4. Rated short circuit breaking current (kA) (expressed in ten and single digits)(2)
5. Rating continuous current (A) (expressed in thousands and hundreds)(3)
6. Installation type (4)
7. Phase distance (mm)
8. Digital circuit breaker code(5)

(1) 24: 24 kV
(2) 25: 25 kA, 31: 31.5 kA
(3) 06: 630 A, 12: 1250 A, 16: 1600A, 20: 2000A, 25: 2500A
(4) E: Withdrawable - Manual Racking Truck, M: Withdrawable - Motorized Racking Truck, F: Fixed.
(5) R: Ready, A1: Active 1, A2: Active 2, A3: Active 3, A4: Active 4, AP1: Active Plus 1, AP2: Active Plus 2

Example: EATK242512E210R represents: EvoPacT HVX withdrawable circuit breaker, equipped for Panel Builder cubicle type, rated voltage 24 kV, rated short circuit breaking current 25 kA, rated continuous current 1250 A, phase distance 210 mm digital ready.

C. Technical data
D. Rated supply voltage of auxiliary circuits/charging motor/motorization racking truck
E. Manufacturing information
F. Serial number
G. QR code (More product information is available based on access authority)

How to Use the QR Code

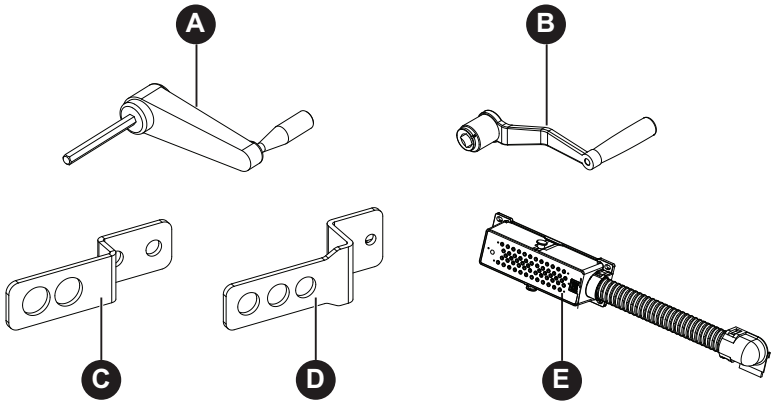
The QR code located under the nameplate grants access to all data related to your circuit breaker from a smart phone or a connected tablet:

- User guide, integration guide, maintenance guide
- Sustainability (Product environmental profile, RoHS, ReacH...)
- Graphical Assets (Dimension drawings, Mounting & Clearances, CAD)...

To access this information, read the QR code with your smart phone or your connected tablet; you will be directed to the website containing the data relating to your circuit breaker. Follow the instructions to obtain personal access.

Accessories

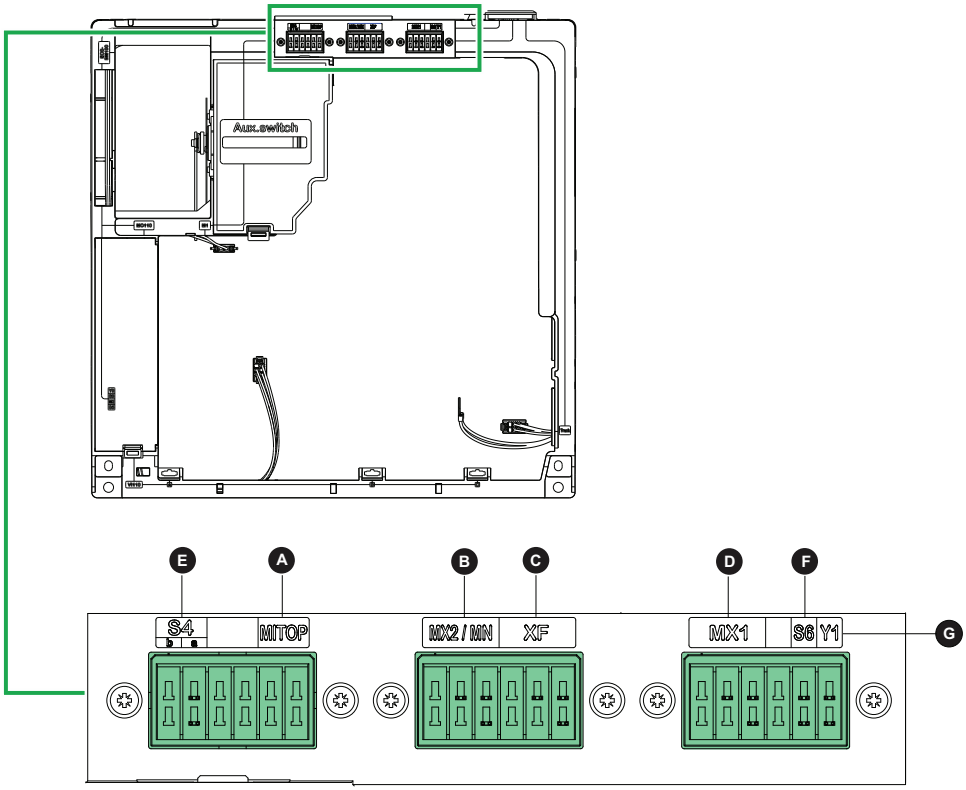
The accessories provided with the circuit breaker are as follows.



A. Spring charging handle
B. Racking truck handle
C. Lifting brackets for fixed verion circuit breaker (installed before delivery).
D. Lifting bracket for withdrawable version circuit breaker (installed before delivery).
E. Low voltage socket on the cubicle side

NOTE: The actual accessories used are depending on the panel type, contact your local Schneider Electric representative if necessary.

Wiring Module Interface



A: Terminal block for MITOP

B: Terminal block for 2nd shunt opening release or Undervoltage release

C: Terminal block for shunt closing release

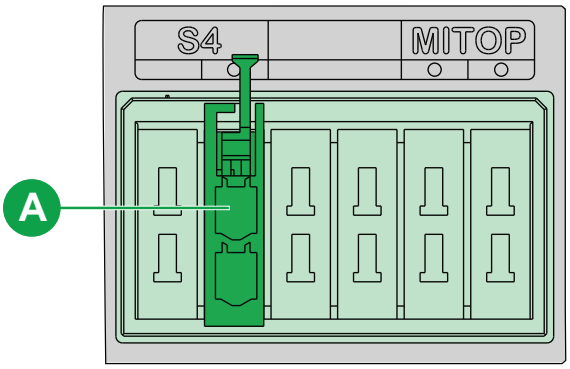
D: Terminal block for shunt opening release

E: Terminal block for ready to close(S4)

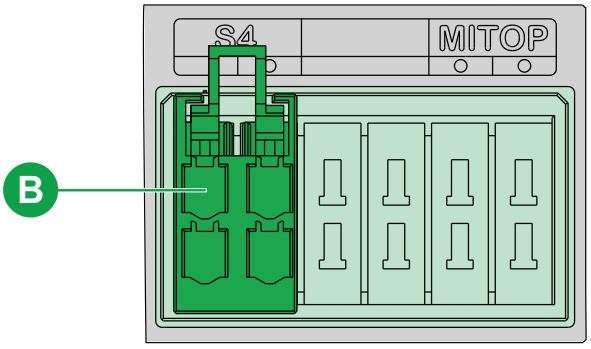
F: Terminal block for micro switch of Y1(Closing locking magnet)

G: Terminal block for Y1

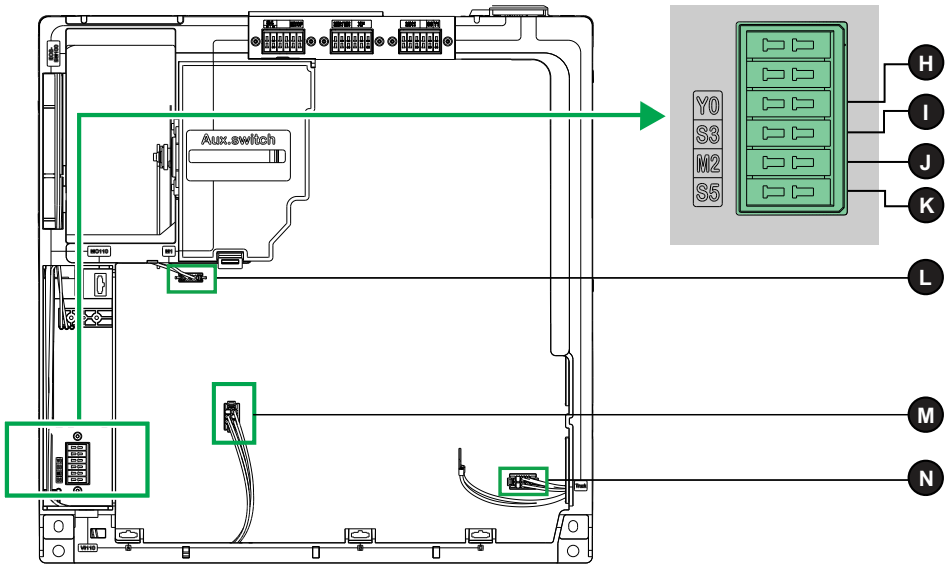
Note: When the Y0 or Y1 components are not selected, the corresponding terminal blocks must be short circuited according to schematic diagram.



A— Connector of S4 (Non-digital)



B— Connector of S4 (Digital)



H: Terminal block for Y0

I: Terminal block for micro switch of Y0(truck locking magnet)

J: Terminal block for racking truck motor(M2)

K: Terminal block for manual transport table operation versus motorized one

L: Connector for spring charging motor(M1)

M: Connector for Auxiliary switches for charging(S2-B)

N: Connector for Auxiliary switches for charging(S2-A)

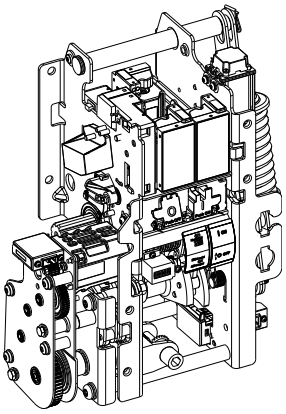
Technical Data

Overall Technical Data

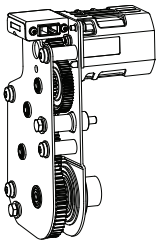
Rated voltage		U_r	kV	24			
Rated frequency		f_r	Hz	50/60			
Rated short-duration power frequency withstand voltage (1min)		U_d	kV	50			
Rated lightning impulse withstand voltage		U_p	kV	125			
Rated operating sequence				O-0.3s-CO-15s-CO			
Phase distance			mm	210		275	
Rated short-circuit breaking current		I_{sc}	kA	25	31.5	25	31.5
Rated continuous current		I_r	630A	•	•	•	•
			1250A	•	•	•	•
			1600A			•	•
			2000A			•	•
			2500A			•	•
Rated short-time withstand current		I_k	kA	25	31.5	25	31.5
Rated duration of short circuit		t_k	s	3			
Rated peak withstand current		I_p	kA	65	82	65	82
DC component of the short-circuit breaking current				52%			
DC time constant of rated short-circuit breaking current		τ	ms	45			
Opening time			ms	22...40			
Closing time			ms	36...60			
Rated cable charging breaking current		I_c	A	31.5			
Rated line charging breaking current		I_l	A	10			
Rated back-to-back capacitor bank breaking current		I_{bb}	A	400			
Rated back-to-back capacitor bank inrush making current (inrush frequency)		I_{bi}	kA	20 (4250 Hz)			
Mechanical endurance			operations	30000			
Electrical endurance	Rated continuous current breaking times		operations	30000			
	Full capacity rated short circuit break current breaking times		operations	50			
Circuit breaker classification				C2–E2–M2–S1			

Control and Operating Devices

The operating mechanism is to be both manually and electrically charged. In addition, the drive mechanism can be equipped with the control and operating devices. For details, refer to Schematic Diagram, page 97.



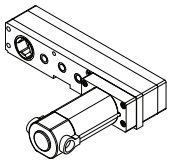
Low Voltage Components



Motor M1

Function: Charging the closing spring electrically.

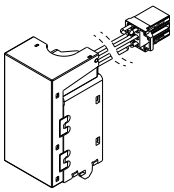
Parameter							
Rated Supply Voltage U_a	VAC	—	—	—	—	110~120	220~240
	VDC	24~30	48~60	110~125	220~250	—	—
Voltage range	V	85~110%U_a					
Resistance	Ω	3.2~5.8	12.8~20	67~94	222~347	67~94	222~347
Insulation resistance to ground	MΩ	≥10					
Inrush power	W/VA	540					
Rated power	W/VA	180					
Inrush duration	s	~0.2					
Charging time	s	4~12					
Short-time power frequency withstand voltage	V	2000 V 50 Hz(1min)					



Motor M2

Function: To enable the withdrawable circuit breaker to electrically rack in from the test position to the service position or rack out from the service position to the test position. The motor has clutch function and will not affect manual operation.

Parameter					
Rated Supply Voltage U_a	VAC	—	—	110	220
	VDC	24	48	110	220
Voltage range	V	85~110%U_a			
Rated power	W/VA	120			
Short-time power frequency withstand voltage	V	2000 V 50 Hz(1min)			



Shunt opening release MX1

The secondary shunt opening release MX2 (optional)

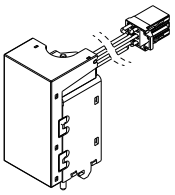
Shunt closing release XF

Function: Select either MX2 or MN.

It can achieve remote control of the circuit breaker opening and closing operations.

This release can be triggered by pulse or continuous command. Minimum pulse duration >100ms.

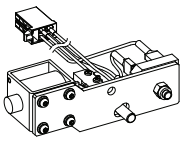
Parameter							
Rated Supply Voltage U_a	VAC	—	—	—	—	110~120	220~240
	VDC	24~30	48~60	110~125	220~250	—	—
Voltage range	V	Shunt opening release MX1 and MX2: 70%~110%U_a (DC) , 85% ~110%U_a (AC) Shunt closing release XF: 85%~110% U_a					
Inrush power	W/VA	250					
Inrush duration	ms	80					
Continuous power	W/VA	5					
Short-time power frequency withstand voltage	V	2000 V 50 Hz (1min)					



Under-voltage release MN (optional)

Function: The MN release opens the circuit breaker when its supply voltage drops to a value below 35 % of its rated voltage U_a. Under voltage (MN) tripping, combined with an emergency-off button, provides fail-safe tripping. The MN release is continuously supplied, i.e. if supply is interrupted : either voluntarily, by the emergency-off button in series, or accidentally, through loss of power or faulty wiring, the release provokes opening of the circuit breaker. If the under voltage is not supplied, the closing of the circuit breaker manually or electrically is not possible

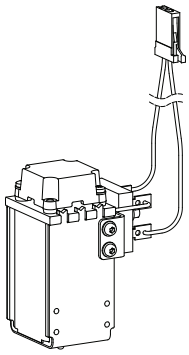
Parameter							
Rated Supply Voltage U_a	VAC	—	—	—	—	110~120	220~240
	VDC	24~30	48~60	110~125	220~250	—	—
Voltage range	V	When an under-voltage release is provided, it shall operate to open and prevent closing of the circuit breaker for all values of the voltage at its terminals below 35 % of its rated supply voltage. Between 70 % and 35 % of its rated supply voltage, the under-voltage release may operate, opening the circuit breaker and preventing its closing. On the other hand, the under-voltage release shall not operate to open the switching device when the voltage at its terminals exceeds 70 % (AC or DC) of its rated supply voltage. The closing of the switching device shall be possible when the value of the voltage at the terminals of the release is equal to or greater than 85 % of its rated voltage.					
Inrush power	W/VA	250					
Inrush duration	ms	80					
Continuous power	W/VA	5					
Short-time power frequency withstand voltage	V	2000 V 50 Hz(1min)					



Blocking magnet on racking truck Y0 (optional)

Function: If the auxiliary power supply is lost, the racking truck cannot be racked in or out (either manually or by motorization).

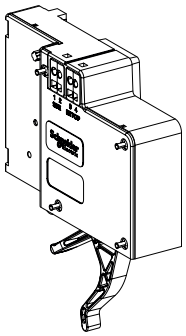
Parameter												
Rated Supply Voltage U_a	VAC	—	—	—	—	—	—	—	110	120	220	230
	VDC	24	48	60	110	125	220	250	—	—	—	—
Voltage range	V	85%~110%U_a										
Resist-ance	KΩ	0.16	0.64	1	2.52	4.36	13.5	14.8	2.52	4.36	13.5	14.8
Rated power	W/ VA	3.6	3.6	3.6	4.8	3.6	3.6	4.2	4.8	3.3	3.6	3.6
Short-time power fre-quency with-stand voltage	V	2000 V 50 Hz(1min)										



Blocking magnet on closing Y1 (optional)

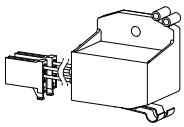
Function: If the auxiliary power supply is lost, the circuit breaker cannot perform the normal closing operation (including manual closing).

Parameter									
Rated Supply Voltage U_a	VAC	—	—	—	—	—	—	110	220
	VDC	24	30	48	60	110	220	—	—
Voltage range	V	85%~110%U_a							
Resistance	Ω	52.3	83.5	211.9	364.9	1033.9	4510.6	1033.9	4510.6
Rated power	W/ VA	~12							
Short-time power frequency withstand voltage	V	2000 V 50 Hz(1min)							



Low-energy shunt opening release MITOP (optional)

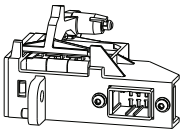
Function: The low-energy shunt opening release is designed for passive relay protection MiCOM P115. It can be triggered by low energy (0.1J/50ms). For other applications, please contact Schneider Electric.



Auxiliary switches for Ready to Close: S4

Function: The auxiliary switch is mainly used to check the status of the mechanism position.
It is operated by opening half moon so that the mechanism cannot be closed during the opening operation.

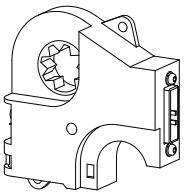
Auxiliary switches for charging: S2



S2–A

Function: Provides the charging signal of the circuit breaker, consisting of a set of 3 micro switches.

Withdrawable CB, non digital: 1 NO is available for "Ready To Close" indication.
Withdrawable CB, digital: 1 NO is available for "Ready To Close" indication. 1NC contact is available for charging spring indication.
Fixed CB, non digital: 1 NO is available for "Ready To Close" indication. 1NC contact is available for charging spring indication.
Withdrawable CB, with MITOP: 1 NO is available for "Ready To Close" indication. 1NC contact is available for charging spring indication.

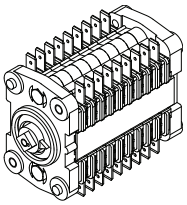


S2-B (optional)

Function: Provides the charging signal of the circuit breaker, consisting of 2 micro switches.

2NC contacts are available for charging spring indication.

Auxiliary switches for position indication: S11



Function: The position of the circuit breaker auxiliary switch is driven by the main shaft of the circuit breaker through the connecting rod. The position of the auxiliary switch is always corresponding to the position of the main contact to provide the circuit breaker opening and closing status signal. The circuit breaker is equipped with 9 open and 9 closed auxiliary switches (up to 5 open and 5 closed for users).

Parameter							
Rated thermal current (I_{th})	A	10					
Short-time power frequency withstand voltage	V	2000 V 50 Hz(1min)					
Rated lightning impulse withstand voltage	kV	5					
Resistance	mΩ	≤50					
Rated Supply Voltage U_a	V	VDC				VAC	
		24	48	110	220	110	220
Switching capacity	A	10	8	4	2	10	5
Power factor cosφ		—				0.3	
Time constant τ	ms	—		300		—	

Service Conditions

Normal Service Conditions

The circuit breaker, including auxiliary equipment, is designed to operate according to its rated characteristics and under the service conditions listed as follows.

Service conditions IEC 62271-1:2021	
Ambient air temperature	
Minimum value	-25°C
Maximum value	+40°C
Average measured over a 24-hour period	≤ +35°C
Altitude above sea level	≤1000m
Environment	The ambient air must not be significantly polluted with dust, smoke, corrosive gas, flammable gas, vapors, or salt
Average relative humidity	
Measured over a 24-hour period	≤ 95%
Measured over a 1-month period	≤ 95%
The average vapor pressure measured over a 24-hour period	≤ 2.2kPa
The average vapor pressure measured over a 1-month period	≤ 1.8kPa

Other Service Conditions

NOTICE

HAZARD OF INCORRECT OPERATING CONDITIONS

- If operated beyond the normal service conditions, the circuit breaker is subject to accelerated ageing with a risk of malfunction.
- The circuit breaker may only be used under conditions other than the normal service conditions with express written permission from the manufacturer.

Failure to follow these instructions can result in equipment damage.

Storage Conditions and Arrangements

Storage Conditions

⚠CAUTION

HAZARD OF INAPPROPRIATE INITIAL OPERATING CONDITIONS

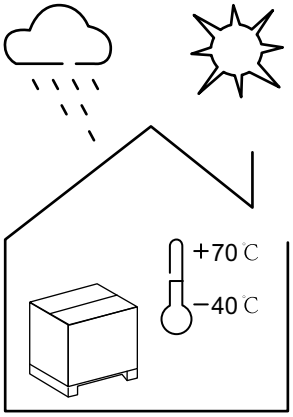
- Never install the equipment if damaged.
- If the circuit breaker is to be stored, observe all storage instructions. The circuit breaker must remain in the packaging until the final installation.

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

If the circuit breaker is not installed immediately upon delivery, we recommend storing the circuit breaker in its original packaging, in a dry environment, and sheltered from the sun and rain at a temperature of -40°C to +70°C. This helps preserve all the characteristics of the functional unit when stored for prolonged periods.

The maximum storage period is 12 months. If the storage period of the equipment is:

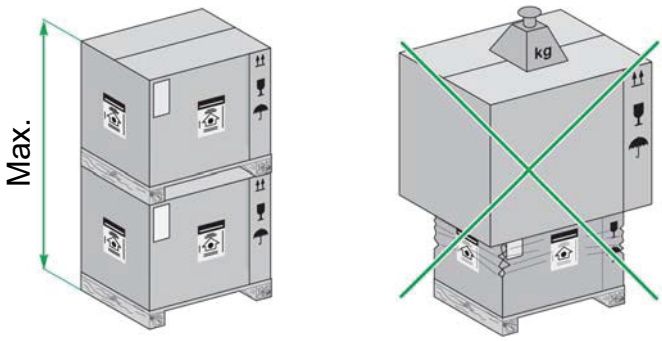
- 6 to 12 months: Perform basic preventive maintenance to help ensure equipment is operating properly.
- Over 12 months : Contact your local Schneider Electric service representative for equipment inspection.



After unpacking, check the circuit breaker carefully for:

- Broken or damaged parts
- Condensation marks
- Visible deteriorations (graying, rust, sediments, and so on.)

Storage Arrangements-Stacking



⚠CAUTION

HAZARD OF EXCESSIVE COMPRESSION OR STRESS

Do not place any heavy objects on the packaging that could either deform it or apply mechanical stress on the circuit breaker structure.

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

Handling

⚠WARNING

HAZARD OF FALL OR TIPPING OF THE CIRCUIT BREAKER DURING UNLOADING OR HANDLING

- Apply appropriate personal protective equipment (PPE) and provide collective protection equipment (CPE) whenever possible. Follow all safe work practices.
- Do not try to catch the parcel if it falls.
- Use handling equipment suitable for the dimensions and weight of the circuit breaker.
- Take into account the position of the center of gravity when handling the parcels or the device.

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

⚠CAUTION

HAZARD OF INAPPROPRIATE HANDLING

- Move the circuit breaker with utmost caution and avoid shocks.
- Do not move the circuit breaker by rolling it on the floor.

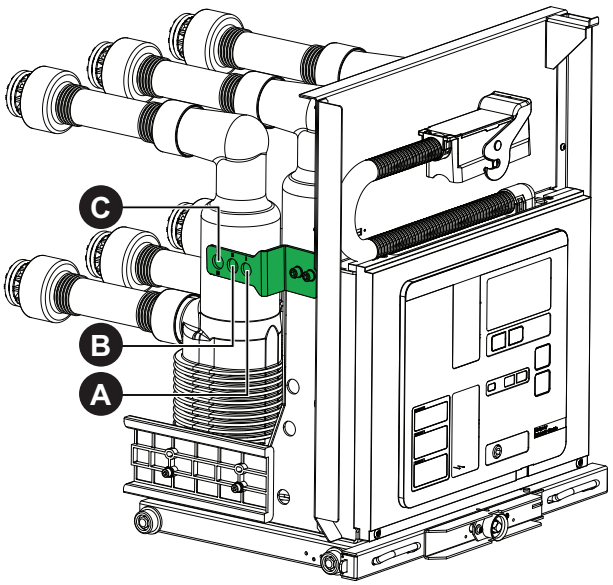
Failure to follow these instructions can result in injury or equipment damage.

Mass

Rated continuous current	A	630/1250				1600/2000/2500
Rated short-circuit breaking current	kA	25		31.5		25/31.5
Phase distance	mm	210	275	210	275	275
Type	EvoPacT HVX Fixed Type Circuit Breaker					
Mass	kg	85	95	90	95	134
Type	EvoPacT HVX Withdrawable Type Circuit Breaker					
Mass	kg	125	145	130	150	228

Lifting Positions

Lift the breakers using the lifting brackets supplied. The lifting positions for each circuit breaker model are listed and illustrated as follows.



Rated voltage (kV)	Phase distance (mm)	Rated continuous current (A)	Lifting positions	
			Fixed type	Withdrawable type
24	210/275	≤ 1250	A	A
			A	A
	275	1600/2000/2500	A	B

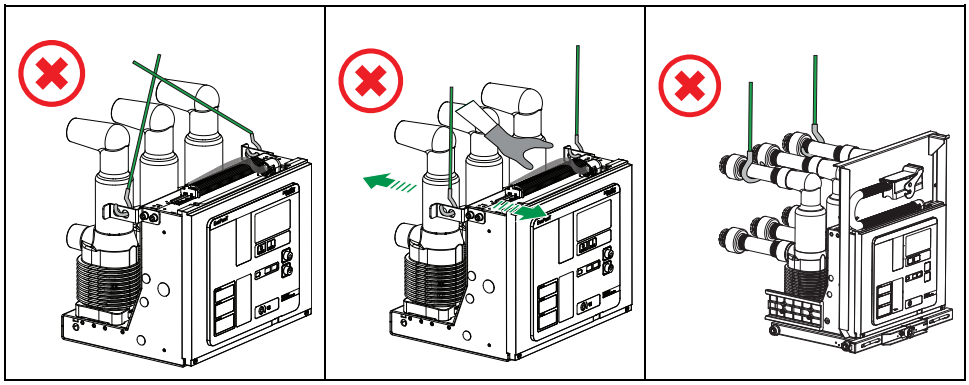
Lifting the Circuit Breaker

⚠WARNING

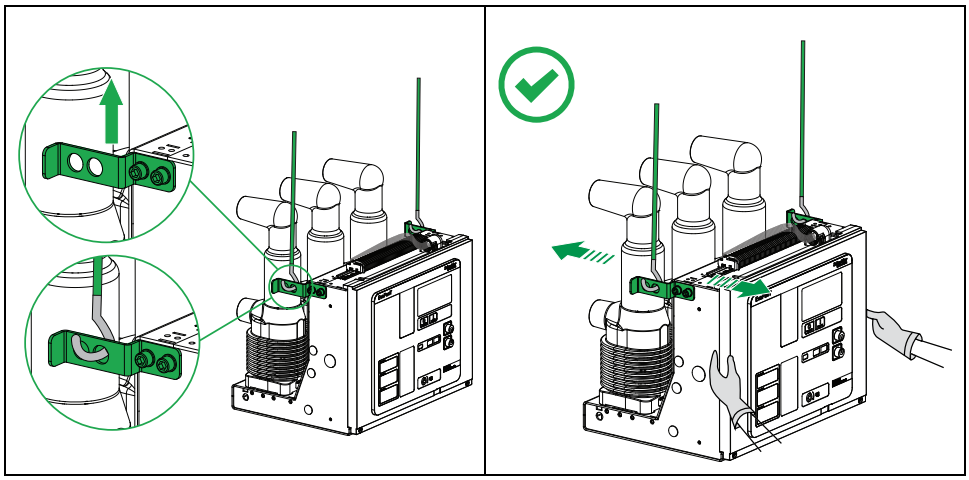
HAZARD OF INAPPROPRIATE HANDLING

- The lifting hooks and ropes MUST NOT touch the poles.
- Do not manipulate the circuit breaker poles as handles for moving the circuit breaker to the desired position.
- For withdrawable type, do not lift the circuit breaker by the power connections

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



The correct lifting steps are as follows:



Before Energizing for the First Time

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

If the cuibicle does not have the level of internal arc protection as defined by IEC 61171–200, the installer, operater and main maintenance personnel on site must make the following confirmation:

- Risk assessments must be carried out and relevant risk mitigation measures must be strictly enforced
- Do not enter the area affected by arc when the circuit breaker is making/breaking through remote operating.
- Do not enter the area affected by arc when the circuit breaker is racked in/out through remote operating.
- If the racked in/out operation cannot be performed remotely, take the necessary additional protection measures.
- Use personal protective equipment (PPE) and follow safe work practices.
- Make sure the circuit breaker is in opening stage when racking in/out.

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

General check of the device can reduce the risk of mistakes due to errors or negligence.

It must be carried out:

- Before energizing following switchgear installation
- Before re-energizing following an extended period during which the device has not been in service.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

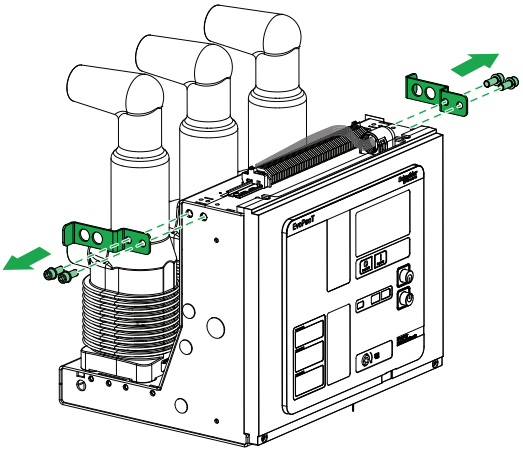
- Perform all the checks with the entire switchgear de-energized.
- Check that the lifting brackets of the circuit breaker have been removed.
- Check that the nameplate data is compatible with the electrical installation data.
- Check the correct operation of the auxiliary releases.

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

The installer of your equipment must deliver a commissioning report before the first energizing of your electrical installation.

Circuit Breaker Inspection

Check that the circuit breakers are installed in a clear environment in accordance with the service conditions, free of any installation scrap or items (tools, electrical wires, broken parts or shreds, metal objects).



⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

The lifting brackets of the circuit breaker must be removed prior to installation in the switchgear.

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

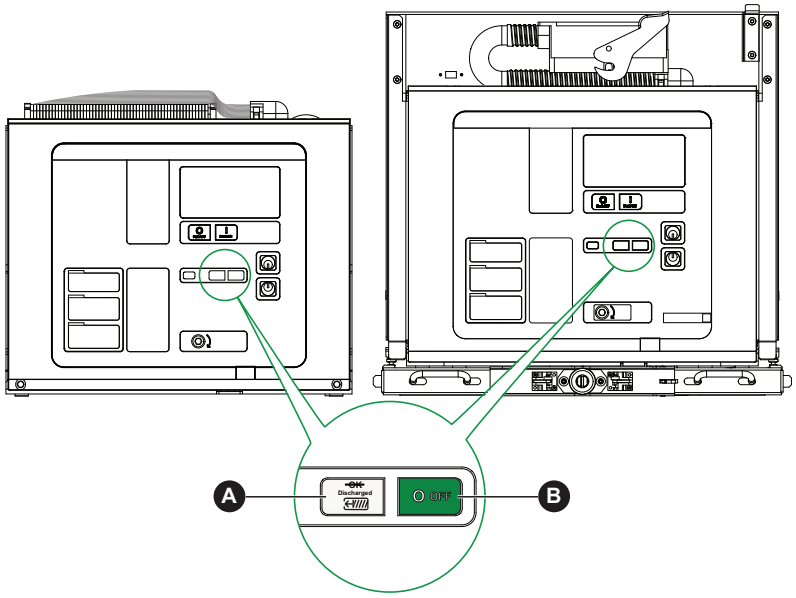
Conformity with the Installation Electrical Diagram

Check that the circuit breakers match the installation diagram:

- Breaking capacities indicated on the nameplates.
- Presence of optional functions (electric control of charging mechanism, auxiliaries, meters and indicators) and conformity of their electrical characteristics.

Operating

Refer to your equipment documentation and follow your switchgear commissioning rules. The initial state of the fixed circuit breaker and withdrawable circuit breaker is as follows:



A. Operation mechanism discharged
B. Circuit breaker in OPEN position

Check the mechanical operation of the devices in every control model (local mechanical, electrical controls, and remote control) and for every possible operation:

1. Charging the spring of the operation mechansim.
2. Close the device.
3. Charging the spring of the operation mechansim.
4. Open the device.
5. Close the device and charging the spring of the operation mechansim, perform an operation sequence: OPEN-CLOSE-OPEN.
6. Rack in and rack out your device (according to the configuration of your switchgear).
7. Check the operation of the locking and interlocking.

Restore the circuit breaker to its initial state and wait for the switchgear to be energized.

Initialization of the Maintenance Information

Record the number of the circuit breaker operations (as displayed on the operation counter), date of observation and note this information in the maintenance log of your installation.

Using the Circuit Breaker

Understanding the Controls and Indicators

Position Indicators on the Operation Interface

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Installation, repair, and maintenance work on the circuit breaker must only be carried out by qualified personal.
- Beware of potential danger, apply appropriate personal protective equipment and take appropriate safety precautions.

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

Position indicators on the operation interface of the circuit breaker and possible operating sequences are listed and illustrated in the table as follows.

Circuit Breaker Indicators		Electrical state	State description
Main contacts position indicator	Spring and ready-to-close indicator		
O OFF	~~OK~~ Discharged	O OFF	Circuit breaker is OPEN and mechanism is discharged.
O OFF	Charged OK Charged		Circuit breaker is OPEN with mechanism charged and circuit breaker is “ready to close”.
I ON	~~OK~~ Discharged	I ON	Circuit breaker is CLOSED and mechanism is discharged.
I ON	Charged OK Charged		Circuit breaker is CLOSED and mechanism is charged.

Interlocks (Only for Withdrawable Type)

⚠WARNING

HAZARD OF INAPPROPRIATE FORCED OPERATION

Operators must be familiar with those interlocks before operating the circuit breaker.

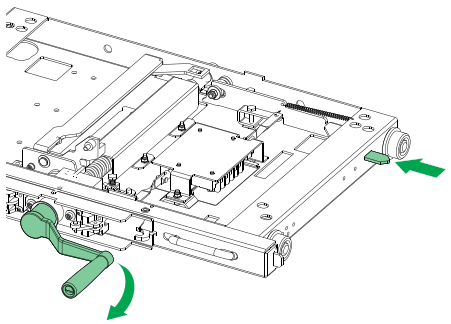
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Mechanical Interlocks

The EvoPacT HVX circuit breaker with racking truck includes basic mechanical interlocks helping to prevent operating errors.

1. Between the racking truck and the earthing switch

Function:
The racking truck cannot be racked in while the earthing switch of the switchgear is closed.
Operation:
Insert the crank handle; it cannot be rotated after 3/2 turn in clockwise direction.



Function:
The earthing switch cannot be closed when the racking truck has left its test position.
Operation:
Earthing switch interlock device will hit the bracket on the side of the racking truck.

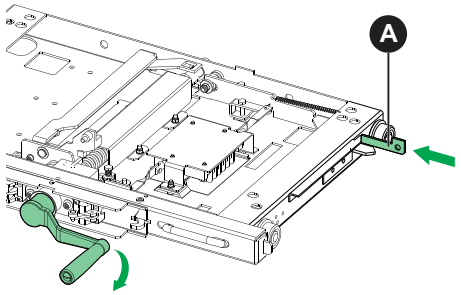
NOTICE

HAZARD OF IMPROPER OPERATION

Do not apply force.

Failure to follow these instructions can result in equipment damage.

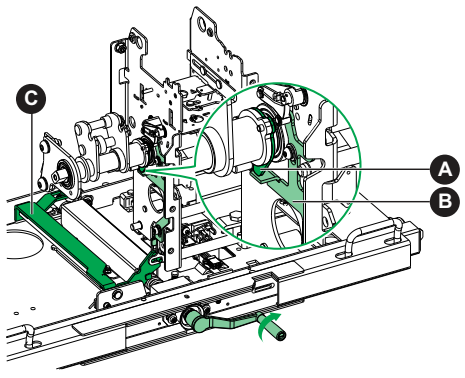
(A) is connected with the earthing switch interlock device.



2. Between the racking truck and operating state of the circuit breaker

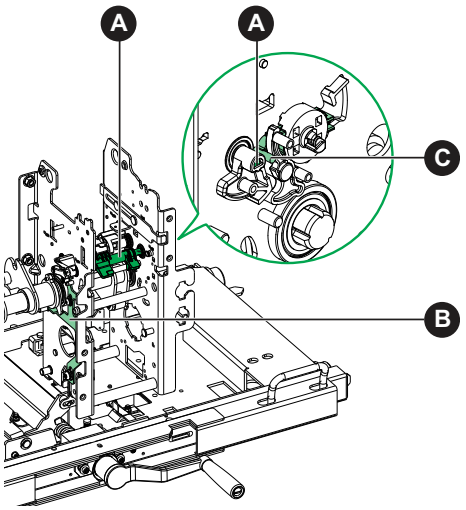
Function:
The racking truck cannot be racked in or out while the circuit breaker is closed.
Operation:
Insert the handle; it cannot be twirled after 1/2 turn in the clockwise/anti-clockwise direction.

NOTE: While the circuit breaker is closed, **(A)** will limit **(B)**, and **(C)** can not be rotated, so the racking truck cannot be racked in/out.



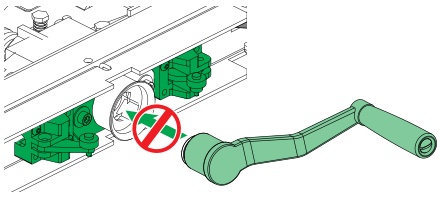
Function:
The circuit breaker cannot be closed unless the racking truck is completely in its test or service position.
Operation:
The circuit breaker cannot be closed by manual operation or power drive.

NOTE: The opening half-moon **(A)** is driven by the pushing link **(B)** and the slider **(C)** is clutched ,so the circuit breaker cannot be closed.



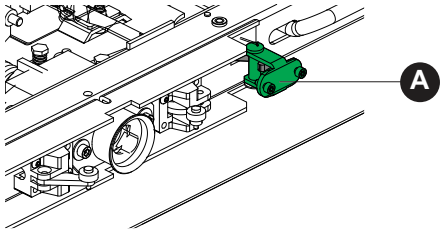
3. Door interlock (optional)

Function:
The racking truck cannot be racked in or out while the door of the switchgear is not closed.
Operation:
The handle cannot be inserted.



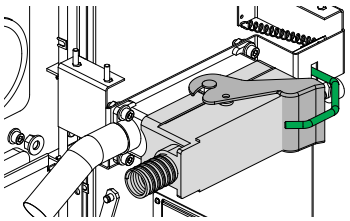
Function:
The door of the switchgear can not opened as soon as the racking truck has left its test position.
Operation:
The door of the switchgear cannot be opened.

Part **(A)** is fixed on the door (Part **(A)** not supplied by Schneider Electric).



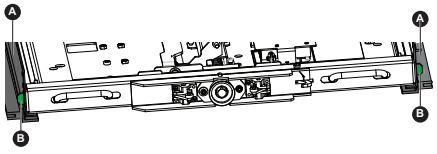
4. Interlock between the auxiliary circuit plug and the cubicle
(Optional latching to be carried out by Panel builder)

Function:
The auxiliary circuit plug cannot be disconnected while the circuit breaker is in service position.
Operation:
The operating handle of the auxiliary circuit plug cannot be moved.



5. Interlock between the racking truck and the cubicle

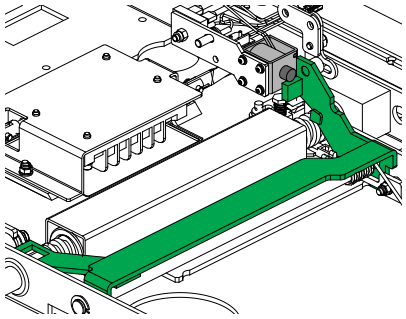
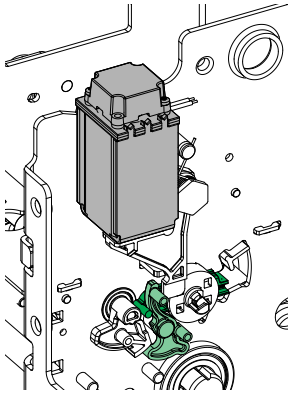
Function:
Fix the circuit breaker in the cubicle.
Operation:
The truck is locked by locking tabs **(B)** inserted into slots on the cubicle rails **(A)**.



Electrical Interlocks

Electric interlocks have been designed according to the wiring diagram.

NOTICE
HAZARD OF INAPPROPRIATE OPERATING CONDITIONS Re-establish power supply to the circuit breaker before electrically unlocking the circuit breaker. **Failure to follow these instructions can result in equipment damage.**

Electrical Interlock	
Interlock type: racking truck interlock **Operation:** When racking truck locking magnet Y0 is not powered on, the racking truck cannot be racked in or out.	
Interlock type: Closing interlock **Operation:** When closing locking magnet Y1 is not powered on, the circuit breaker cannot be closed.	

Operation Handles

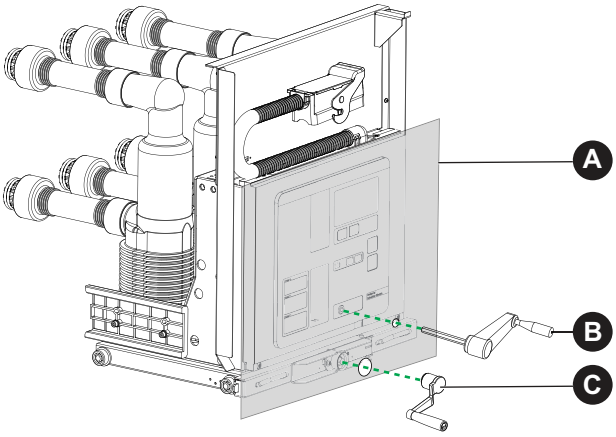
⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Make sure that you have installed the correct circuit breaker in the correct cubicle.

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

The tools for operating the circuit breaker are shown as follows.



A. Closed door of the switchgear
B. Handle for charging the spring of the operation mechanism (only possible when CB in test position)
C. Handle for racking in/out the racking truck

Low Voltage Connection

⚠⚠WARNING

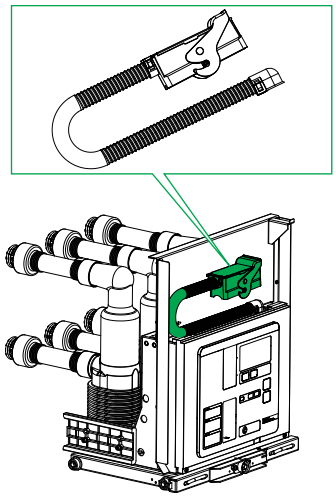
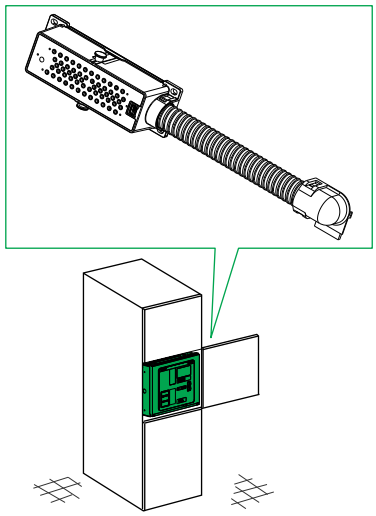
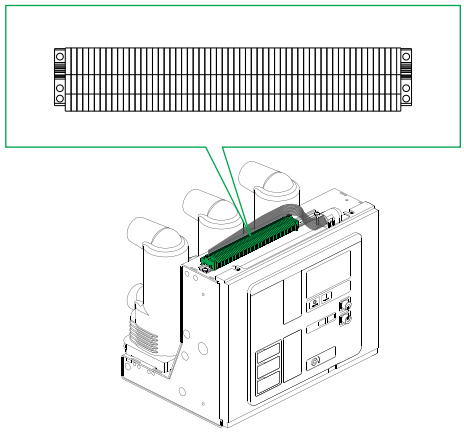
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

For all electrical operations of the circuit breaker, make sure that the wiring harness has been reliably connected between low voltage cabinet of the switchgear and the circuit breaker.

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

The wiring harness for EvoPacT HVX can be connected using one of the following components:

- A connection plug with wires 1 mm^2
- A terminal block with wires 1 mm^2 (for fixed type only)
- Grounding: 2 wires of 1.5 mm^2

Low voltage plug on CB side	
The wiring harness is connected through a connection plug (for removable switchgear).	
Low voltage terminal block on the cubicle side	
The low voltage socket on the cubicle side is used to connect the circuit breaker to the low voltage cabinet of switchgear.	
Terminal block on CB side	
The wiring harness is connected through a terminal block.	

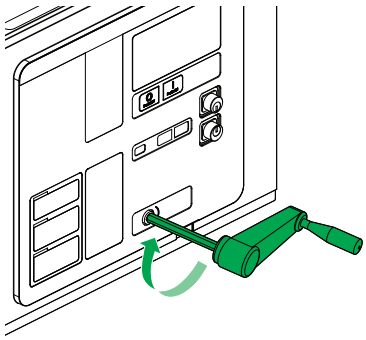
Charging the Operating Mechanism

Manual Charging

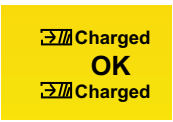
Perform the following steps to manually charge the closing spring:

1. Confirm the mechanism charge status. The indicator shows the spring to be Discharged.

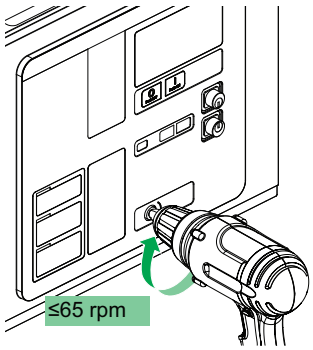
2. Insert the charging handle ensuring it is fully inserted until it stops. Rotate the handle in a clockwise direction.



3. When the mechanism is charged the indicator changes status and further charging is not possible.



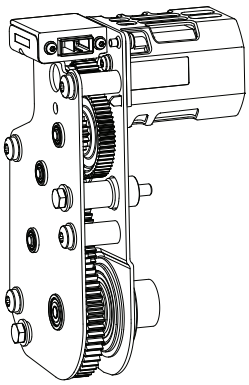
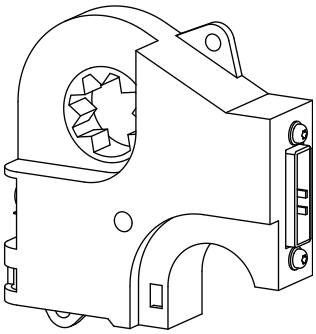
NOTICE
HAZARD OF INAPPROPRIATE OPERATING CONDITIONS In the case of manual charging using a power drill, make sure that the maximum speed of the tool does not exceed 65 rpm. **Failure to follow these instructions can result in equipment damage.**



NOTE: If the motor starts during this process, this does not constitute a risk to the operator.

4. After the charging is complete, remove the charging handle or power tool.

Automatic Charging

M1 Charging Motor 	Charging of the operating mechanism occurs automatically when the spring is in the discharged state and auxiliary power is present.
S2-A/S2-B Contact 	The “Ready to Close” state of the circuit breaker is shown by a mechanical indicator and a S2–A/S2-B changeover contact.

Closing the Circuit Breaker

Closing Conditions

NOTICE
HAZARD OF INAPPROPRIATE OPERATING CONDITIONS To close the circuit breaker, the circuit breaker must be in the "ready to close" state and must meet the following conditions. **Failure to follow these instructions can result in equipment damage.**

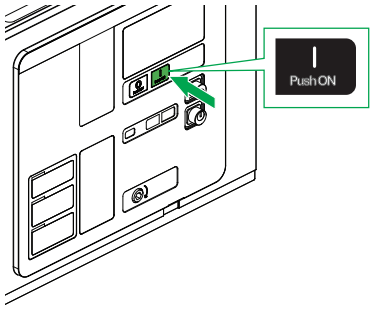
- The circuit breaker is open.

- The spring is charged.

- No opening order is activated by MX1, or by optional MN, MITOP.
- If closing locking magnet (Y1) is installed, it must be energized.

Manual Closing (Local)

1. Press the closing push button.

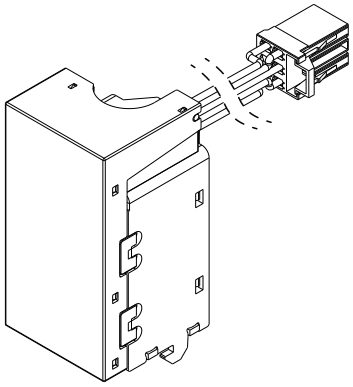


2. The main contact position indicator moves to the “On” state, indicates that circuit breaker is in the closed state.

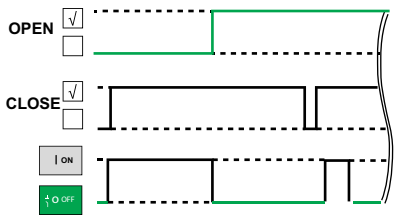
Closing by Electrical Control

Local/Remote

The circuit breaker can be closed remotely or locally by an order activating the below shunt closing release.



Anti-pumping Function



If opening and closing orders apply simultaneously, the opening order has priority over the closing order. An anti-pumping function is integrated into the circuit breaker allowing it to carry-on its opening. Existing closing orders must be cancelled before being reapplied to be taken into account.

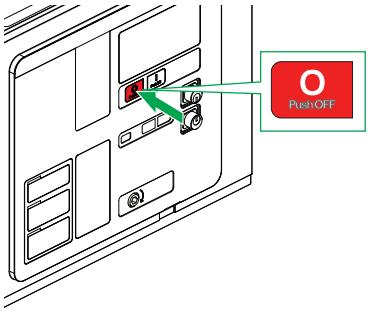
Opening the Circuit Breaker

Opening Conditions

The opening order takes precedence over any other commands.

Manual opening (Local)

1. Press the opening push button.



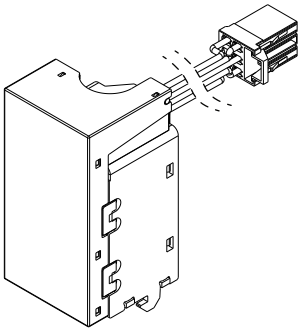
2. The main contact position indicator moves to the “OFF” state.

Opening by Electric Order

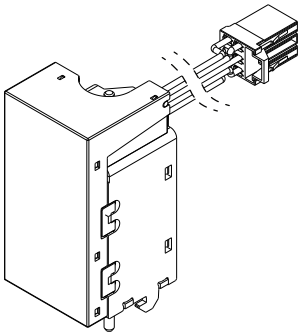
Local/remote

The circuit breaker can be opened remotely or locally by an order activating one of the below shunt opening release.

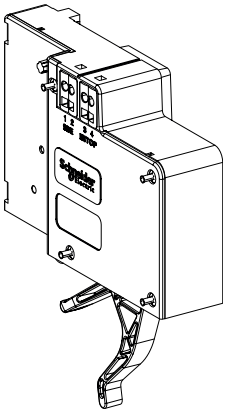
Shunt opening release MX1/MX2



Under-voltage release MN



Low energy shunt opening release MITOP



Discharging the Mechanism

To discharge the mechanism:

- Turn off the auxiliary voltage supply or remove the low voltage plug to disable the automatic charging.
- Press the opening and closing push-buttons alternately until the status indicators of the circuit breaker are OFF/"Discharged".

Racking-in/Racking-out Mechanism (For Withdrawable Type Only)

The withdrawable circuit breakers can be moved manually or electrically from the test position to the service position, and vice versa.

The inward moving operation (from test position to service position) is called “Rack-in”; the opposite outward operation is called “Rack-out”.

⚠⚠DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION, OR ARC FLASH

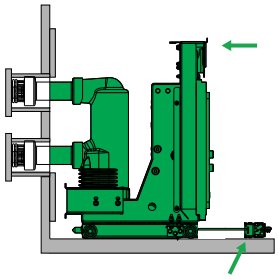
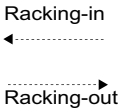
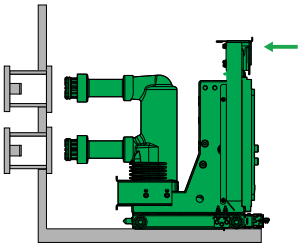
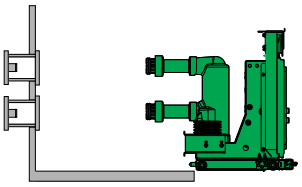
- Observe the interlock conditions.
- Observe the position indicator on the switchgear for the racking truck.

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

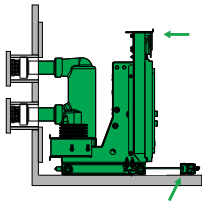
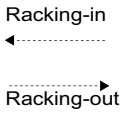
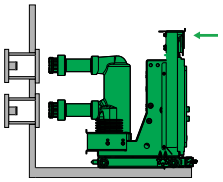
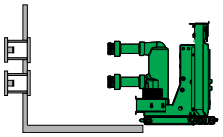
Rack-in/rack out conditions:	
Manual	• The circuit breaker is OFF. 
Motorized (with electrical control)	• The earthing switch is in the open position. • If the blocking magnet for the racking truck (Y0) is installed, it must be powered-on. • The door of the switchgear is closed (if the circuit breaker comes with door interlocks).

Understanding the Racking Device Controls and Indicators

Different States

Circuit Breaker Position	State Description	Command Available
	**Service** The circuit breaker connections are connected to the switchgear contacts, the LV auxiliary circuit is connected, and the circuit breaker compartment door is closed and locked.	• Circuit breaker operations • Racking-out (Manual) • Racking-out (Motorized)
	**Intermediate** The circuit breaker is moving from the disconnected position to the service position or vice versa. The circuit breaker compartment door is closed and locked.	• Racking-in (Manual) • Racking-in (Motorized) • Racking-out (Manual) • Racking-out (Motorized)
	**Disconnected/Test** The circuit breaker is inside the circuit breaker compartment. Its power connections are separated from the switchgear contacts by shutters, the LV auxiliary circuit is connected and it is possible to open the circuit beaker compartment door,	• Circuit breaker operation • Racking-in (Manual) • Racking-in (Motorized)
	**Removed** The circuit breaker is extracted from the switchgear using the extraction table.	

The following table describes the functions available on the withdrawable version of EvoPacT HVX:

Withdrawable Circuit Breaker positions			
Service	**Intermediate**	**Disconnected/test**	**Removed**
			

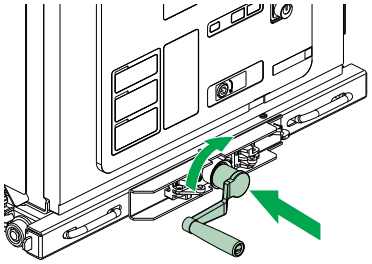
Parts	**Service**	**Intermediate**	**Disconnected/ Test**	**Removed**
Locking tabs	Locked	Locked	Locked	Unlocked
LV connection plug	Connected	Connected	Connected/ Disconnected	Disconnected
Compartment door	Closed and Locked	Closed and Locked	Unlocked	Unlocked
Circuit breaker VI contacts position	OPEN/CLOSED	OPEN	OPEN/CLOSED	OPEN/CLOSED
Earthing Switch mechanical link position[1]	Earthing Switch OPEN	Earthing Switch OPEN	Earthing Switch OPEN	Earthing Switch OPEN
			Earthing Switch CLOSED	Earthing Switch CLOSED
Shutters	OPEN	OPERATING	CLOSED	CLOSED

[1]: For details, please refer to your equipment manufacture documentation.

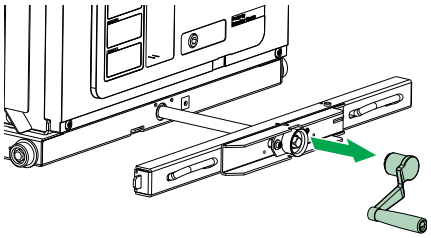
Manual Rack-in/Rack-out

Manual rack-in procedure

1. Open the circuit breaker.
2. Insert the handle and turn it clockwise until it stops, the circuit breaker is racked into the service position.

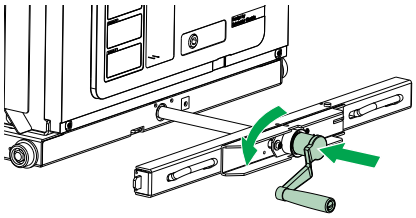


3. Electrical contacts are available to confirm the breaker is correctly racked-in. If wired to an indicator in the LV cabinet, check this indicator.
4. Remove the handle.



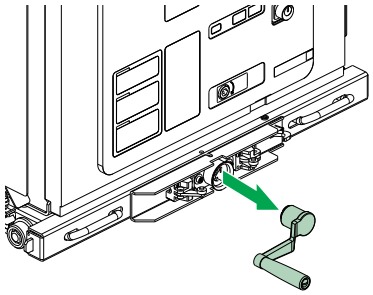
Manual rack-out procedure

1. Open the circuit breaker.
2. Insert the handle and turn it counterclockwise until it stops, the circuit breaker is racked back to the test position.



3. Electrical contacts are available to confirm the breaker is correctly racked-in. If wired to an indicator in the LV cabinet, check this indicator.

4. Remove the handle.



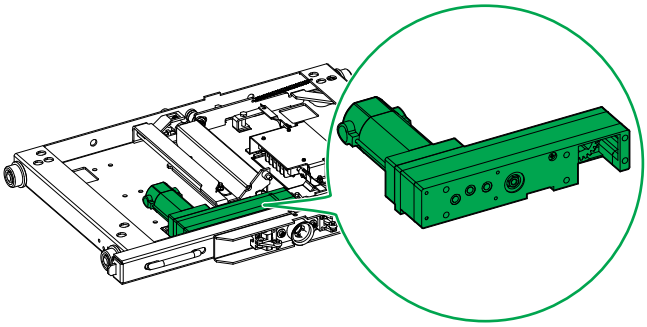
Motorized Rack-in/Rack-out

⚠CAUTION

HAZARD OF UNEXPECTED EQUIPMENT OPERATION

Remove the crank handle to allow rack-in/rack-out with the M2 gear motor.

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



Local/remote

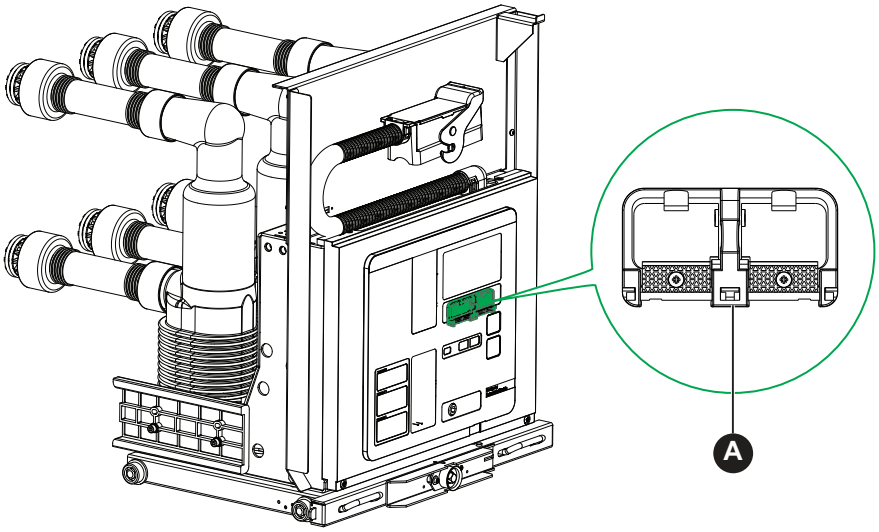
If the M2 gear motor for the electrical racking truck is powered on, the racking truck can be racked in/out by electrical control.

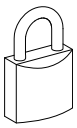
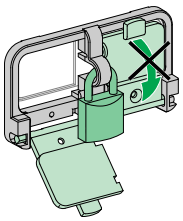
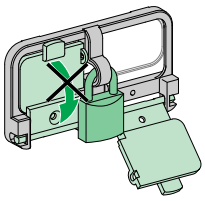
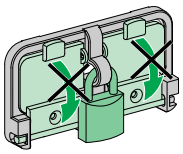
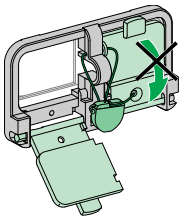
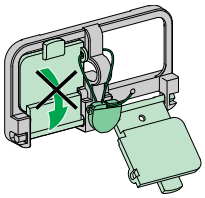
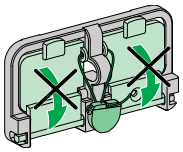
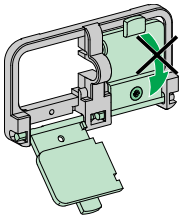
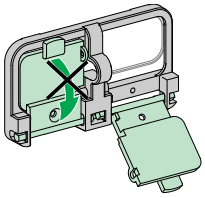
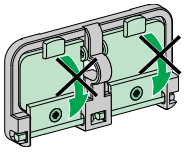
Refer to the user guide of your equipment to find out the location of the racking truck rack-in/rack-out button.

Locking the Circuit Breaker Control

Locking the Push-buttons

The push-button locking cover (A) is an optional accessory that must be installed on the circuit breaker to enable the push-buttons to be locked.



Locking by padlock			
 1 padlocks: Ø 5 to 8 mm, not supplied.			
Locking by lead sealing			
 Lead sealing system (ref. LV429375), not supplied.			
Locking by screw			
 Two M3 x 7 Cross countersunk head screws, supplied.			

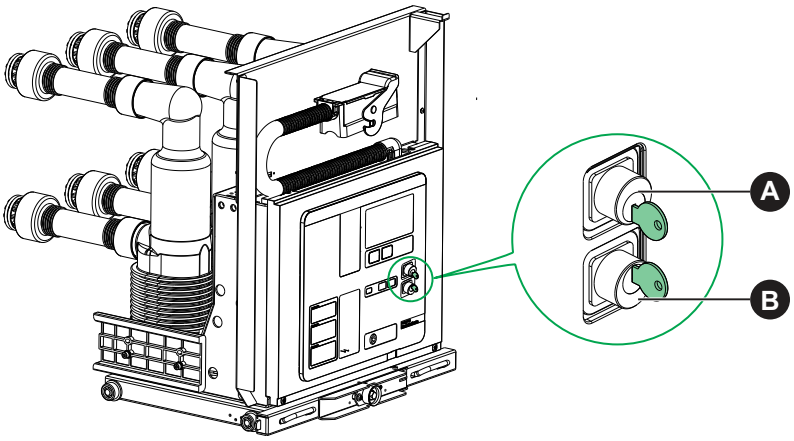
Locking the Device in the Open Position

The circuit breaker can be locked in the open position by locking the opening half-moon shaft in the tripping position with 1 or 2 keylocks.

The locking system is an optional accessory that must be installed on the circuit breaker to enable the device to be locked in the OPEN position.

When configuring the lock at the OPEN position, you can choose different key(for a single circuit breaker) or the same key (for multiple circuit breakers).

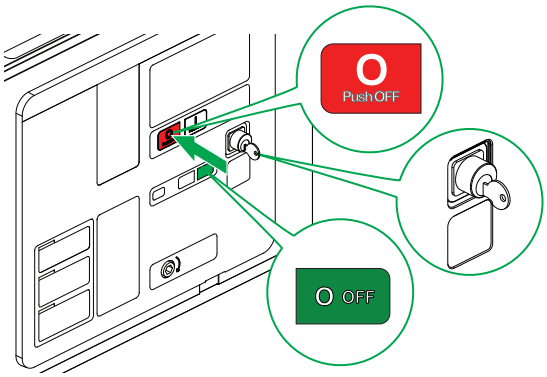
Consignment and locking procedures must be defined by the end user.



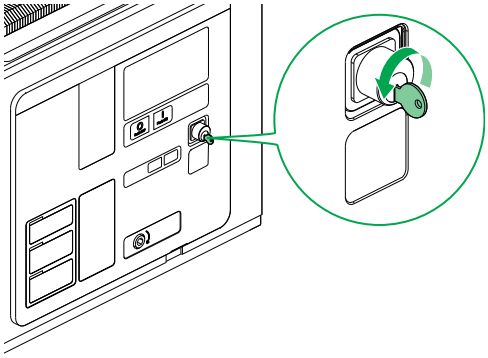
A. Key 1
B. Key 2

Lock with one key

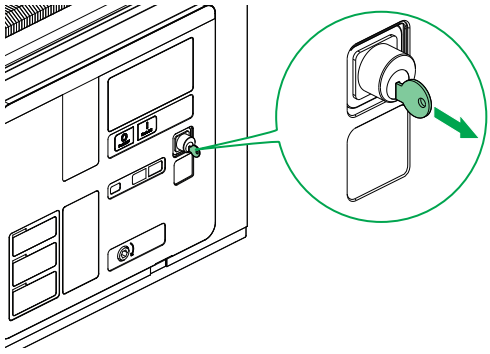
1. Open the circuit breaker by pressing the opening push button.



2. Turn Key 1 counterclockwise, the CB is locked in the opening position.

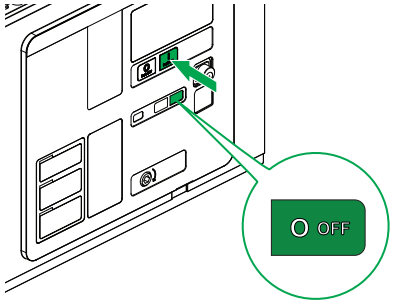


3. Remove Key 1.



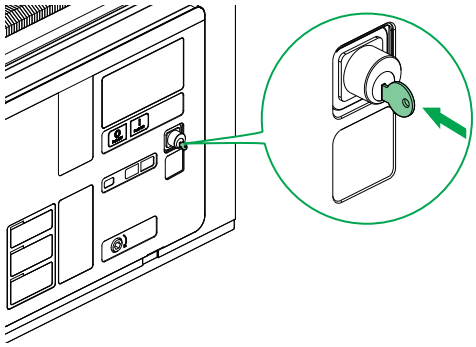
Check

1. Press the closing button to check that the circuit breaker can not be closed.

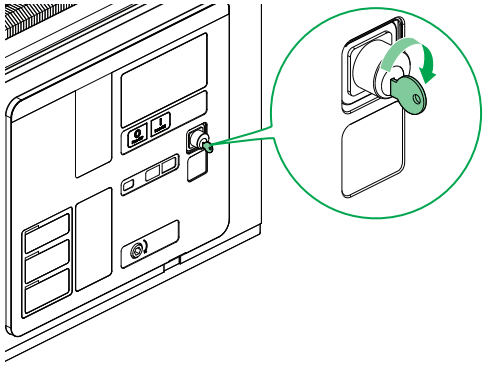


Unlock with one key

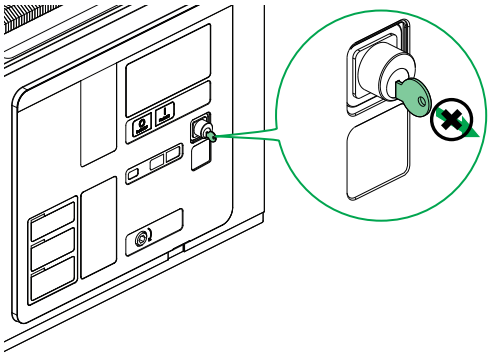
1. Insert Key 1.



2. Turn Key 1 clockwise.

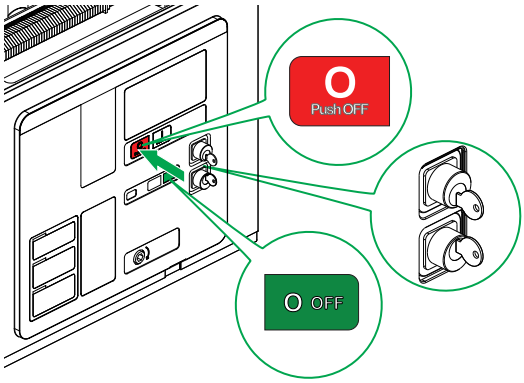


3. Key 1 is captive and can't be removed.

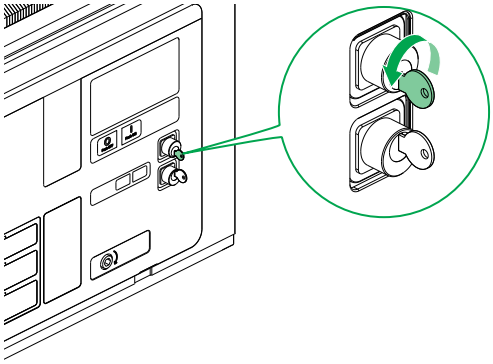


Lock with two keys

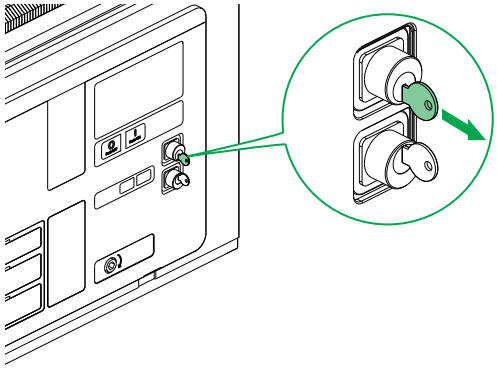
1. Open the circuit breaker by press the opening push button (key 1 and key 2 are capitive on the CB).



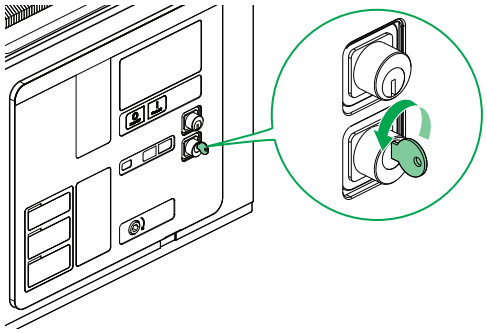
2. Turn Key 1 counterclockwise, the CB is locked in the opening position.



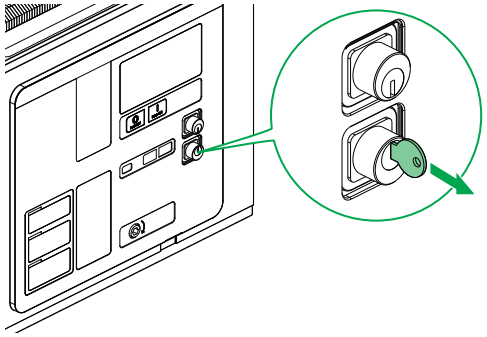
3. Remove Key 1.



4. Turn Key 2 counterclockwise. Keylock 1 is no more operational.

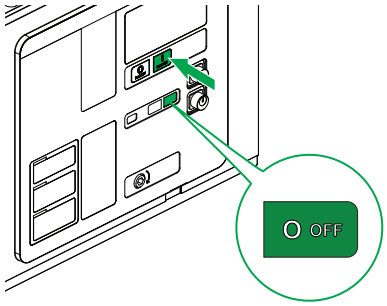


5. Remove Key 2.



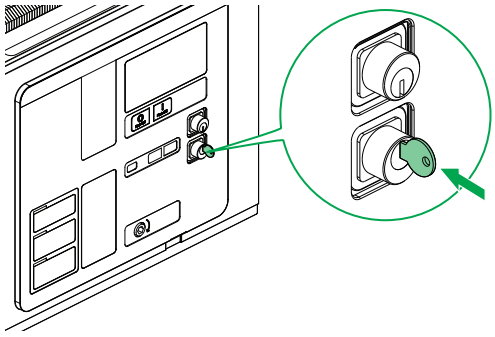
Check

1. Press the closing button to check that the circuit breaker can not be closed.

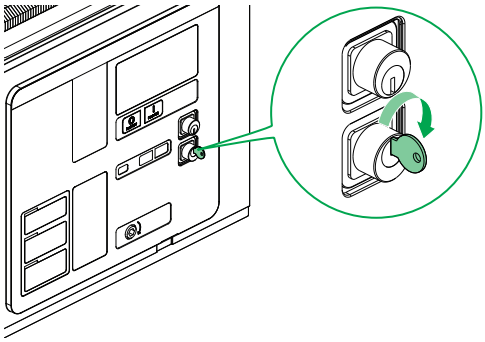


Unlock with two keys

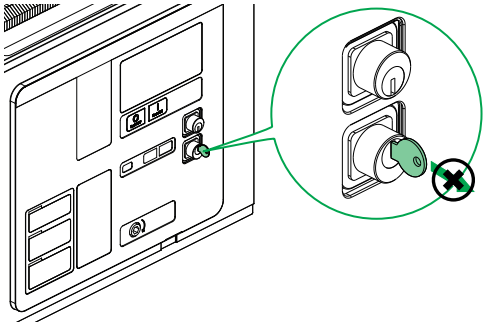
1. Insert Key 2.



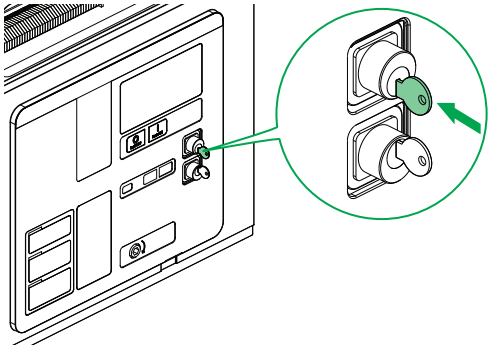
2. Turn Key 2 clockwise.



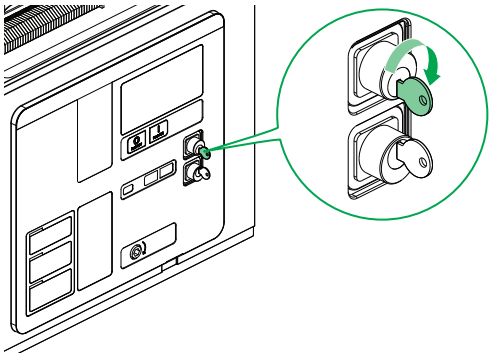
3. Key 2 is captive and can't be removed.



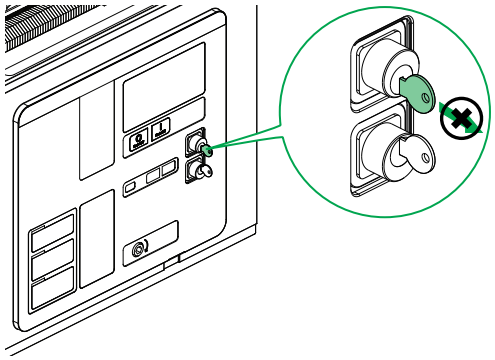
4. Insert Key 1.



5. Turn Key 1 clockwise.



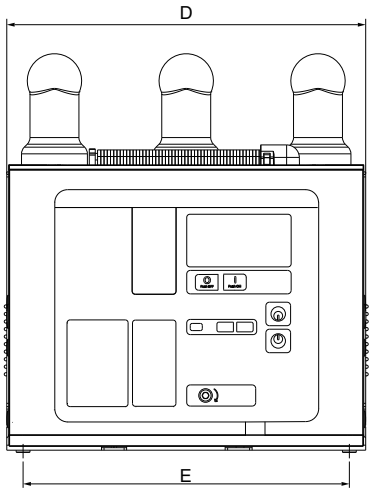
6. Key 1 is captive and can't be removed.

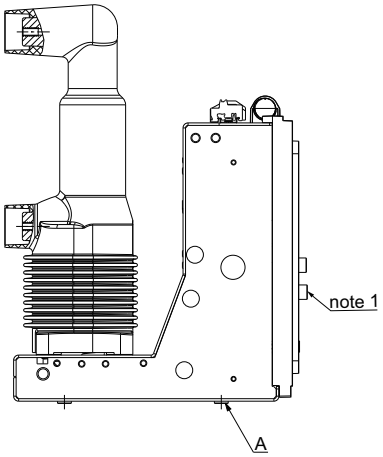


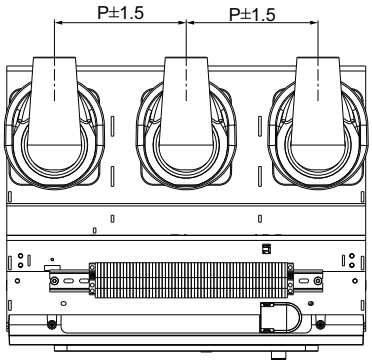
Main Dimensions and Installation of Fixed EvoPacT HVX Circuit Breaker

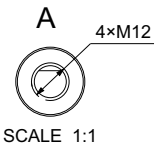
Main Dimensions of Fixed Circuit Breaker

1. 24kV, 630/1250A, 25/31.5kA







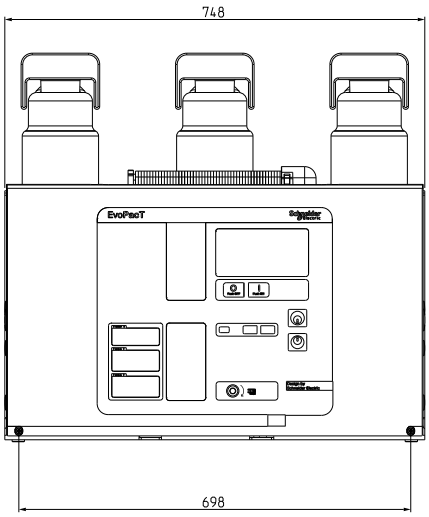


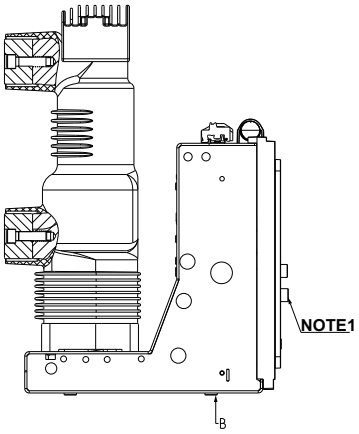
NOTE 1: Keylock is optional.

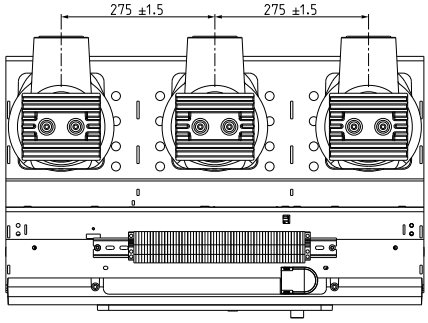
NOTE 2: Refer to the Outline drawing PKR2098102 for complete dimensions.

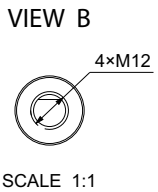
Rated current (A)	Rated short-circuit breaking current (kA)	P (mm)	D (mm)	E (mm)
630/1250	25/31.5	210	572	520
		275	748	700

2. 24kV, 1600/2000/2500, 25/31.5kA









NOTE 1: The keylock is optional.

NOTE 2: Refer to the Outline drawing BRU1357602 for complete dimensions.

Installation in the Switchgear

⚠⚠DANGER

All integration studies must be validated according to the IEC 62271-200:2021 or your local switchgear standard.

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

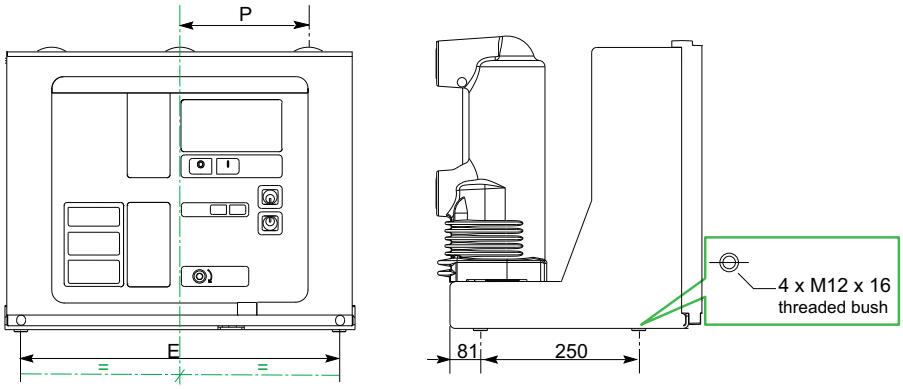
EvoPacT HVX has been certified in a specific test environment: all the dimensions and the main circuits are defined on the drawings. Please contact your local representative to request a copy. If there is any difference between the specific test environment and your integration, analyze the influence on the performance (dielectric and continuous current tests).

Fixing the EvoPacT HVX Circuit Breaker

The base plate of the circuit breaker has 4 holes.

Recommended screws	zinc plated screws M12, Class 8.8, with a spring washer
Tightening torque	70 ±10 % N•m

Fixing point position:



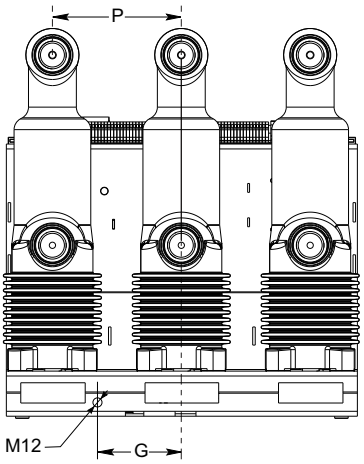
Voltage levels	24		
Rated Current (A)	630/1250		1600/2000/2500
Rated short-circuit breaking current (kA)	25/31.5		
Phase distance P (mm)	210	275	275
E (mm)	520	700	698

Note: Use fixing screws adapted to the thickness of the fixing points ensuring correct engagement with the bush and not more than 10 mm above the bush.

Earthing Connection

The earthing connection is available on the rear side of the circuit breaker and is done with one hole M12, tightening torque 70 ± 10% N_m for the fixation on the earthing point.

Recommended screws: zinc plated screws M12, Class 8.8, with a conical spring washer. Length of the thread is 10 mm.



Phase distance P(mm)	210	275
G(mm)	137.5	170

Install in Switchgear

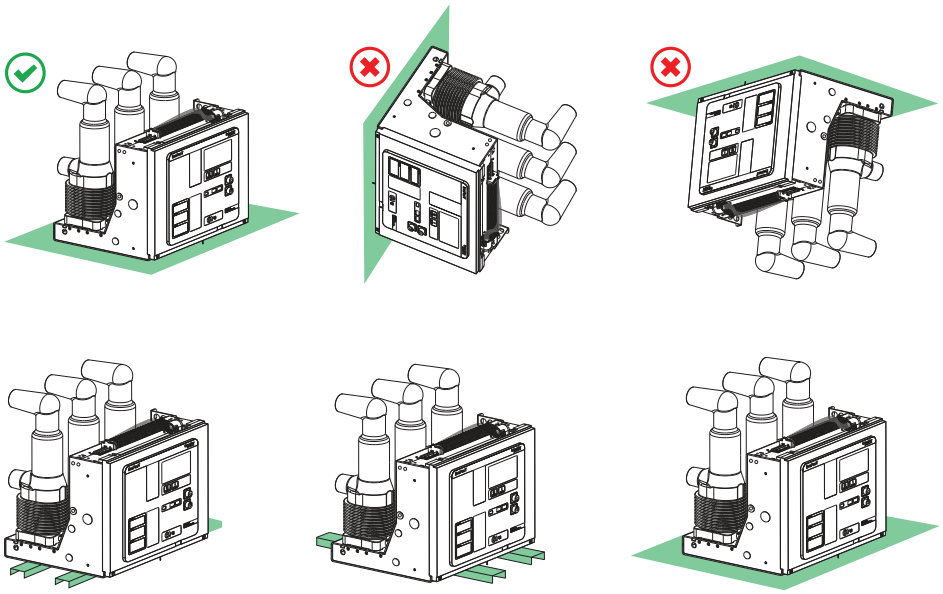
⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Installation conditions should provide sufficient distance between earthed metal sheet and device for dielectric withstand.

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

Possible positions

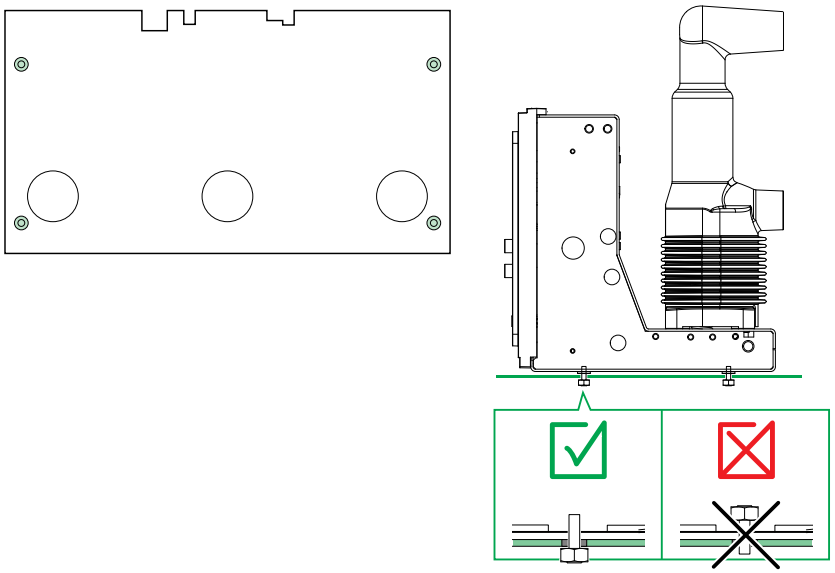


Mounting the circuit breaker

It is important to distribute the mass of the circuit breaker uniformly over a rigid mounting surface such as rails or a base plate.

To eliminate any risk of deformation which could interfere with correct operation of the circuit breaker, the surface on which the circuit breaker is to be mounted must have a flatness tolerance not greater than 2 mm.

The base plate of the circuit breaker has some holes, at least in line with the main axis of the poles, which could allow a better cooling and be useful for the temperature rise withstand.



Power Connections

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- The shape and dimensions of the power connections must be designed to take into account the dielectric and continuous current withstand requirements of the entire connection system.
- Ensure the tightening torque values are respected.
- Use only qualified screw with appropriate length to avoid any low contact pressure.
- All integration studies must be validated by performing type tests: dielectric and continuous current tests are required. Short time current may also be required.

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

Recommended screws	Tightening torque
zinc plated screws, Class 8.8, with a spring washer	M12: 70 ±10 % N•m

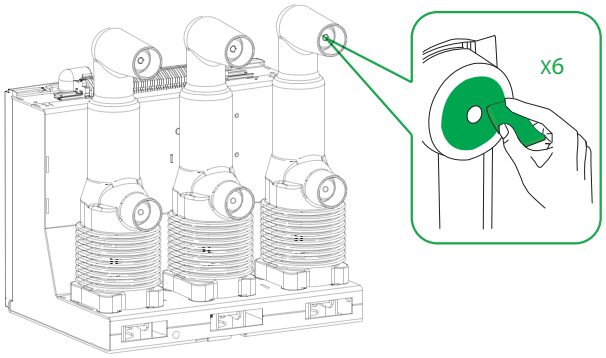
Connection surface preparation

The Medium Voltage power connections are made from aluminium AW 6082-T6 with 5µ silver electrolytic surface treatment.

Contact surfaces must be subjected to preliminary treatment before screwing.

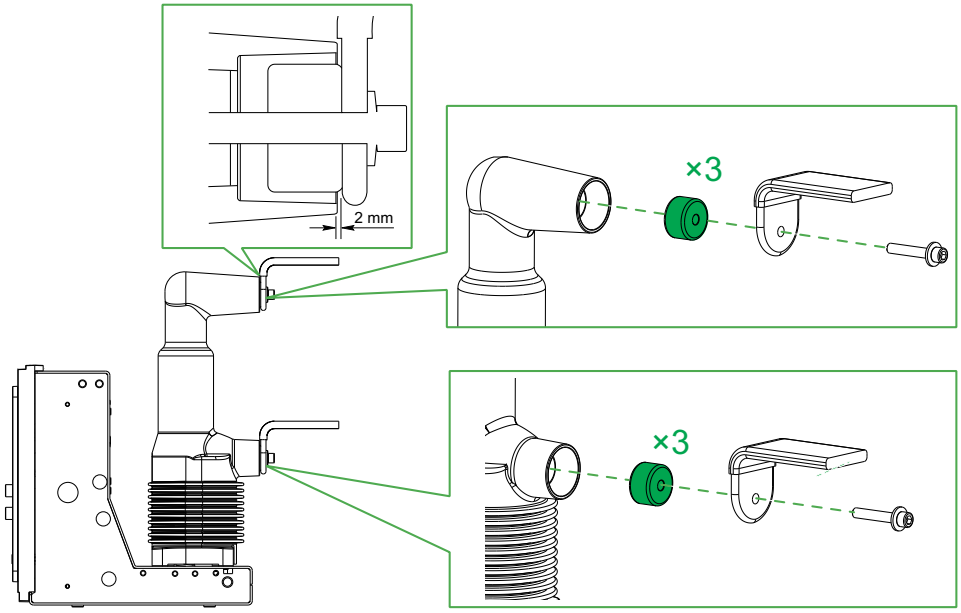
Make sure to use abrasive pad (grain size: 100 or finer) to clean all the particles from the circuit breaker.

The electroplating layer should not be damaged.

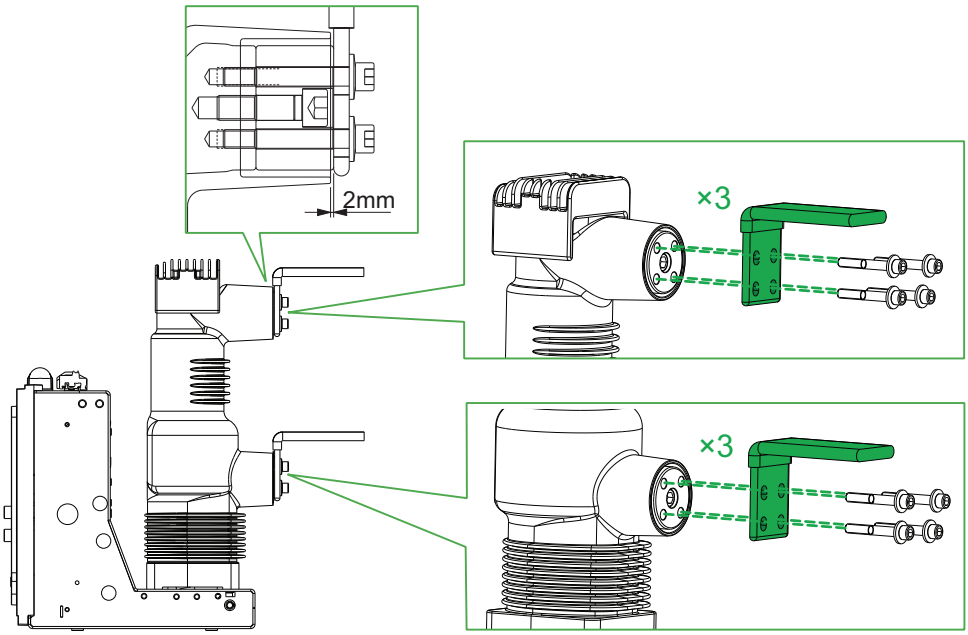


630/1250A connection

When connecting the copper bar, additional adapters(Schneider Electric provide) are recommended.



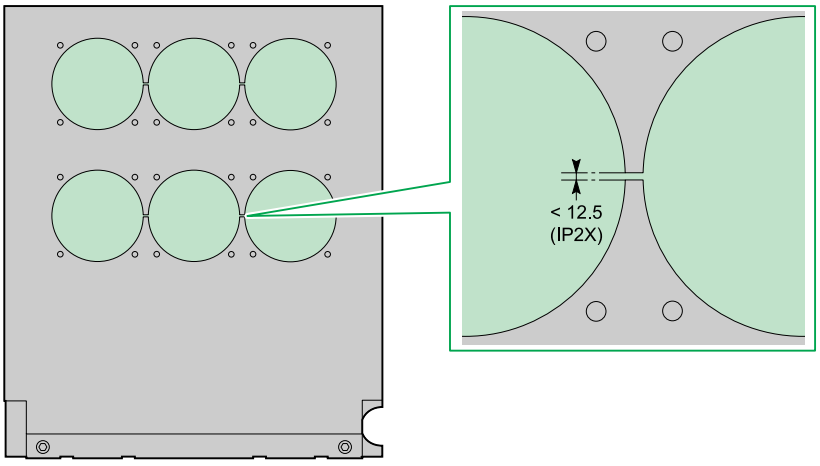
1600/2000/2500A connection



Main power circuit

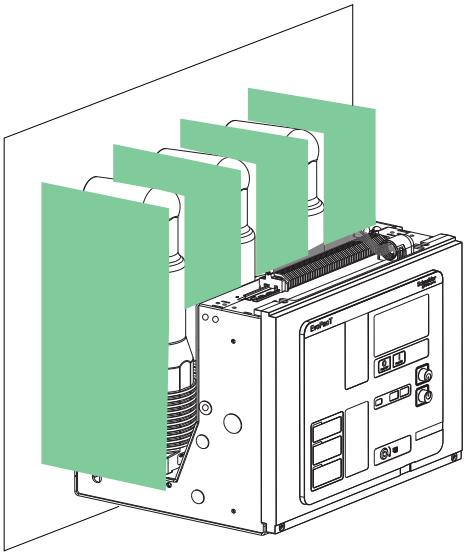
Eddy currents must be avoided to ensure no additional heat is generated.

NOTICE
HAZARD OF EXTRA HEATING Use non-magnetic material for partition or by adding cutouts on the sheet metal partition using the principle described in the picture as shown below. **Failure to follow these instructions can result in equipment damage.**



Inter-phase barrier

In some specific integration cases, where insulating phase barriers are required : barriers must be fixed on the cubicle and not on the circuit breaker.



Auxiliary Circuit Wiring Diagrams and Wiring Recommendations

⚠WARNING

HAZARD OF CIRCUIT BREAKER MALFUNCTION

- Ensure that the assigned auxiliary voltage is applied directly to the auxiliary terminals of the circuit breaker.
- Do not wire an auxiliary contact in series with the XF shunt closing release.
- Before power on, check whether the configuration of the secondary equipment is aligned with what you need.
- Before power on, check whether the voltage applied on the secondary equipment is aligned with its electrical parameter.
- Contact point 41 and 13 can only be used for trip circuit supervision(TCS), contact point12 can only be used for close circuit supervision(CCS), can not be used for opening and closing circuit loop control.

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

Wiring diagram

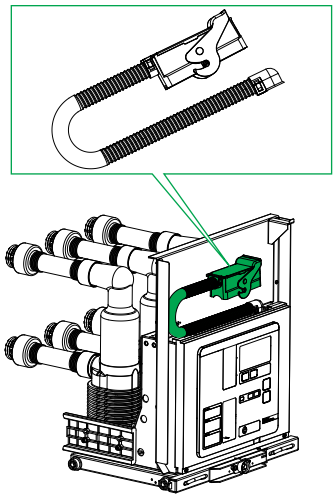
The electrical diagrams show the maximum circuit breaker equipments, using the number of pins available in the Schneider Electric offer. Schematic Diagram, refer to Schematic Diagram, page 97 for the list of wiring diagrams available for the fixed circuit breaker.

Low Voltage Connection and wires characteristics

The fixed circuit breaker is delivered with a connection plug or a terminal block.

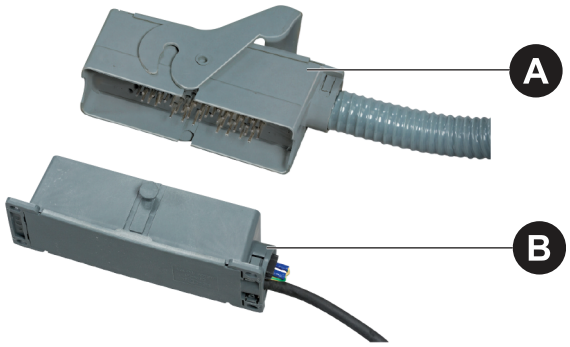
The Low Voltage wiring has to be done in adaptation to the auxiliary equipment of the circuit breaker. Connection plug solutions are also available upon request, please consult Schneider Electric.

Connection plug type



The connection plug type consists of a removable female connector and 58 male contacts mounted on a 750 mm flexible duct.

The male connector and 58 male contacts will be provided as loose components for the connection to the switchgear low voltage cabinet.

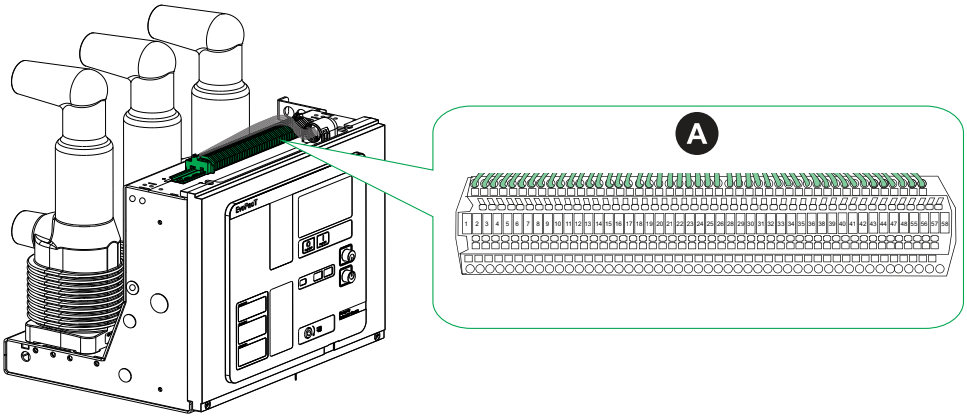


A. Female connector
B. Male connector

Terminal block type

The terminal block consists of maximum 48 spring connection terminals depending on the configuration of the CB and is assembled on the frame of the circuit breaker.

According to the wiring diagram, from left to right, all terminals are marked with the corresponding wire reference.



A. Terminal block coding

Wire characteristics

The connector is wired with:

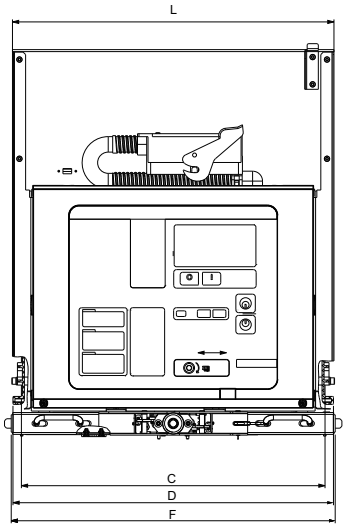
- 1 mm^2 wires
- A 1.5 mm^2 earthing wire

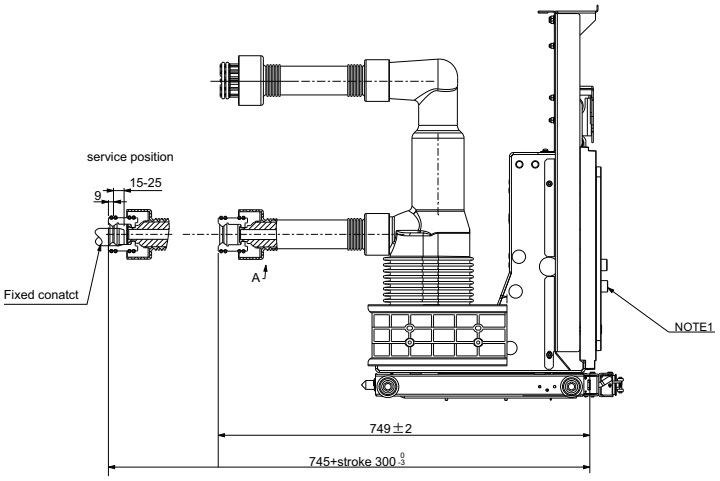
NOTICE
HAZARD OF DIELECTRIC FAILURE Take care of the LV wiring duct. The circuit breaker connections must be designed to avoid dielectric issue. **Failure to follow these instructions can result in equipment damage.**

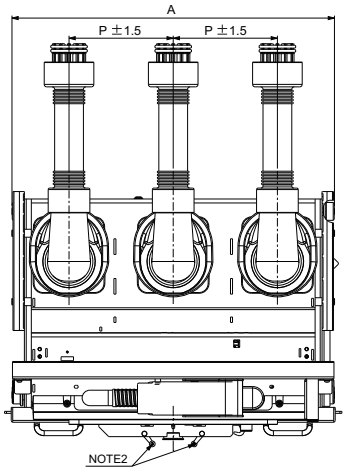
Main Dimensions and Installation of Withdrawable EvoPacT HVX Circuit Breaker

Main Dimensions of Withdrawable Circuit Breaker

1. 24kV, 630/1250A, 25/31.5kA







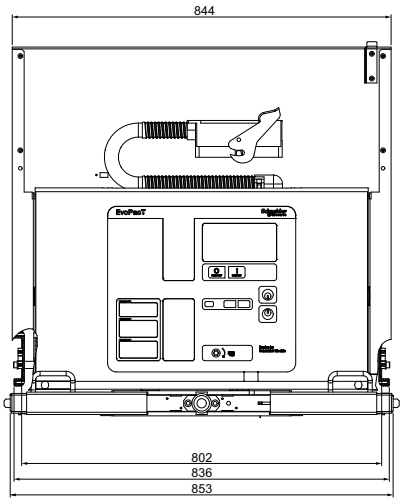
NOTE 1: Keylock is optional.

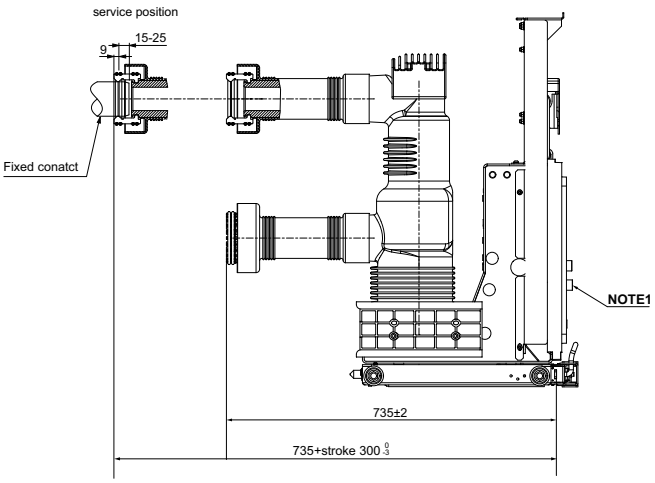
NOTE 2: Door interlock is optional.

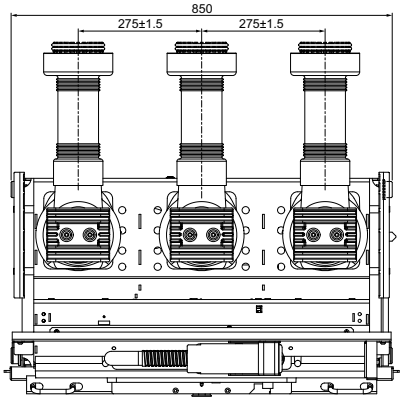
NOTE 3: Refer to the outline drawing PKR2219802 for complete dimensions.

Rated current (A)	**Rated short-circuit breaking current (kA)**	P (mm)	A (mm)	C (mm)	D (mm)	E (mm)	L (mm)
630/1250	25/31.5	210	650	612	646	653	648
		275	850	802	836	853	844

2. 24kV, 1600/2000/2500A, 25/31.5kA







NOTE 1: Keylock is optional.

NOTE 2: Door interlock is optional.

NOTE 3: Refer to the outline drawing BQT5438302 for complete dimensions.

Installation in the Switchgear

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- All integration studies must be validated according to the IEC 62271-200 or your local switchgear standard.
- For any variations, consequences must be analyzed for dielectric and continuous current performances impact. The short-circuit for clusters connections and functional interlocks should also be analyzed.

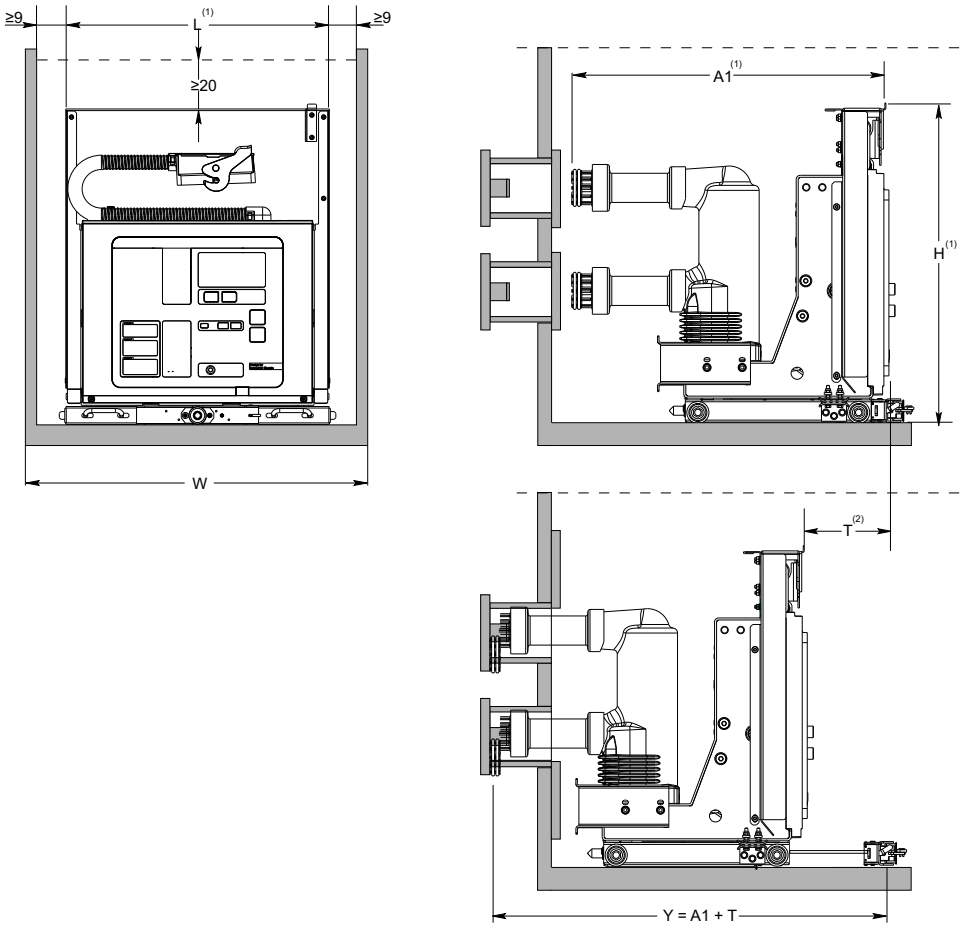
Failure to follow these instructions will result in death or serious injury.

EvoPacT HVX has been certified in a reference cubicle: all the dimensions, openings, and the main circuits are defined on the drawings. Please contact your local representative to request a copy.

To help ensuring the reliability of interlocks delivered by the customized circuit breaker, interfaces between circuit breaker and cubicle must be correctly implemented (racking truck/rails, racking truck/door, handle door and racking truck/Earthing switch).

Switchgear dimensions (circuit breaker compartment)

The dimensions of the circuit breaker compartment shall respect those indicated in the table and illustrations below to enable the circuit breaker to be freely inserted with its racking track and its auxiliary and control circuit breaker connector. For IP2X compliance, it may be necessary to add additional covers to the circuit breaker compartment of the switchgear.



(1): Refer to the paragraph “Dimensions and mass of the circuit breaker”
(2): T is the travel of the circuit breaker from the test position to the service position.

Rated votage	**Ur**	**kV**	**24**
Travel	T	mm	300

Preferred switchgear width				
Phase Distance	**PD**	**mm**	**210**	**275**
Width	W	mm	800	1000

Device Environment

Installation conditions should provide sufficient distance between the earthed metal sheet and the device for dielectric withstand.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- All cabinet performance must be verified according to IEC 62271-200:2021 or your local switchgear standard.
- For any other case, the insulation, continuous current and short-time withstand current must be verified, and the reliability of the contact connection and functional interlocking should also be analyzed.

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

The EvoPacT HVX has been type-tested in Schneider Electric PIX switchgear.

Earthing of the Withdrawable Circuit Breaker

The CB shall remain connected to Earth in all positions, Disconnected/Test, Service and intermediate, and also in any **Intermediate** position. According to IEC62271-200, the rail of the cubicle shall be designed to carry 30 A (dc.) with a voltage drop of maximum 3V to the earthing point of the cubicle. We recommend using non-painted parts with the earthing circuit.

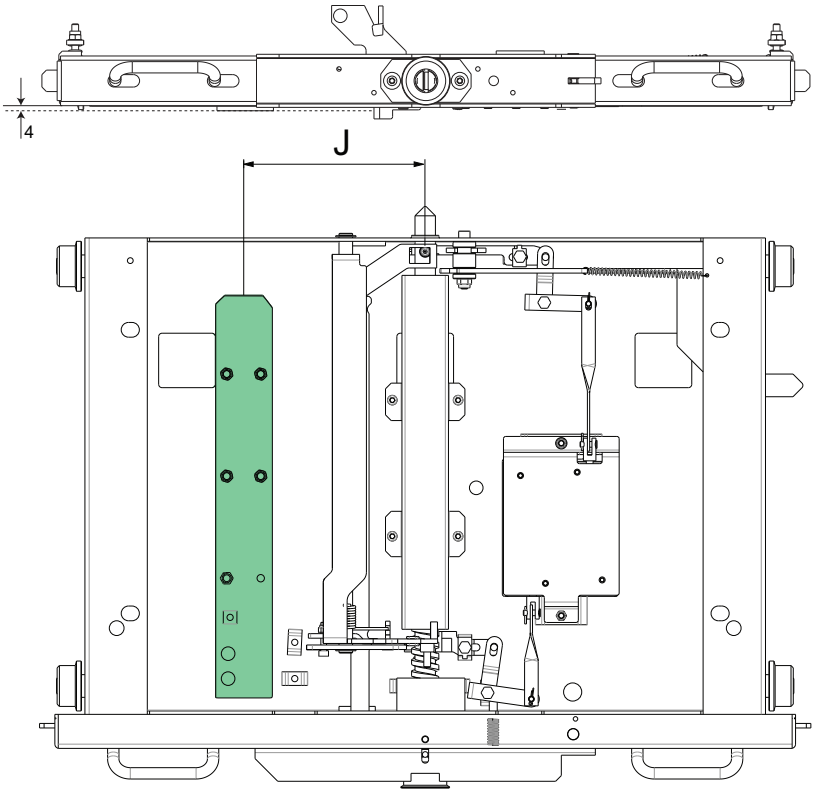
The circuit breaker can be earthed by one of the following:

- copper bar fixed on the bottom of the racking truck.
  - 1 bar for PD = 210 mm
  - 2 bars for PD = 275 mm
- 2 sliding contacts on both sides of the racking truck.

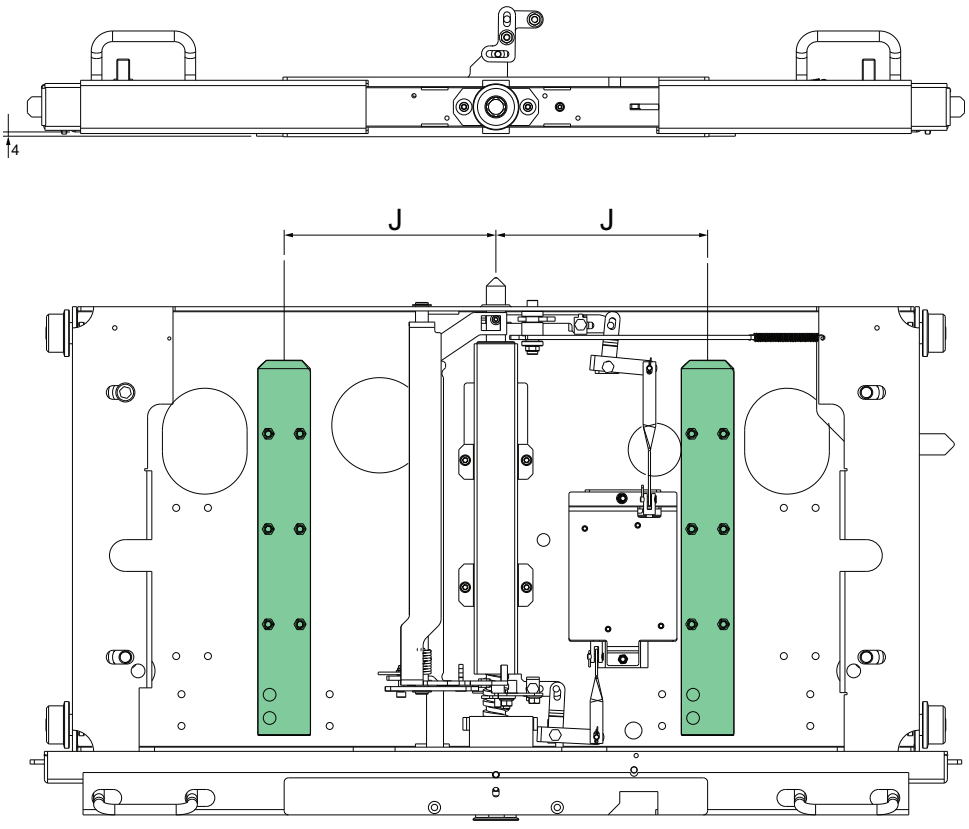
Bottom earthing

The truck can be equipped with 1 or 2 copper bars (as shown below), and the bar can slide on flexible contacts assembled on the circuit breaker compartment floor of the switchgear (part not provided). The bottom earthing bar, 50 mm width x 4 mm thick, shall be assembled on the bottom surface of the racking truck.

Phase distance: 210



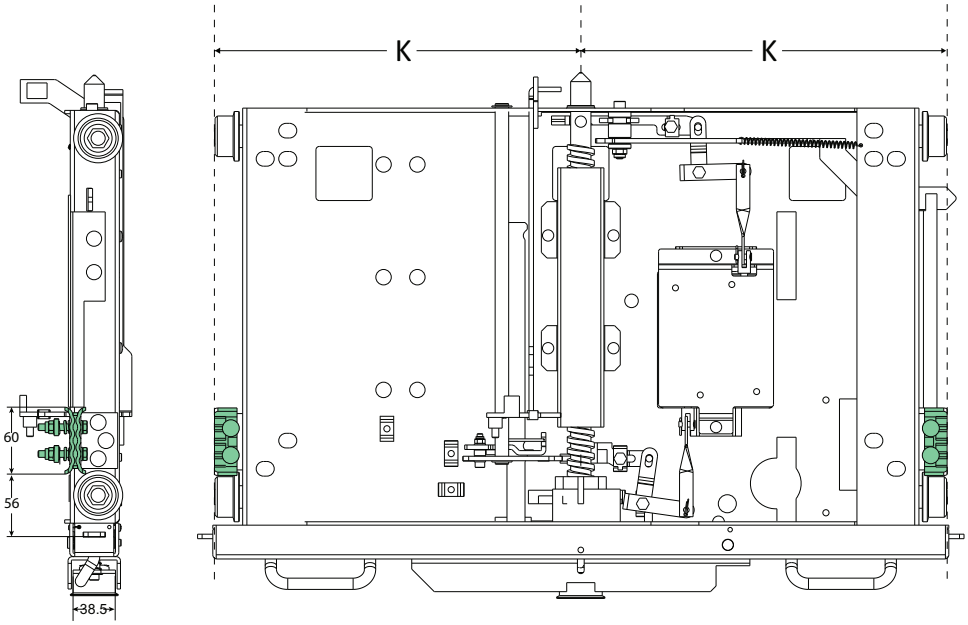
Phase distance: 275



Phase distance	PD(mm)	210	275
Position of the earthing bars	J (mm)	160	200 (with two busbars)

Side earthing

2 earthing contacts can be assembled on both sides of the racking truck. They can slide on bars fixed to the circuit breaker compartment of the switchgear. (example: top part of the rails which guide the circuit breaker).



Phase distance	P (mm)	210	275
Position of the earthing pads	K (mm)	325	425

Racking truck/Rails in the switchgear

The circuit breaker compartment shall be equipped with rails in order to

- Guide the circuit breaker during racking operations.
- Ensure relative position between fixed and moving parts.
- Ensure correct operation of interlocks

⚠ DANGER

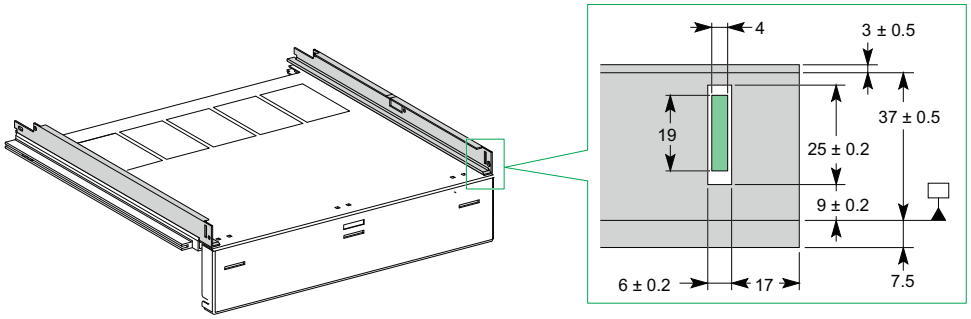
HAZARD OF RACKING OPERATION AND INTERLOCKING MALFUNCTION

The rail dimensions and position must be adapted to comply strictly with the technical description as below.

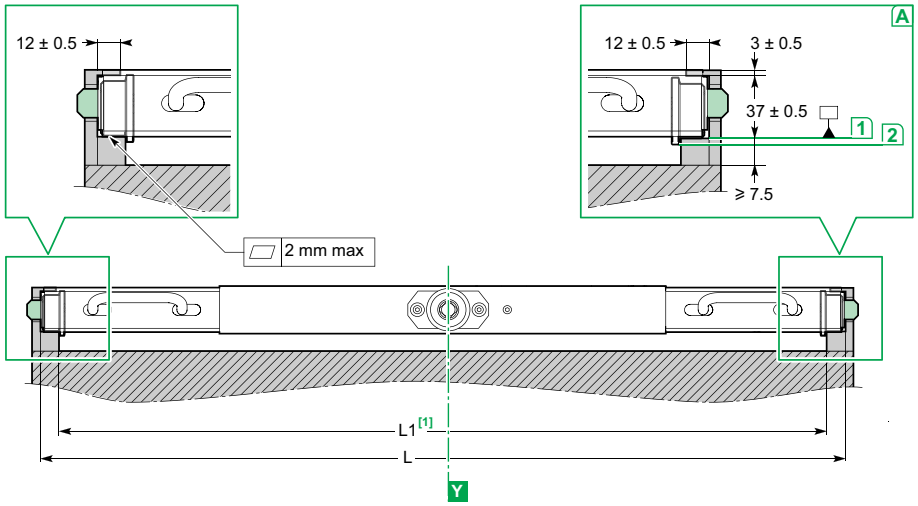
- Two slots shall be provided on the rails for attachment of the racking truck locking tabs.
- The accepted flatness tolerance of the plane through the rails shall not be greater than 2 mm.
- The rails shall be positioned symmetrically to the middle phase of the circuit breaker.

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

The following illustrations show the locking position for the circuit breaker inside the switchgear compartment.



Front view of racking transport table and the rails

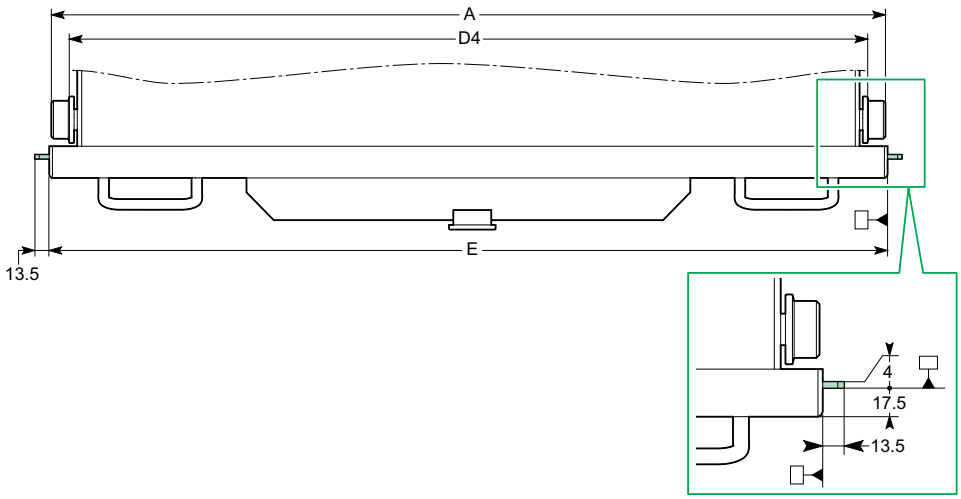


[1]: Free area for parts of the circuit breaker which protrude below the rolling surface

Main dimensions of the rails and the slots
[A]: Rolling base detail

- [1]: Rolling surface on the switchgear rails
- [2]: Rolling surface outside the switchgear (floor)

Top view of racking transport table



Positioning dimensions of the rails(mm)					
Phase Distance	**L**	**L1**	**E**	**A**	**D4**
210	654	621	653	650	618
275	854	821	853	850	818

Racking Truck / Switchgear Earthing Switch

The circuit breaker includes two parts which can interlock with the switchgear earthing switch to prevent：

- the earthing switch closing if the circuit breaker is not in the disconnected/test position.
- the circuit breaker racking in if the earthing switch is not open.

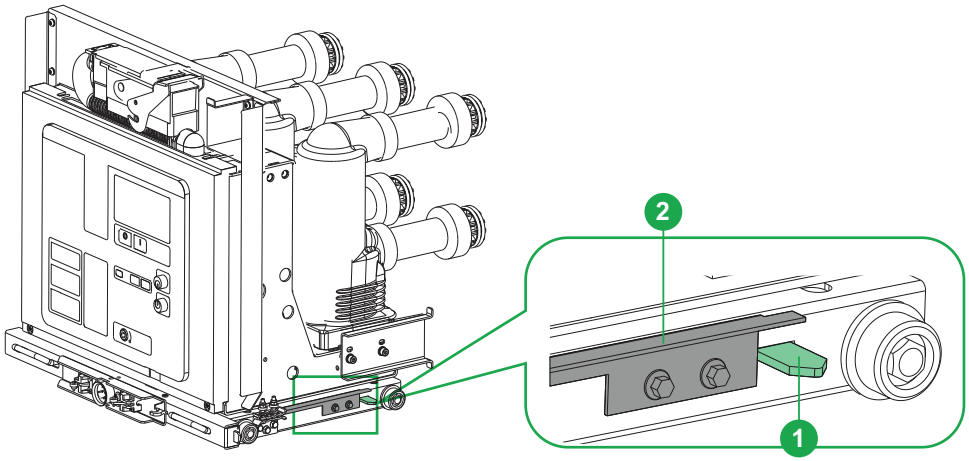
Part **1** and Part **2** are located on the right side of the circuit breaker racking truck.

⚠WARNING

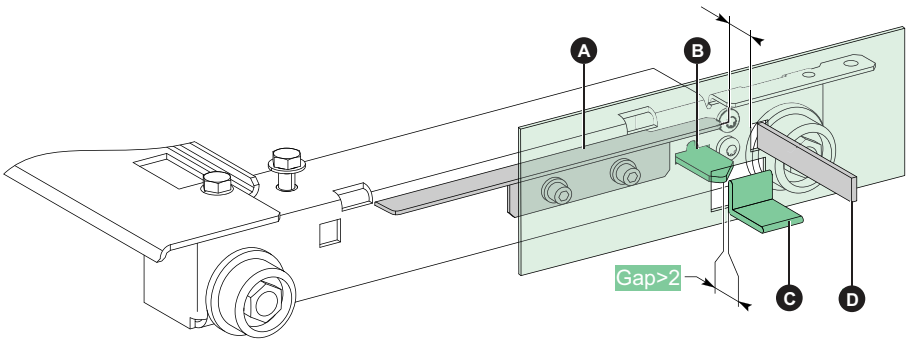
HAZARD OF INAPPROPRIATE FORCED OPERATION

Operators must be familiar with these interlocks before operating the circuit breaker.

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



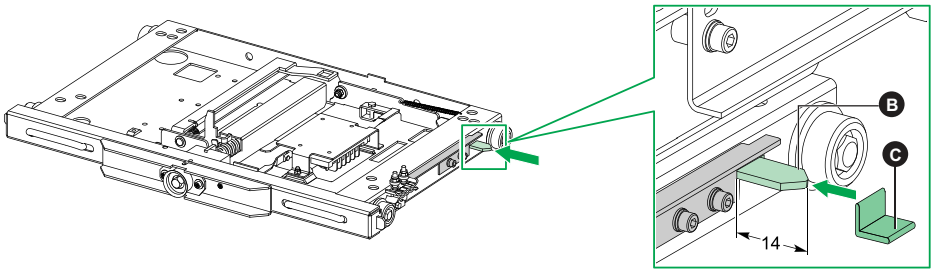
Parts for interlock with the switchgear earthing switch



A. Locking part
B. Sliding lever
C. Sliding rod
D. Locking part

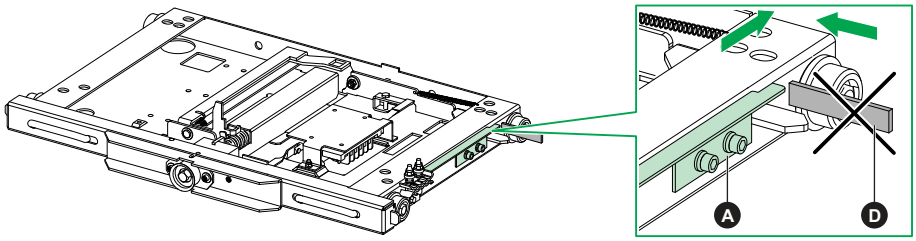
The sliding rod C and the locking part D are not in contact with the with the locking part A and sliding lever B. Therefore, the circuit breaker is ready to be racked in.

Sliding lever



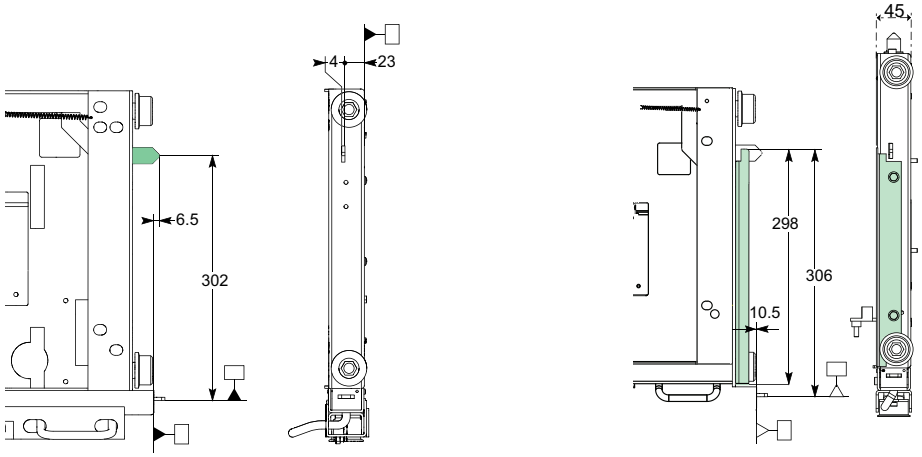
Once the earthing switch is closed, the sliding lever B shall be pushed by the sliding rod C with a travel of 14 mm to prevent the circuit breaker from being racked in.

Locking part



When the circuit breaker has left its test position, the locking part A can be used to interlock the earthing switch.

In this position , it is impossible to operate the earthing switch mechanism (earthing switch can not be inserted) as soon as the circuit breaker has left the disconnected position. The locking part D is locked by the locking part A.



Clusters

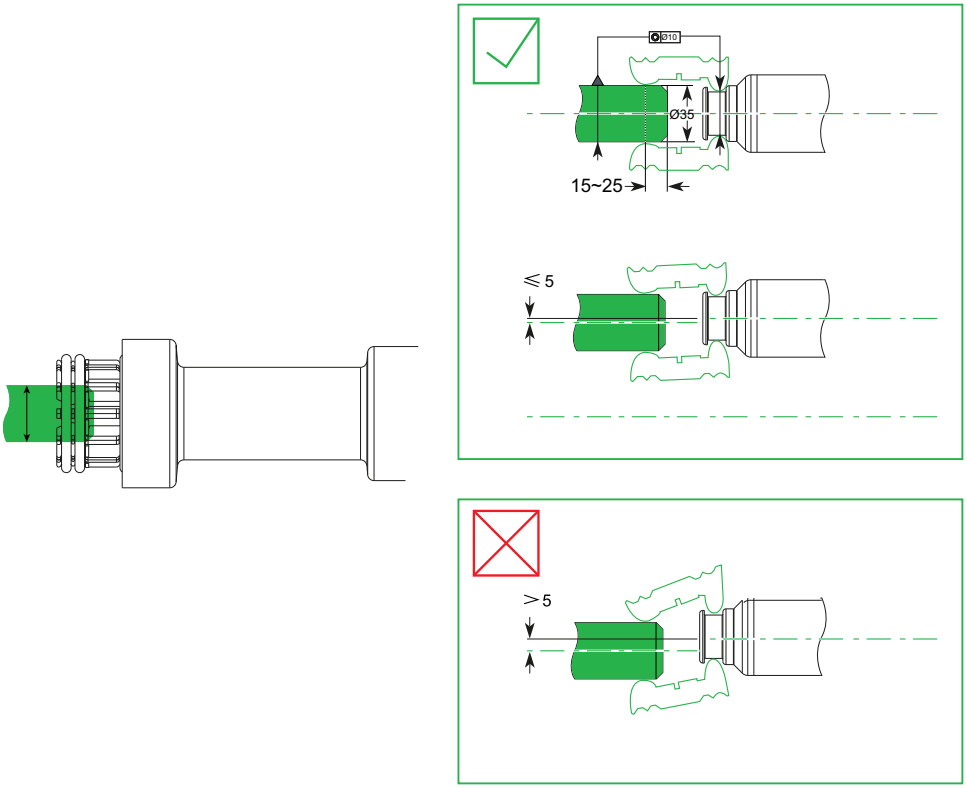
⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Make sure that the clusters are correctly positioned and aligned with the fixed contact in the bushing. Refer to the following technical data.

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

Examples of fixed contact placement into the cluster



Bushing

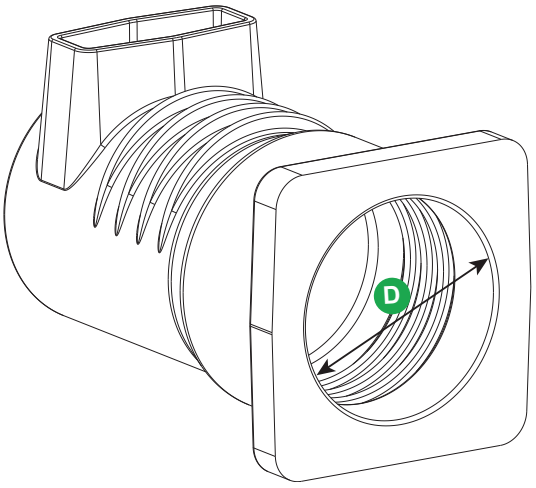
NOTICE

HAZARD OF LACK OF PERFORMANCE

Conduct the following tests to prove the performance of the bushing in the switchgear environment:

- Dielectric.
- Continuous current.
- Short-time withstand current (STC).

Failure to follow these instructions can result in equipment damage.



Rated voltage (kV)	Rated current (A)	Rated short-circuit breaking current (kA)	Recommend Bushing diameter D (mm)
24	630/1250	25/31.5	138
	1600/2000/2500	25/31.5	192

NOTICE

The bushing surface must have no burrs, and have enough creepage distance.

The recommended value is at least 480mm.

Failure to follow these instructions can result in equipment damage.

Shutter Ramp

⚠⚠DANGER

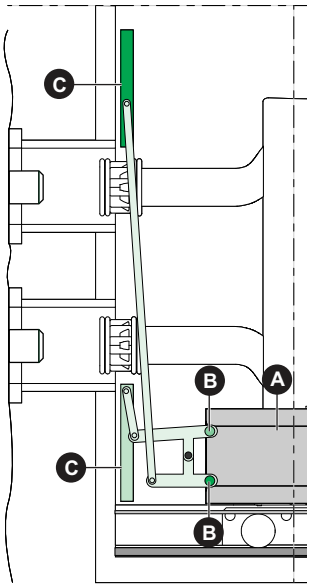
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- The shutter mechanism of the switchgear must be designed to operate correctly with the circuit breaker ramps and must comply with IEC standard.
- Ensure that a minimum gap between shutters and clusters is respected during the racking operations (See figure **C** on the next page).

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

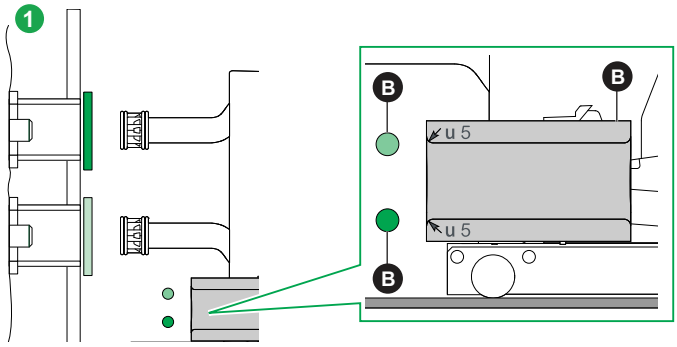
Shutter ramps located on both side of the circuit breaker shall operate the shutter mechanism with the 2 rollers simultaneously. The travel of the shutter must be adapted to ensure a minimum gap between shutters and clusters during the racking operation (refer to view 3).

Example of shutter operation

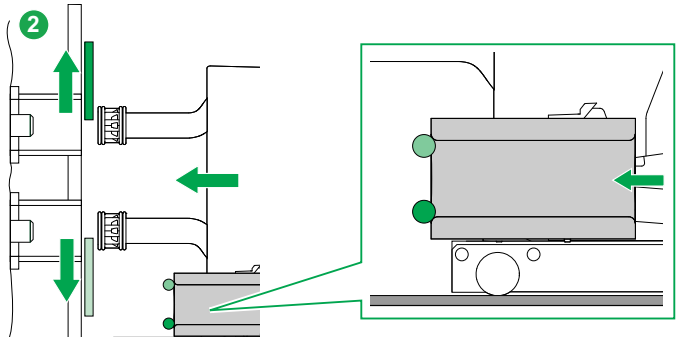


A. shutter ramp
B. shutter mechanism rollers
C. shutter

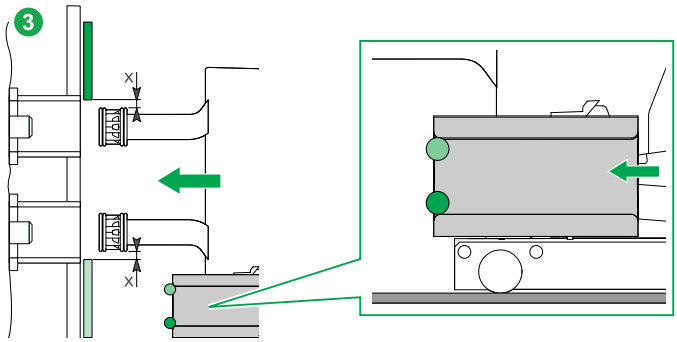
The view on the right 1–4 show the operating principle of shutter ramps during circuit breaker racking-in.



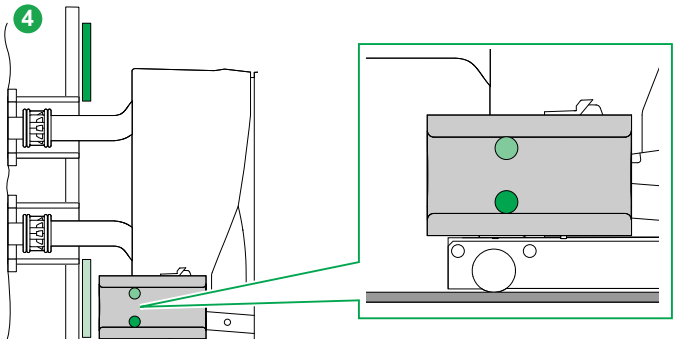
The circuit breaker is in the disconnected/test position, the shutters are closed.



When the shutter ramps reach the rollers, the rollers start opening of the shutters.



Ensure that a minimum gap X between the shutters and the clusters is respected during the racking operations. The circuit breaker racking-in is still in progress.



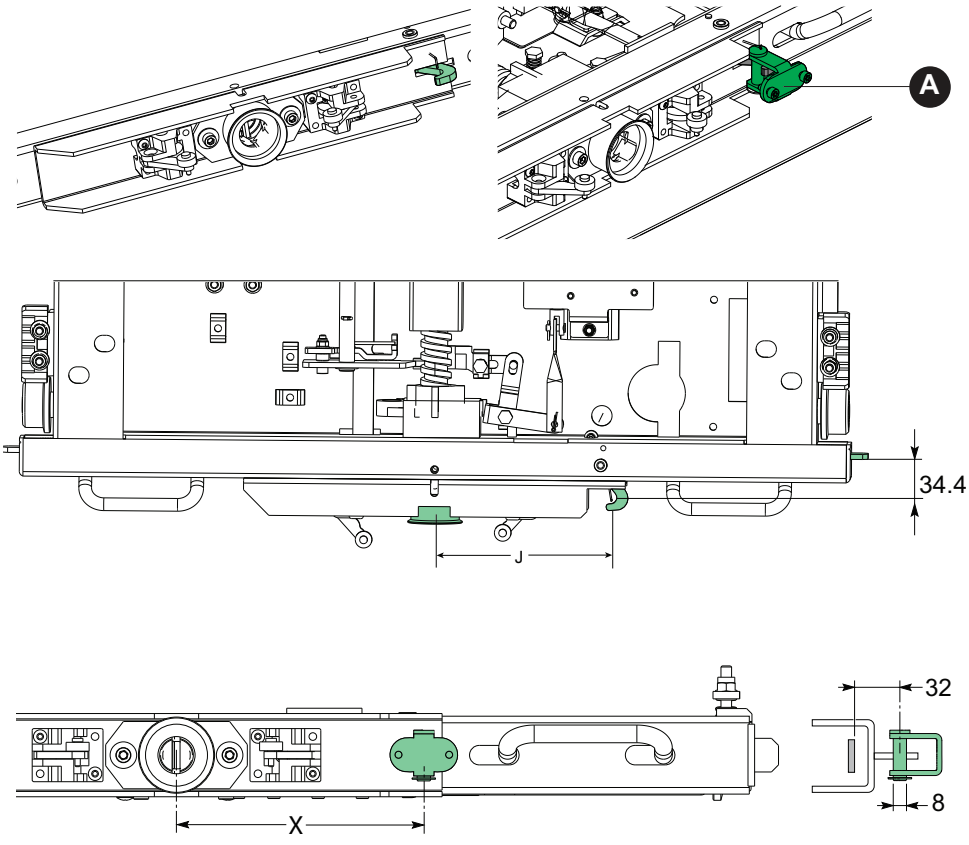
The circuit breaker is in the service position, The shutters have reached their final open position.

Circuit Breaker Compartment Door Interlock

Refer to chapter Interlocks (Only for Withdrawable Type)" to get details about Door lock mounting. Dimensions are indicated below:

Hook on the racking racking truck

Lock on the switchgear door



Position of the racking truck hook	J	mm	132.5
Position of the door locking hook	X	mm	128.5

Auxiliary Circuit Wiring Diagram and Wiring Recommendations

⚠WARNING

HAZARD OF CIRCUIT BREAKER MALFUNCTION

- Ensure that the assigned auxiliary voltage is applied directly to the auxiliary terminals of the circuit breaker.
- Do not wire an auxiliary contact in series with the XF shunt closing release.
- Before power on, check whether the configuration of the secondary equipment is aligned with what you need.
- Before power on, check whether the voltage applied on the secondary equipment is aligned with its electrical parameter.
- Contact 41 and 13 can only be used for Trip Circuit Supervision (TCS), and contact 12 can only be used for Closing circuit Supervision (CCS). They can not be used for opening or closing circuit control.

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

Wiring diagram

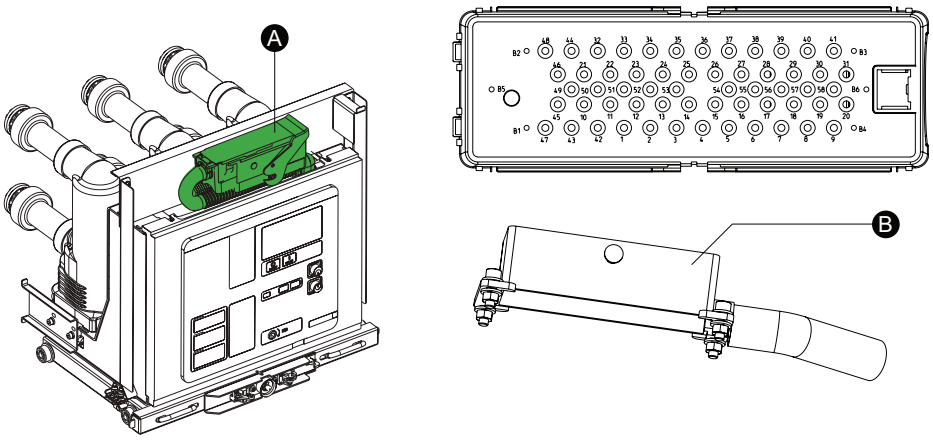
The electrical diagrams show the maximum circuit breaker equippments, using the number of pins available in the Schneider Electric offer. Refer to Schematic Diagram, page 97 for the list of wiring diagrams available for the withdrawable circuit breakers.

The circuit breaker is in the Discharged and OPEN positions. The racking truck is in service position.

Low Voltage Connection and wires characteristics

The standard withdrawable circuit breaker is delivered with a connection plug.

The Low Voltage wiring has to be performed in adaptation to the auxiliary equipment of the circuit breaker.



A. LV plug on circuit breaker

B. LV socket on cubicle

The socket and 58 contact pins will be provided as loose components for the connection to the switchgear Low Voltage cabinet.

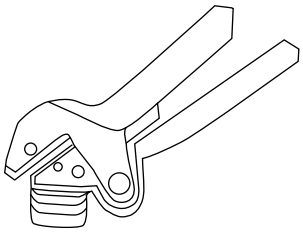
Wire characteristics

The connection plug is wired with:

- Wire of 1 mm²
- 2 x 1.5 mm² earthing wires

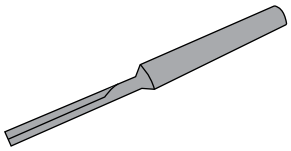
Specific tools are needed to fix or remove wires in the connector of the low voltage cabinet in the switchgear.

- Pin fitting

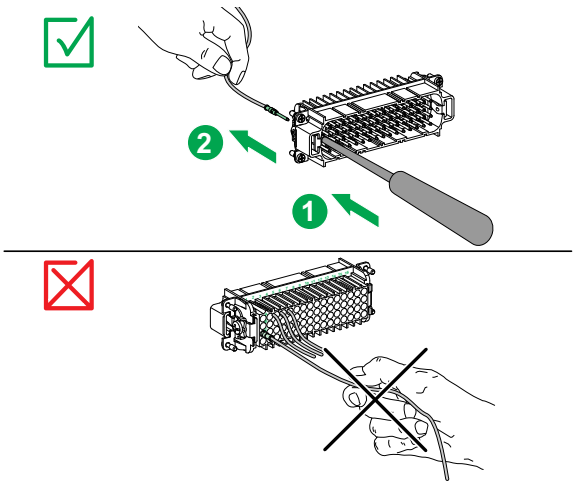


Crimping tool: 1980010010011 TL02G or equivalent

- Pin removal



PIN removable tool : 1980010000008 TL08

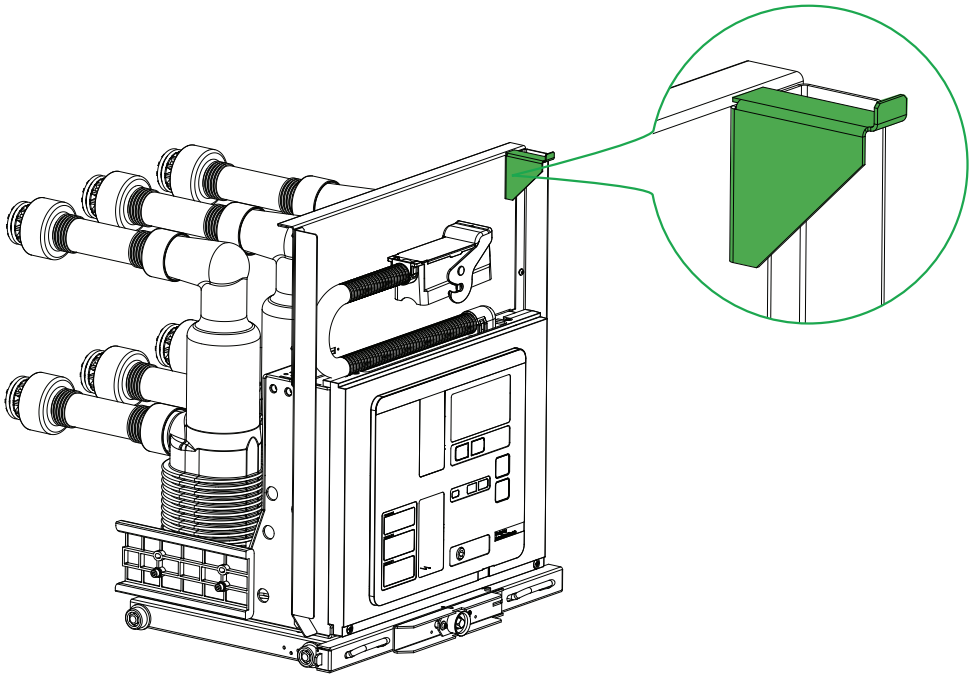


Racking Truck/LV Plug

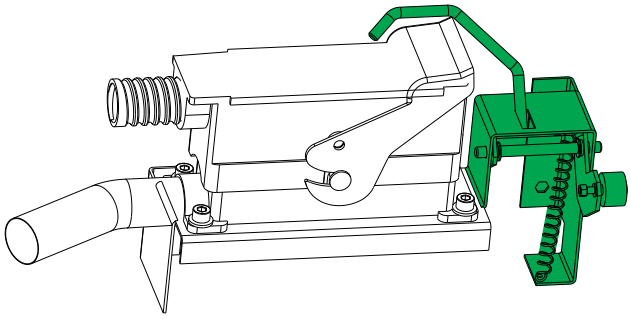
A mechanical interlock (not provided by Schneider Electric) assembled on the switchgear can help preventing the LV plug from disconnecting as long as the circuit breaker is not in the test position. Once the circuit breaker is in the test position, the blocking lever will be released and it will be possible to disconnect the LV plug.

If a door interlock is already used, once the circuit breaker has left its test position, the LV plug cannot be accessed due to the door is closed. In this case, this Low Voltage plug mechanical interlock is not needed.

If this mechanical interlock is used, it will be operated by the green highligted part of the circuit breaker as shown below.

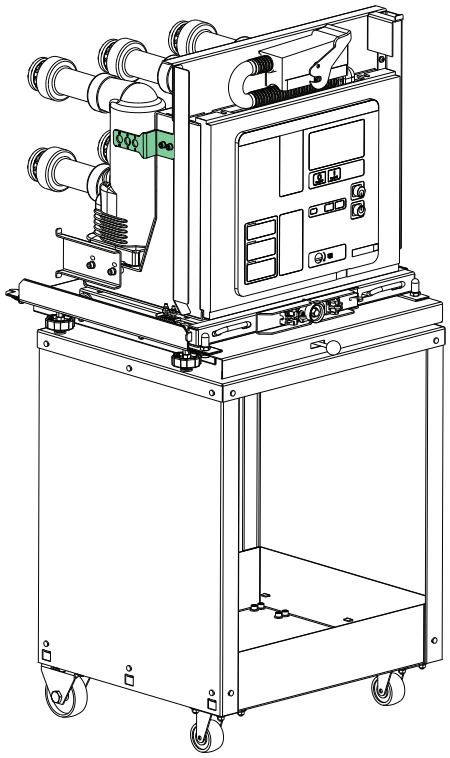


The following figure shows the mechanical interlock inside the cubicle (optional latching to be carried out by Panel builder) .



Inserting Circuit Breaker into Cubicle by Transport Table

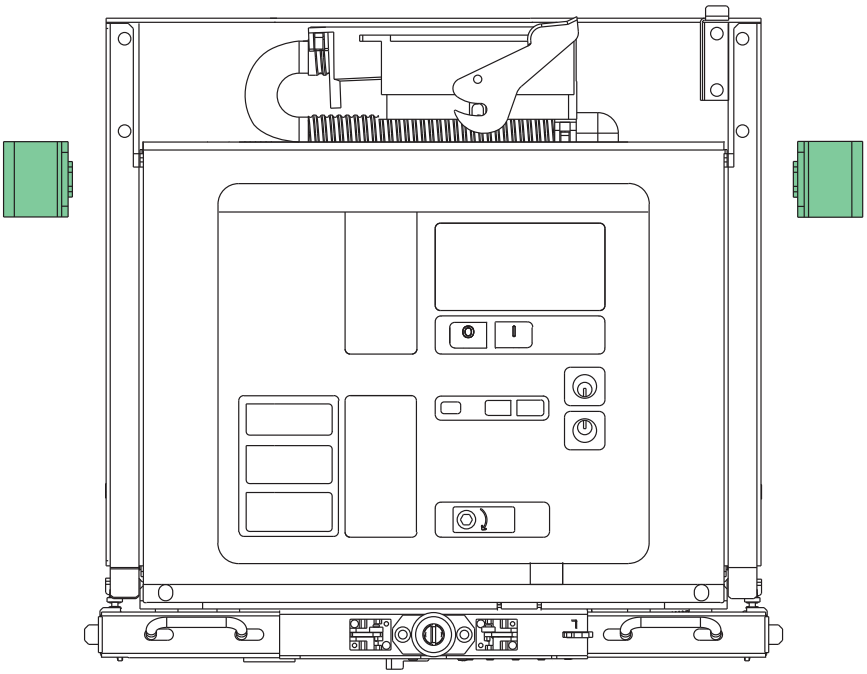
1. Lifting circuit breaker onto the transport table and lock it on the transport table



NOTICE
HAZARD OF INAPPROPRIATE OPERATION During tranport of EvoPacT HVX on the transport table, be sure that the circuit breaker is locked on the table. **Failure to follow these instructions can result in equipment damage.**

Transport table is not part of Schneider Electric supply.

2. Remove the lifting brackets



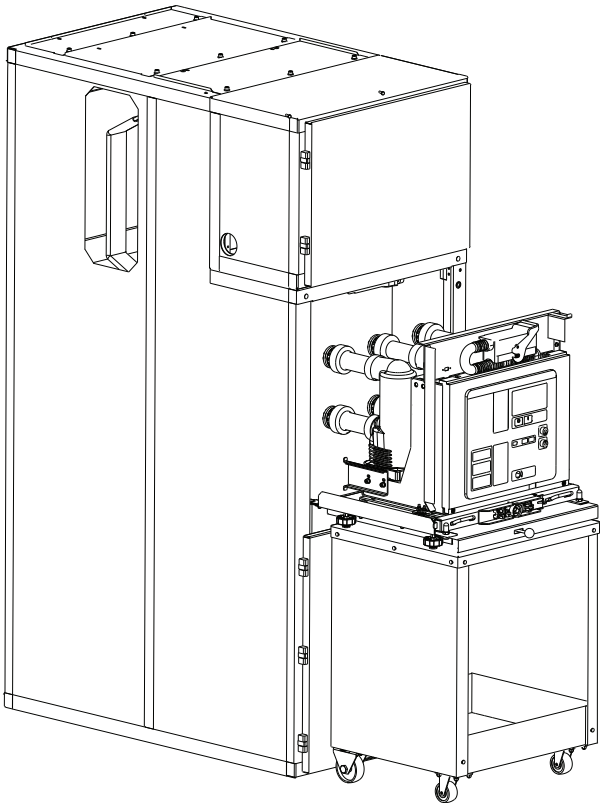
3. Push the circuit breaker into test/disconnected position

NOTICE

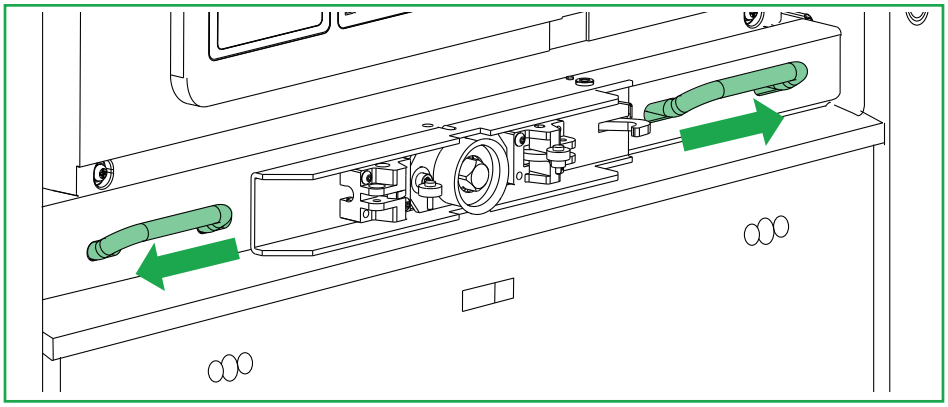
HAZARD OF INAPPROPRIATE OPERATION

- Before pushing the circuit breaker into the cubicle, align the transport table with cubicle first.
- Ensure that the rail between the transport table and cubicle is on the same plane, and lock the transport table with cubicle.
- Make sure the transport table is stable before operation.

Failure to follow these instructions can result in equipment damage.

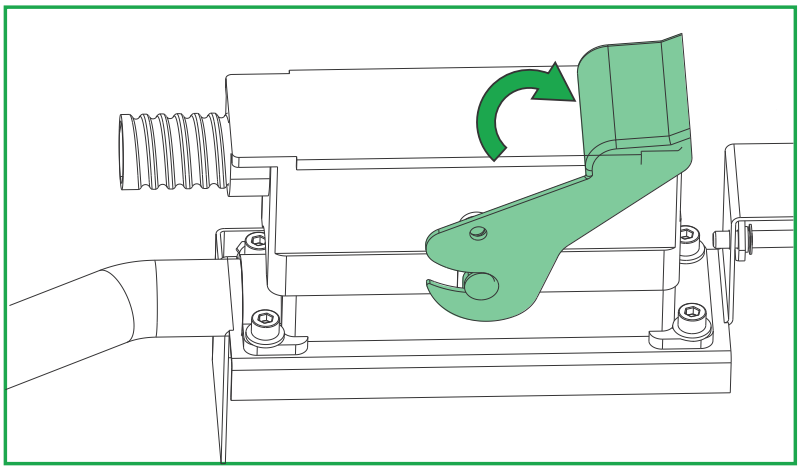


Then push the circuit breaker into the test/disconnected position. Lock the circuit breaker in the cubicle.



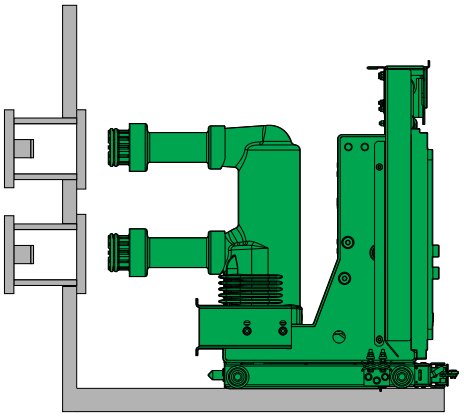
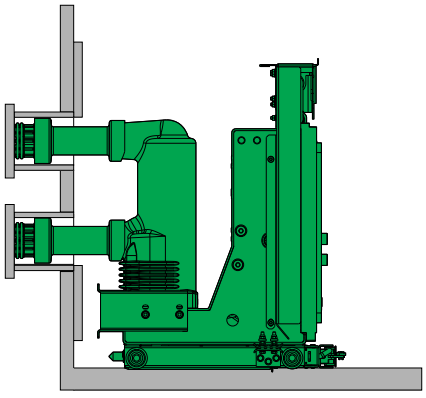
4. Connect the LV plug to the cubicle

Connect the Low voltage plug of the circuit breaker to the Low voltage socket on the cubicle side. Then lock the Low voltage plug.



5. Use the racking handle to move the circuit breaker from test/disconnected position to service position

Racked-in in the service position, the clusters should be fully engaged on the fixed contact of the bushings.

Circuit breaker in test/disconnected position	Circuit breaker in service position
	

Remove Circuit Breaker From Cubicle by Using Transport Table

The following procedures shows how to remove circuit breaker from cubicle by using transport table.

1. Rack out the circuit breaker from service position to test/disconnected position.
2. Disconnect the LV plug from cubicle.
3. Align the transport table with cubicle. Ensure that the rail between transport table and cubicle is on the same plane. Lock the transport table beside the cubicle. Make sure the transport table is stable before operation.
4. Unlock the circuit breaker and pull onto the transport table (not supplied by Schneider Electric). Lock the CB on the transport table.
5. Assemble the lifting brackets on the circuit breaker with M12x30 screw. Torque: 70N·m +/- 7N·m
6. Lift the circuit breaker to the floor.

Circuit breaker fixing during the transport

⚠WARNING

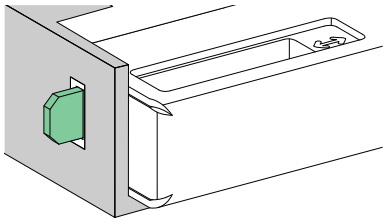
HAZARD OF DAMAGE TO THE CIRCUIT BREAKER

Do not transport the circuit breaker in the switchboard if the rated current of the circuit breaker is greater than or equal to 1600 A. It must be individually packed. Refer to the EvoPact HVX Embedded Pole - Receipt Guide for handling and transport informations.

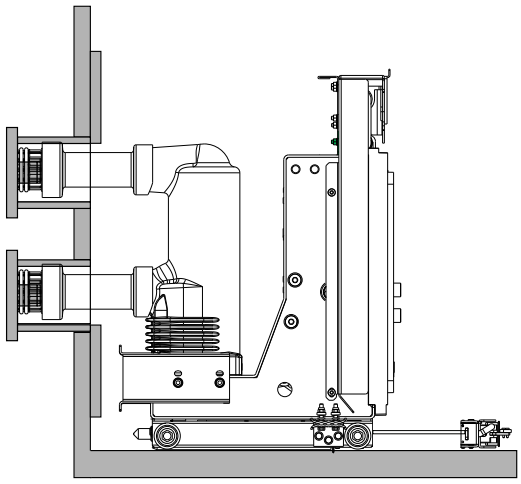
Failure to follow these instructions can result in death, serious injury, or equipment damage.

If the circuit breaker is shipped inside the cubicle, the circuit breaker shall be:

- Attached to the rails with the locking tabs.



- Racked-in in the service position, the clusters should be fully engaged on the fixed contact of the bushings.



Maintenance

Prerequisites

Knowledge Levels

Level 1:	Basic maintenance operations which can be carried out by personnel with basic skills and doing operations according to Schneider Electric documentation. The personnel has received specific training.
Level 2:	Maintenance operations to be carried out by professional and trained personnel, according to instructions provided by Schneider Electric or following Schneider Electric documentation.
Level 3:	Advanced maintenance operations performed by authorized and trained personnel, either Schneider Electric, Official or Licensed Service Partners.

For maintenance level 2 and advanced maintenance level 3, please contact Schneider Electric Customer Care Centers.

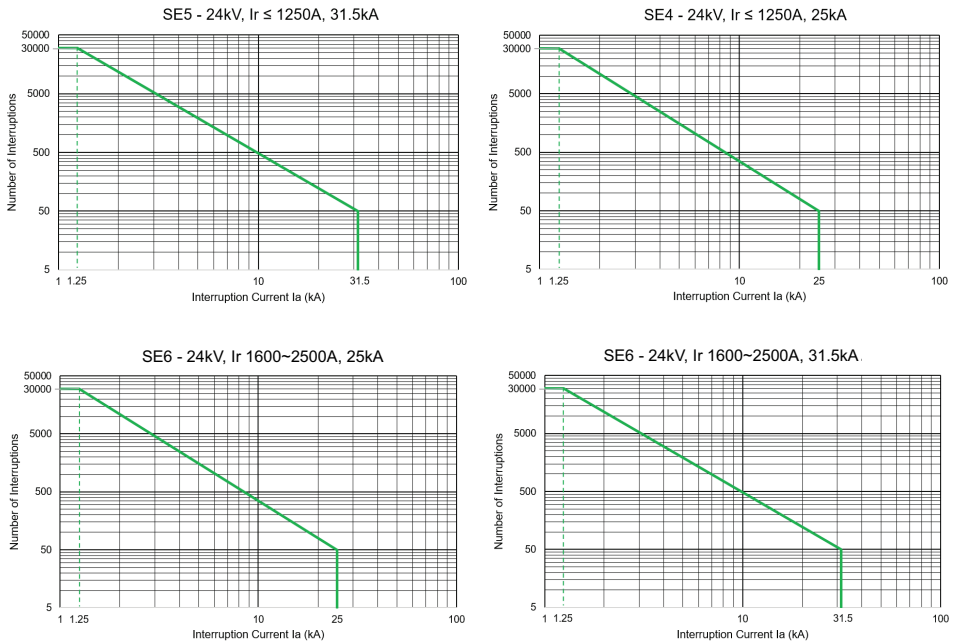
Operating Limits for EvoPacT HVX

EvoPacT HVX is installed in normal service condition and with preventive maintenance program. This product is designed to meet the following technical specifications.

Rated Short Circuit Breaker Current	Circuit Breaker	Racking Device	M1	MX/XF/MN Release
24kV	30000 operation cycles	3000 operation cycles	30000 operation cycles	50000 operation cycles

Admissible Numbers of Breaking Operations of the Vacuum Interrupters

The following diagram defines exclusively the admissible breaking current limit. It is a guide as to assess whether the vacuum interrupter chambers/pole sections need to be replaced or not.



Lock Out Tag Out (LOTO) Procedure

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

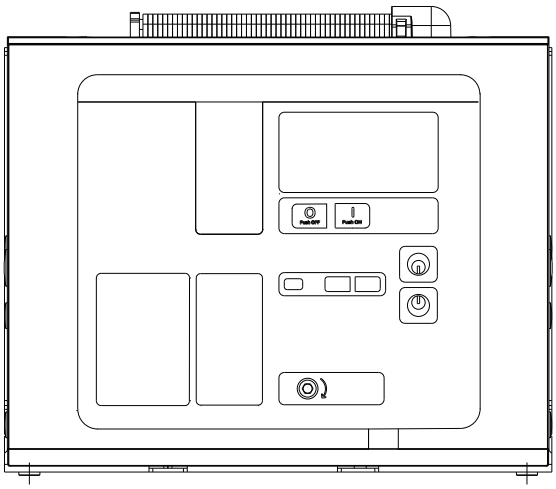
- Apply appropriate protective equipment (PPE) and follow safe electrical work practices.
- Turn off all power supplying the equipment before working on or inside it.
- Respect the LOTO of the equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Do not attempt to modify the existing parts.
- Carefully inspect the equipment for parts or tools that may have been left inside it during the operation.
- Replace all doors and covers before turning on power to the equipment.

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

For the Fixed Circuit Breaker

Turn off all electric power that supplies this circuit breaker before working on or inside it.

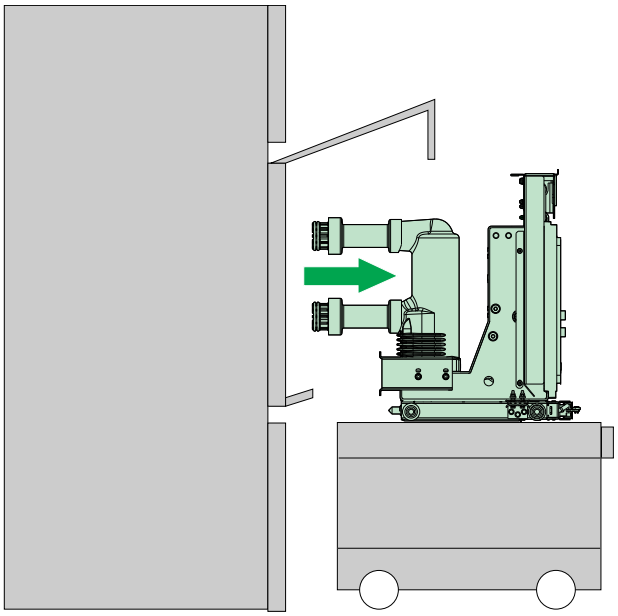
1. Turn off or trip the circuit breaker.
2. Make sure that the circuit breaker is in the open (**OFF**) position and the mechanism is not charged. Refer to **Position Indicators on the Operation Interface**.



For the Withdrawable Circuit Breaker

1. Turn off all power supplying the circuit breaker before working on or inside it.
   - Turn off or trip the circuit breaker.
   - Make sure that the circuit breaker is in the open (**OFF**) position and the mechanism is not charged. Refer to **Position Indicators on the Operation Interface**.
2. Rack out the circuit breaker and make sure it is in the test position.

3. Pull the circuit breaker out of the switchboard by using a transportation trolley.



Maintenance Structure

⚠⚠WARNING

HAZARD OF MISSING MAINTENANCE

- Lubricate the charging ratchet of the drive mechanism every year or every 5000 operations. Refer to Troubleshooting, page 94 for details
- Do not use chlorinated detergents.

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

Routine Maintenance

Routine maintenance will be performed every year to keep the circuit breaker in optimal conditions. The routine maintenance should be operated by the personnel with level 1 knowledge.

	Task	Withdrawable Circuit Breaker	Fixed Circuit Breaker	Frequency: every year
Check	Visual inspection of the whole CB	●	●	●
	Check the general conditions (missing or broken parts, signs of corrosion, condensation, etc.) of the mechanical parts	●	●	●
	Check operation number of the Circuit Breaker	●	●	●
	Visual check of the snatch gap	●	●	●
	Visual inspection (signs of rust, chalking, cracking, signs of heating) of the clusters	●		●
	Inspect the poles for damages (chalking, cracking, signs of heating, condensation, etc)	●	●	●
	Check CB keylocks and padlocks	●	●	●
	Check interlocks between racking truck and circuit breaker	●		●
Clean	Clean and dust the poles and arms	●		●
Operation	Operate the CB manually	●	●	●
	Operate the CB electrically	●	●	●
	Operate the racking truck manually	●		●
	Operate the racking truck electrically	●		●
Lubricant	Lubricate charging ratchet (Refer to Troubleshooting, page 94).	●	●	●

Time Required

The global time required to perform this maintenance program is as below:

- 15–25 minutes typically for a fixed circuit breaker and with all accessories installed.
- 25–35 minutes typically for a withdrawable circuit breaker and all accessories installed.

Tools

Perform the procedure of the maintenance program that is required as below:

- a standard toolbox with electrical tools and equipment for an electrician.

Manufacturer Maintenance Prolongation

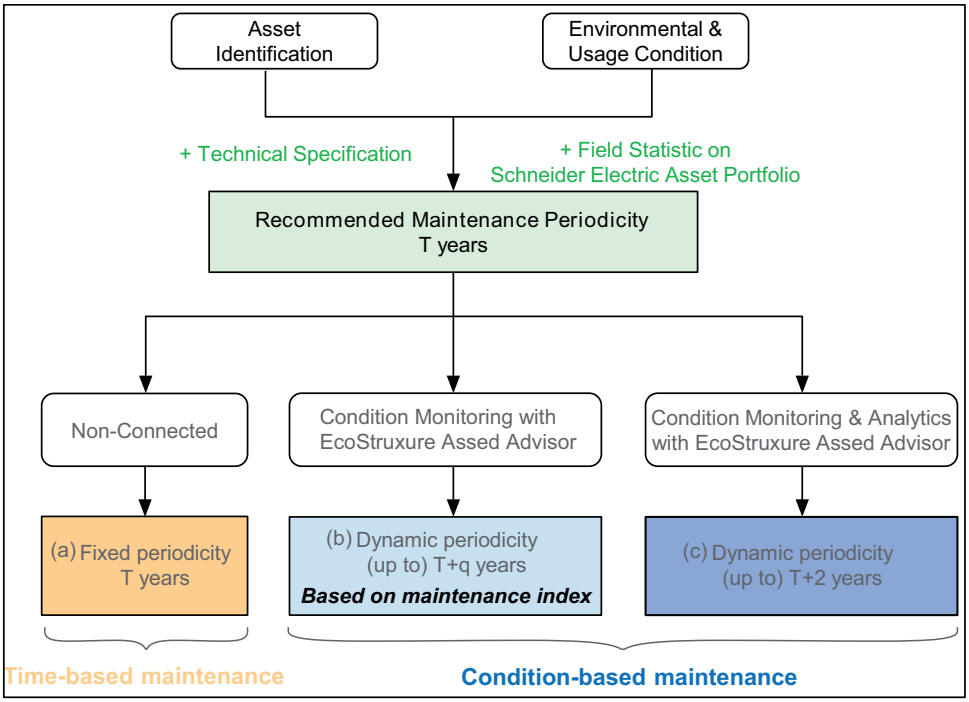
Maintenance Scheme

Basic electrical equipment, technical expertise, IoT and cloud connectivity are pillars of Schneider Electric，which can fine-tune the maintenance periodicity of your electrical assets. It relies on the following guidelines:

- By identifying the equipment (range, age, maintenance history), its environmental and usage conditions, Schneider Electric defines its maintenance periodicity. This recommendation is based not only on our technical expertise but also on field statistics. The statistics are from the maintenance history of our worldwide installed base.
- If the asset is non-connected, this maintenance periodicity is fixed and time-based.
- If the asset is connected, this maintenance periodicity is condition-based, which allows a periodicity extension of up to 2 years. Considering the assets under monitoring can enable live monitoring, the maintenance date shall be rescheduled at the right date. It enables the dynamic condition-based maintenance. This dynamic stage is driven by the Maintenance Index computed in EcoStruxure Asset Advisor.

These guidelines are described in Figure 1 and detailed in the next parts.

Figure 1: Rules for electrical distribution equipment maintenance



Time-based Maintenance

The recommendation is to carry out manufacturer maintenance every 3 years as an average in standard operation conditions (Figure 2 – Bottom).

The recommendation is valid for any industry and geography.

This maintenance periodicity shall be reduced depending on environmental conditions, where one parameter might influence the whole performance (Figure 2 - Top). It may also vary with equipment usage conditions.

This maintenance periodicity is fixed and time-based, defined with operating/ services conditions assumptions and mission profile.

Figure 2: Time-based maintenance recommendation

Environmental factors	Normal all criteria to be fulfilled	Severe from one criterion checked
Temperature average annual around / out of switchgear	T° < 35°C	T° > 35°C
Humidity relative	H < 85%	H > 85%
Salinity site distance from seaside & room with no protected atmosphere	Low salt mist D > 10km	High salt mist D < 10km
Dust level further to filtration and/or ventilation present	Low dust level or Filtration and/or ventilation	High dust level and No filtration nor ventilation
Impact on Maintenance cycles		
Equipment **Low Voltage** **Medium Voltage** **Transformer**	T = 3 years	T= 2 years

NOTE:

- Top section: factors description
- Bottom section: recommended years periodicity

Condition-based Maintenance

Extend the maintenance periodicity:

The increasing native IoT connectivity of our equipment and the continuous monitoring of environmental equipment allow the extension of the manufacturer maintenance periodicity up to 1 or 2 years based on the EcoStruxure Asset Advisor services subscription:

- 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.

Asset maintenance at the right date with maintenance index:

The Maintenance Index, based on stress, wear and aging indicators of the asset, continuously controls the date of the next recommended maintenance. The Maintenance Index scales from 1 (no reschedule needed) to 5 (immediate action needed), indicates the need for maintenance and enables dynamic periodicity adjustment.

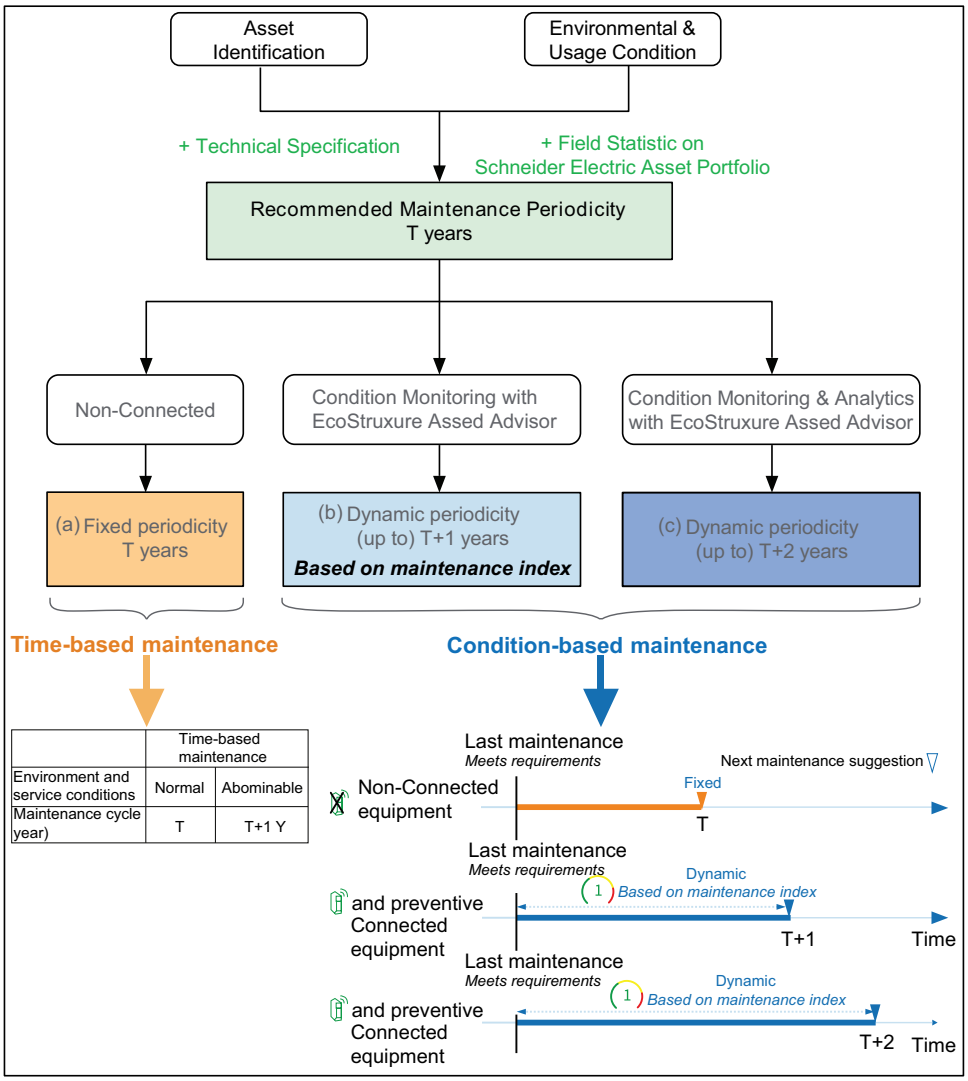
Dynamic condition-based maintenance:

The maintenance date shall evolve dynamically following the scheduled initial date and the maintenance index result. If the Maintenance Index goes high, a new maintenance date might be proposed to the customer. The new date might be earlier than the initially schedule date.

> **NOTE:** between two manufacturer preventive maintenances, one intermediate maintenance shall be performed, and its date shall dynamically evolve, based on the Maintenance Index.

The recommended maintenance plan for connected assets follows an optimized cycle of intermediate/manufacturer maintenance interventions like described in Figure 4.

Figure 3: Rules for electrical distribution equipment maintenance

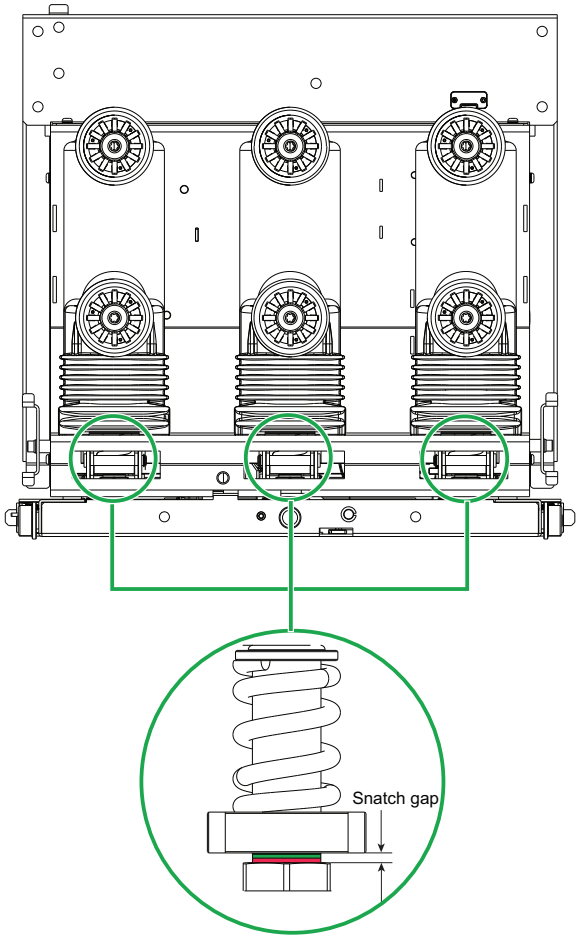


Regular Maintenance

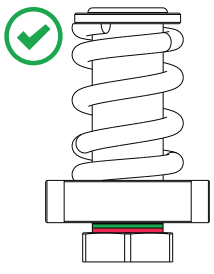
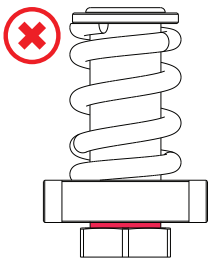
Check the Snatch Gap

NOTICE
HAZARD OF INAPPROPRIATE CHECK • Before checking the snatch gap, make sure that the circuit breaker is in the closed position. • The circuit breaker should be returned to the OPEN and discharged state after checking. **Failure to follow these instructions can result in equipment damage.**

Position of the contact spring

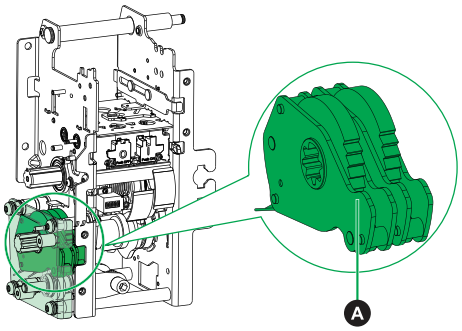


Identify the quality of the snatch gap

Normal snatch gap	Snatch gap reduced (unqualified)
	

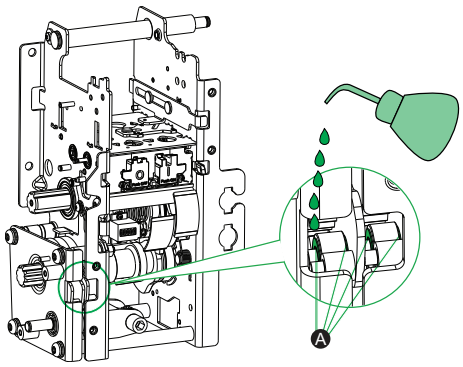
Lubricate the Charging Ratchet

Location of the component



A—Charging Ratchet

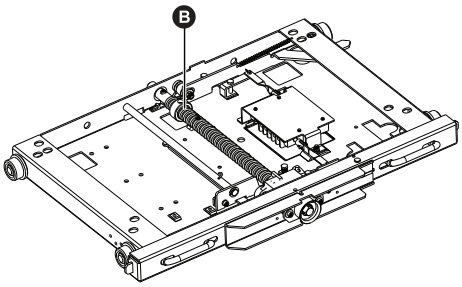
Lubrication area in charging ratchet



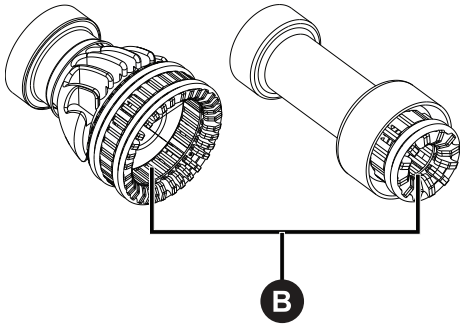
A—Lubrication area

Lubricate the Spindle of Racking Truck and Clusters

Spindle of the trunk



Clusters



Consumables

Products and Consumables			
Description	**Symbol**	**Points of lubrication**	**Reference**
Cleaning agent (1 liter can)	-	-	S008152 HAKU1025–920 (KLUTHE)
Lubricant	A	Charging ratchet of mechanism	Mobil DTE24
	B	Spindle of racking truck; Clusters	Mobilith SHC 100

Schneider Electric supplies original spare parts and can provide assistance with identifying the spare parts required for your electrical distribution equipment.

To order spares parts, please contact your Schneider Electric local representative or your equipment manufacturer.

For any modification or upgrade of the disconnecting device, contact Schneider Electric or your equipment manufacturer.

Troubleshooting

What to Do After a Short Circuit Tripping

Note the Fault

Faults are signaled locally and remotely by the indicators and auxiliary contacts installed depending on the ordered (requested) configuration.

Refer to this maintenance guide and that of your equipment or your protection, control and monitoring unit to find out what the available signaling means.

Troubleshooting assistance may be available, depending on the type of protection, control and monitoring unit.

Identify the Tripping Causes

⚠⚠DANGER

HAZARD OF INAPPROPRIATE REPAIR

- Do not re-close a circuit (locally or remotely) before the root cause of the fault has been identified and cleared.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See related standards or local equivalents.
- Turn off all power supplying this circuit breaker before working on or inside the circuit breaker. Lock the circuit breaker in the open and racked-out position.
- Always use a properly rated voltage sensing device to confirm that the power is off.
- Replace all devices, covers and doors 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 device.
- Respect the Lock Out Tag Out procedures of the equipment.

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

NOTICE

HAZARD OF INOPERABLE EQUIPMENT

- Depending on the type of fault and the criticality of the loads, a number of precautionary measures must be taken, in particular the insulation and dielectric test on all or part of the installation. These checks and tests must be directed and carried out by qualified personnel.

Failure to follow these instructions can result in equipment damage.

Inspect the Device In the event of a Short Circuit

- Check the general condition of the circuit breaker.
- Check the general condition of the clusters for withdrawable version.

Reset the Installation

Refer to the user guide of our equipment of your protection, control and monitoring unit. After you have identified and cleared the causes of tripping, you can reset the installation.

Frequently Asked Questions and Solutions

Diagnose the Problem	Identify the Possible Causes	Find the Solutions
Circuit breaker cannot be closed locally or remotely.	The circuit breaker is interlocked mechanically.	• Check the position of the racking truck. • Check the status of the blocking magnet Y1.
	Auxiliary circuit plug or terminal block is not completely connected.	Make sure the auxiliary circuit plug or terminal block is completely connected.
	Operating mechanism is not charged.	• Charge the mechanism manually. • If the device is equipped with M1 motor, check the conformity between the voltage and power supply. If the problem persists, replace the gear motor M1.
	MX1 shunt opening release is permanently supplied with power.	• Determine the origin of the opening order. • This order must be canceled before the circuit breaker can be closed. If the problem persists, replace the MX1 release.
	MN under-voltage release is not supplied with power.	• This is an opening order. Determine the origin of this order. • Check the voltage and the supply circuit conformity (U > 0.85Un). If the problem persists, replace the MN release.
	XF closing is supplied with power. The circuit breaker is not ready to close, and the anti-pumping relay K01 is working.	• Eliminate the closing order. • Make sure the circuit breaker is ready to close. • Re-send the closing order.
The circuit breaker cannot be closed remotely, but can be closed locally by using the close push button on the circuit breaker.	Closing order is not executed by the XF shunt closing release.	• Check the voltage and the supply circuit conformity (0.85 to 1.1 U_a) • If the problem persists, replace the XF release.
Unexpected tripping of the circuit breaker.	Insufficient voltage supply of the MN under-voltage release.	Check the voltage and the supply circuit conformity (U > 0.85U_a).
	Load shedding order sent to the MX1 shunt opening release by another device.	• Check the overall load in your distribution system. • If necessary, modify the setting of devices in your distribution system.
	Unexpected opening order from the MX1 shunt opening release.	• Determine the origin of the order. • Refer to the instruction sheet for your protection, control and monitoring unit.
	One of the following causes occurs: • Ground insulation fault • Short circuit detected by the control unit	• Determine and eliminate the tripping causes. • Check the condition of the device before putting it back into service.
Instantaneous opening after each attempt to close the circuit breaker.	Transient over-current during closing.	• Check your distribution system or the settings of your control unit. • Check the condition of the device before putting it back into service.
	Closing on a short circuit.	• Determine and eliminate the tripping causes. • Check the condition of the device before putting it back into service.
The circuit breaker cannot be opened remotely, but it can be opened locally.	Opening order is not executed by the MX1 shunt opening release.	• Check the voltage and the supply circuit conformity (0.7 to U_a) • If the problem persists, replace the MX1 release.
	Opening order is not executed by the MN under-voltage release.	Drop in voltage insufficient or residual voltage across the terminals of the under-voltage release is greater than 0.35U_a.
The circuit breaker cannot be opened locally or remotely.	Operating mechanism malfunction or welded contacts.	Contact a Schneider Electric service centre.
Not possible to insert the crank into the racking truck to rack-in or rack-out.	A keylock is present on the racking truck or the open door interlock is present.	Disable the locks.

Diagnose the Problem	Identify the Possible Causes	Find the Solutions
The switchgear door cannot be opened.	The racking truck is at the racked-in position while the open door interlock is present.	Rack out (disconnect) the circuit breaker.
The circuit breaker cannot be racked in (connected).	Mechanical problem on the insulating shutters.	Check the operation of the insulating shutters.
	Clusters are incorrectly positioned.	Check the type of cluster and replace the clusters.
	The circuit breaker is closed.	Open the circuit breaker.
	The blocking magnets for racking truck Y0 is not supplied with power.	Check the voltage and the supply circuit conformity ($U > 0.85U_a$).
	The racking truck is not properly locked at the correct position in the cell.	Lock the racking truck at the correct position into the cell.
	An interlock with earthing switch is present.	Check the status of earthing switching, and try to disable the lock.
	The door is open or the open door interlock is ineffective.	Close the door of cubicle or check the operation of the open door interlock.
Not possible to turn the crank to rack out the racking truck.	The circuit breaker is closed.	Open the circuit breaker.
	The door is open or the open door interlock is ineffective.	Close the door of the cubicle or check the operation of the open door interlock.
Racking racking truck cannot be pulled out from the panel.	The circuit breaker is not in the test position.	Rotate the crank until the circuit breaker reaches the test position.
The Withdrawable circuit breaker cannot be inserted into the cell.	A lock is present on the insulating shutters.	Disable the lock.
Cell door cannot be closed.	The racking truck is not properly locked in the correct position in the cell.	Lock the outline of the cell and circuit breaker.
	The open door interlock is ineffective.	Check the operation of the open door interlock.

Schematic Diagram

Schematic Diagram	Reference File
EvoPacT HVX withdrawable circuit breaker (5NO-5NC, E-Coil)	PKR73838
EvoPacT HVX withdrawable circuit breaker (5NO-5NC, Digital, E-Coil)	JYT34513
EvoPacT HVX fixed circuit breaker (5NO-5NC, MITOP, E-Coil)	PKR73840
EvoPacT HVX withdrawable circuit breaker (5NO-5NC, MITOP, E-Coil)	PKR73839

NOTE: All wiring diagrams are available in the “ Digital Logbook".

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