SureSeT™ Medium Voltage, Metal-Clad, Indoor Switchgear

5/15 kV with EvoPacT™ Medium Voltage Vacuum Circuit Breakers

SureSeT Switchgear User Guide

Logistics, Installation, Operations, and Maintenance

NNZ9886800EN, Rev. 01

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Legal Information

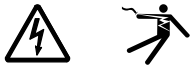
Table of Contents

Safety Information 5
Please Note 5
Introduction 6
Referenced User Guides 10
Receiving, Handling, and Storage 11
Receiving 11
Handling 12
Storage 13
Moisture Contamination Avoidance and Mitigation 13
Product Description 17
Front Sub-Section 18
Hinged Doors with Door-Mounted, Low-Voltage Indication, Protection, and Control Devices 19
Dedicated, Low-Voltage Instrumentation Compartments 21
Circuit Breaker Compartment Description 22
Auxiliary Compartments 44
Main Bus Compartment 52
Rear Compartment 54
Insulated Primary Cable Connection Bus 58
Tie Bus 59
Auxiliary Compartment Connections 59
Ground Bus 60
Other Rear Compartment Components 60
Additional Switchgear Line-up Features and Information Chapter 62
Continuous Equipment Health Monitoring Using Substation Monitoring Devices (SMDs) 62
Equipment Heaters 64
Active Arc Flash Mitigation System 64
Switchgear Information 65
Installation 66
Site Selection and Preparation 68
Foundation 70
Switchgear Installation 74
Shipping Group Installation 74
Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation 77
Main Bus Installation 78
Ground Bus Connection 80
Control Wiring Connections 81
Circuit Breaker and Auxiliary (CPT/VT) Drawer Installation and Operation 81
Circuit Breaker Installation and Operation 82
Circuit Breaker Installation in Switchgear 86
CPT and VT Drawer Operation 88
CPT and VT Drawer Installation 92

Dielectric Withstand Testing 94
Phasing 95
Cable Connections 95
Start-Up 98
Inspection and Maintenance 102
Cleaning 105
Main Bus Compartment 106
Rear Compartment 106
Circuit Breaker Compartment 108
Circuit Breakers 112
CPT and VT Compartment and Drawer 112
Low Power Voltage Transformers (LPVTs) 114
Re-energizing 115
Accessories 116
Racking/Charging Handle 116
SureSeT Circuit Breaker/Auxiliary Drawer Lift Truck 116
Lift Truck Specifications 117
Lift Truck Usage 119
Removing a Circuit Breaker 120
Inserting a Circuit Breaker 122
Removing Auxiliary Drawers 124
Installing Auxiliary Drawers 127
Test Cabinet (Optional) 131
Outlines 132
Product Technical Datasheet 133
Packages and Accessories Shipped with the Switchgear 134
Replacement Parts 135

Safety 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 bulletin or on the equipment to warn of hazards or to call attention to information that clarifies or simplifies a procedure.



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

This is the safety alert symbol. It is used to alert you to personal injury hazards. Obey all safety messages that follow 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.

⚠WARNING

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

⚠CAUTION

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

NOTICE

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

NOTE: Provides additional information to clarify or simplify a procedure.

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 has received safety training to recognize and avoid the hazards involved. Electrical equipment should be transported, stored, installed, and operated only in the environment for which it is designed.

Introduction

Square D™ brand SureSeT medium voltage metal-clad indoor switchgear offers Square D™ brand EvoPacT draw-out vacuum circuit breakers in two-high construction for 5/15 kV power distribution. A typical SureSeT switchgear assembly is shown in the figure Typical SureSeT Metal-Clad Switchgear Assemblies, page 7. This instruction bulletin contains overall description and instructions for receiving, handling, storing, installing, operating, and maintaining SureSeT switchgear.

The EvoPacT circuit breaker is shown in the figures Front View of Typical EvoPacT Circuit Breaker, page 8 and Rear View of Typical EvoPacT Circuit Breaker, page 9. Refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for detailed information.

The SureSeT switchgear contains these design features:

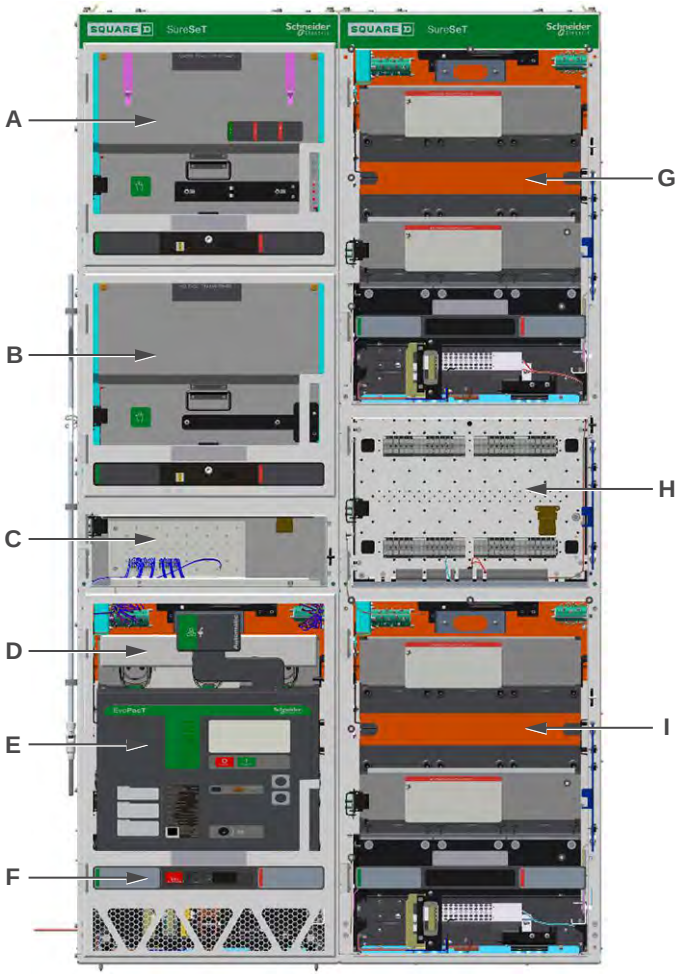
- One-high and two-high construction, with circuit breakers on the top and/or bottom.
- The switchgear assembly consists of individually-grounded, compartmentalized, steel structures.
- Each compartment has doors, barriers, covers, and/or removable access panels/plates to isolate the separate working functions.
- All circuit breakers, instrument and control power transformers, relays, meters, and other components are factory-assembled, wired, and tested as an assembly.
- The installer normally makes only the external control, ground, and power connections at the terminals provided, and reconnects the wiring and bus bars at the shipping splits.

Each assembly is custom-designed, with standard structures and bus configurations also arranged according to customer specifications. The structures are then combined with the circuit breaker and other components necessary for the required protection scheme, metering, and controls.

Complete customer order drawings are provided by Schneider Electric for each SureSeT switchgear order. The drawings include floor plans and elevations, one-line diagrams, bills of material, control schematics, and wiring diagrams.

The environment in which this equipment was designed to be stored, installed, and operated is specified throughout this document, particularly in the section Product Technical Datasheet, page 133.

Figure 1 - Typical SureSeT Metal-Clad Switchgear Assemblies



A	Control power transformer (CPT) drawer	**F**	Racking mechanism
B	Voltage transformer (VT) drawer	**G**	Circuit breaker compartment (without circuit breaker)
C	Low voltage instrumentation compartment	**H**	Low voltage instrumentation compartment
D	Circuit breaker compartment (with EvoPacT circuit breaker)	**I**	Circuit breaker compartment (without circuit breaker)
E	EvoPacT vacuum circuit breaker, withdrawable		

NOTE: Panels and/or doors removed for clarity.

Figure 2 - Front View of Typical EvoPacT Circuit Breaker

15 kV, 2000 A,
40 kA shown

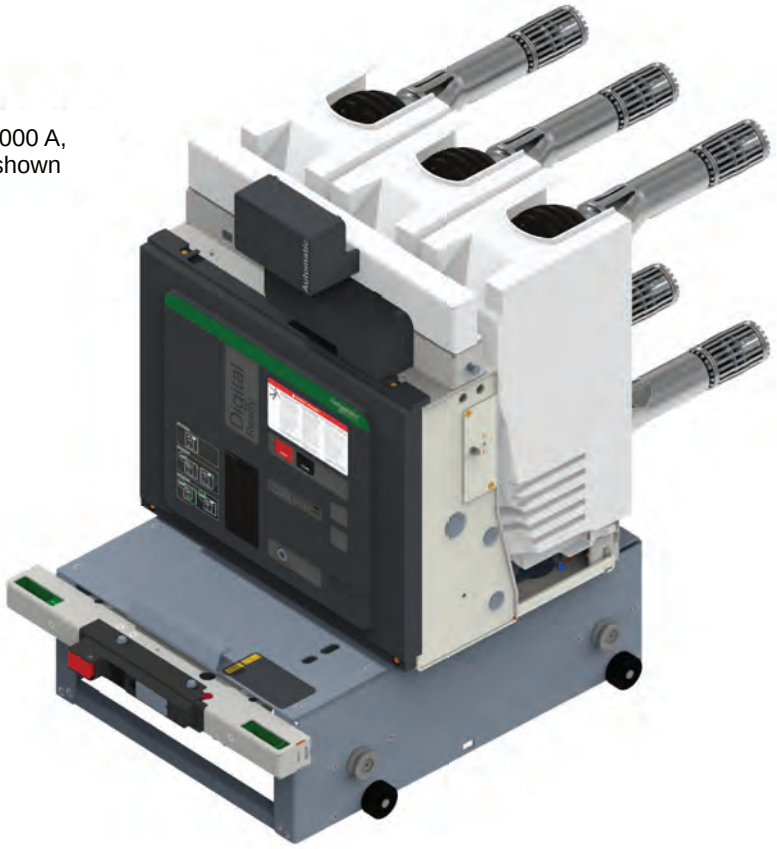
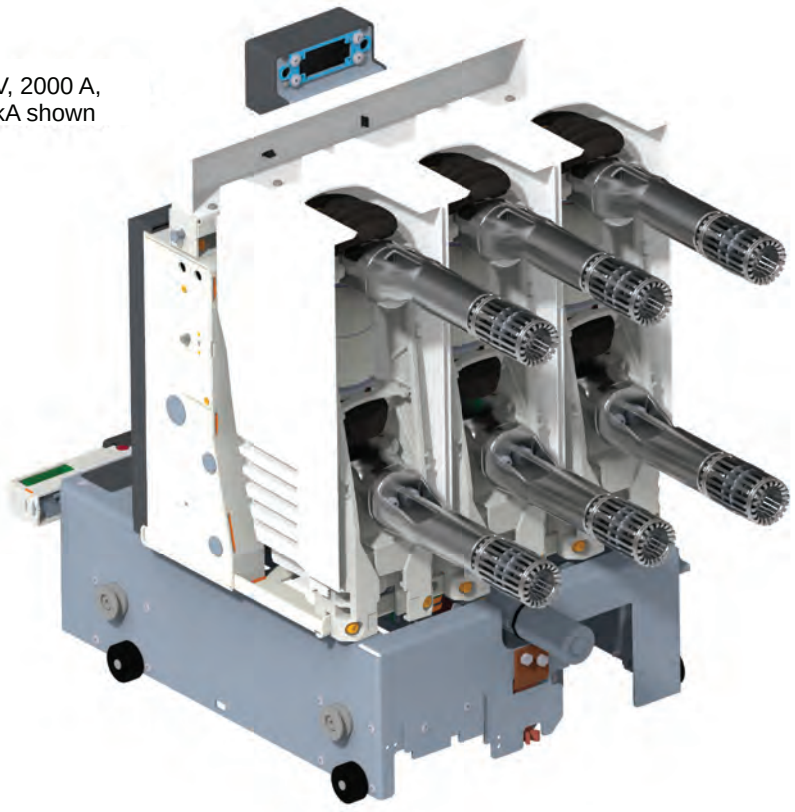


Figure 3 - Rear View of Typical EvoPacT Circuit Breaker

15 kV, 2000 A,
40 kA shown



Referenced User Guides

For each device or system referenced in this user guide, there is a corresponding user guide available. Each user guide describes the safety information, features, receiving/handling/storage instructions, operation, use, and maintenance procedures of the corresponding MV device.

NOTE: Access any of the user guides shown in the table by clicking the document number.

NNZ9886800	JYT3013100
	

Receiving, Handling, and Storage

This section contains instructions for receiving, handling, and storing SureSeT metal-clad indoor switchgear and devices. Follow all safety precautions before working on the equipment.

Receiving

SureSeT two-high, 5/15 kV, metal-clad, indoor switchgear is shipped on pallets in protective crates or wrapping. Circuit breakers are shipped in the switchgear, or separately in protective crates on pallets. Do not stack the circuit breakers. Circuit breakers shipped on pallets have crush cones attached to the top of the circuit breaker box on the pallet. If the cone is crushed, DO NOT accept or use the circuit breaker and report as potential shipping damage to the freight carrier.

Upon receipt, compare the packing list to the equipment received to make sure the order and shipment are complete. Claims for shortages or errors must be made in writing to Schneider Electric within 60 days of delivery. Failure to give such notice will constitute unqualified acceptance and a waiver of all such claims by the purchaser.

Immediately inspect the equipment for any damage that may have occurred in transit. If damage is found or suspected, file a claim with the carrier immediately and notify Schneider Electric. Delivery of equipment to a carrier at any of the Schneider Electric plants or other shipping point constitutes delivery to the purchaser regardless of freight payment and title. All risk of loss or damage passes to the purchaser at that time.

Figure 4 - Equipment with Packaging

Handling

The switchgear is normally shipped with one or two sections assembled together as a shipping group. A shipping split is the end of a shipping group which will connect with another shipping group. Each shipping group has four angled lifting lug pad eyes bolted onto the top. If more than two sections are shipped as one shipping group, lifting channels spanning the entire shipping group are bolted on top instead of lifting lugs. To lift and move a shipping group, follow these steps:

1. Attach a crane hook to each of the four lifting lugs or to the hole in each end of the lifting channels.
   - Use load-rated cables or chains with safety hooks or shackles.
   - A load-rated spreader bar may be necessary to maintain proper angles for lifting.
   - To avoid structural damage, rig the lifting sling so that the minimum angle between lifting cables or chains and the top of the equipment is 45°, and the maximum interior angle is 90°. See the figure Switchgear Lifting Sling, page 13.
   - If a crane is not available, contact Schneider Electric before using any other lifting method.
2. After the equipment has been placed in position, the lifting eyes can be left in place or removed and discarded (if desired).
3. If removed, install the mounting bolts back into place to cover the mounting holes.

   NOTE: If a crane is not available, the shipping group may be unloaded and moved with a forklift. Rollers under the pallet may be used on a relatively flat surface if other moving equipment is not available or space prohibits the use of other moving methods. See Site Selection and Preparation, page 68 for handling uncrated assemblies.

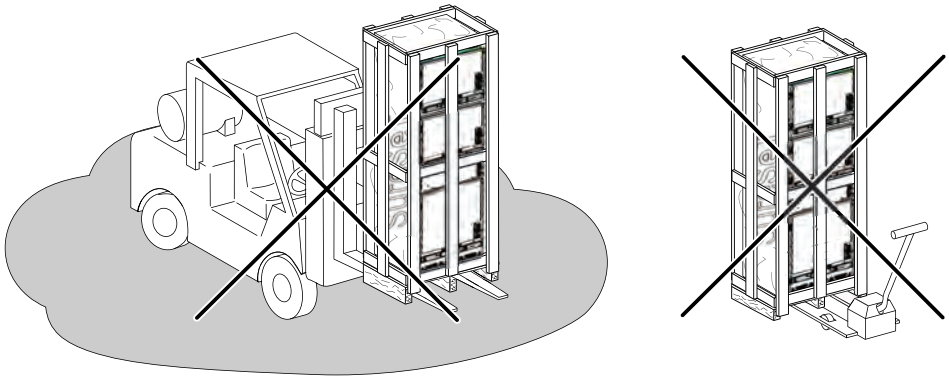
NOTICE

EQUIPMENT DISTORTION

- Do not remove the pallet(s) until all shipping groups are in the final location.
- Do not maneuver the switchgear directly on rollers.
- Always have the pallets in place when moving the switchgear.

Failure to follow these instructions can result in equipment damage.

Figure 5 - Non—Recommended Moving Methods



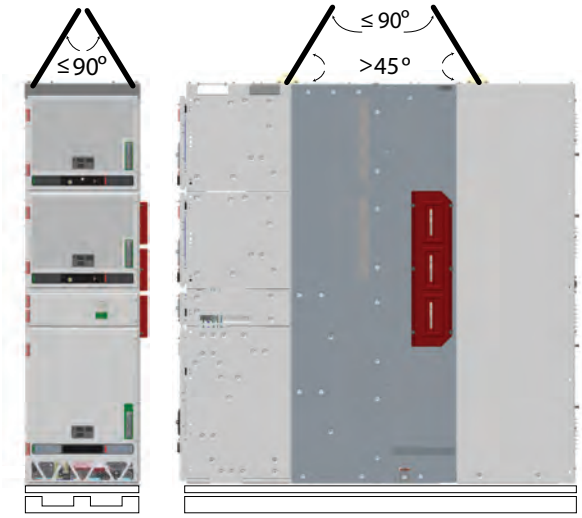
⚠CAUTION

FALLING OR DROPPED EQUIPMENT

- If moving by crane, the interior angle of the lifting sling should not exceed 90°. Angles greater than 90° apply greater inward pressure of lifting lugs which can damage or dislodge lifting lugs from switchgear.

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

Figure 6 - Switchgear Lifting Sling



Storage

Moisture Contamination Avoidance and Mitigation

Shipping, Receiving, and Storage Requirements

This equipment does not achieve its ratings until it is installed per record/as-built drawings, installed per the instructions contained in this document, and has operational environmental controls with appropriate settings to help mitigate environmental influences. This equipment can also be stored in a climate controlled area that uses both heating and cooling to maintain acceptable environmental conditions. Indoor and outdoor rated equipment is not suitable for outdoor storage.

- The equipment should be treated as if it is in storage until it is installed and operational. The storage area should be clean, dry (75% or less relative humidity), and climate controlled with proper ventilation.

- To keep the equipment dry, the use of heaters is required in some cases (for example, during seasonal or low periods of loading and equipment de-energization).
  - Consult the Engineer of Record for the appropriate environmental control settings or means to mitigate environmental influences.
  - If so equipped, ensure that the thermostats and/or humidistats are set to mitigate condensation. A minimum of 200 watts of heat per section is suggested.
  - If heaters are being used with the equipment that were not included in the equipment by Schneider Electric, they must be clean and free of debris and grease. Greasy and/or smoky heaters can contaminate electrical insulation and lead to dielectric breakdown and/or tracking.
- Shipping packaging is not suitable for and cannot be used by itself for equipment storage unless otherwise indicated on the shipping packaging labeling.
- When receiving equipment, the equipment may be at a lower temperature than the ambient air temperature. Allow time for the equipment temperature, including the temperature of internal components, to rise to ambient air temperatures before making openings in or otherwise or disturbing the packaging. Condensation can occur on and inside the equipment if warm air contacts cold surfaces of the equipment. Moisture damage can occur, destroying the dielectric capabilities of the equipment and rendering it unusable.
- The factory shipping wrap around the equipment on shipping pallets is not suitable for non-enclosed over the road transportation that risks exposing the equipment to the elements. The factory shipping wrap around the equipment should remain on the equipment until the equipment is ready to be inspected and stored or inspected and installed. After receiving the equipment and allowing it to acclimate to the environment, remove the packaging and inspect the equipment for damage that may have occurred in transit. If damage is found or suspected, immediately file a claim with the carrier and notify the local Schneider Electric representative.
- Follow these guidelines every time the equipment is moved to a new storage location or to its final destination.

Installation, Operation, and Maintenance Requirements

This equipment does not achieve its ratings until it is installed per record/as-built drawings, installed per the instructions contained in this document, and has operational environmental controls with appropriate settings to help mitigate environmental influences. This equipment can also be operated in a climate controlled area that uses both heating and cooling to maintain acceptable environmental conditions. Indoor and outdoor rated equipment is not suitable for outdoor storage.

In some cases (such as seasonal electrical loading, de-energized equipment, and standby/alternate power sources), the heat generated by equipment loading is insufficient to prevent condensation and alternate heat sources are required. If environmental controls such as a thermostat or humidistat are used, ensure their settings are sufficient to mitigate condensation and remain operational at all times. Consult the Engineer of Record for the appropriate environmental control settings.

Exposure to Moisture and Chemicals

If liquids such as moisture, chemicals, and condensation contact the electronics, circuit breaker, fuses, bussing, or other electrical components, do not attempt to clean or repair the equipment as this may lead to unrepairable damage. If the equipment is energized, de-energize it. If equipment is not energized, do not energize it. Contact the Schneider Electric Customer Care Center at 888-778-2733.

General Storage Requirements

Store the equipment in the original packaging, placed indoors on dry ground or on material that insulates it from humidity.

Figure 7 - Recommended Indoor Storage Conditions

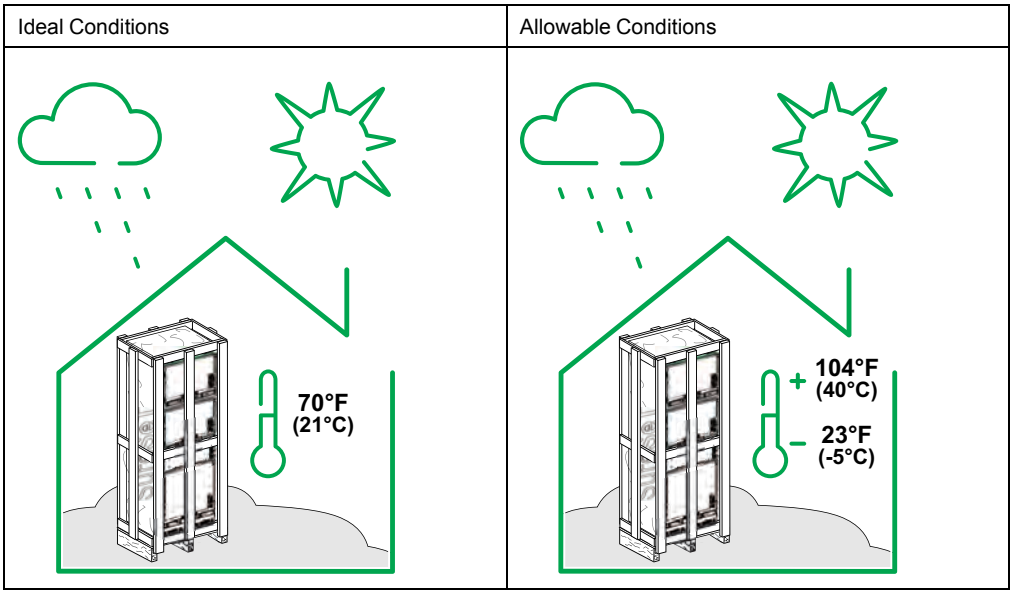


Table 1 - Average Relative Humidity For Storage

Measured over a 24-hour period	≤ 95%
Measured over a 1-month period	≤ 90%

If space heaters are furnished in the equipment, energize the space heaters from an external source. To energize space heaters furnished in the equipment, refer to the schematic and wiring diagrams for a logical connection point and for voltage and power requirements.

If the space heaters are normally energized from the CPT in the switchgear, then to energize the space heaters with an external source during storage, follow these steps before connecting the external source.

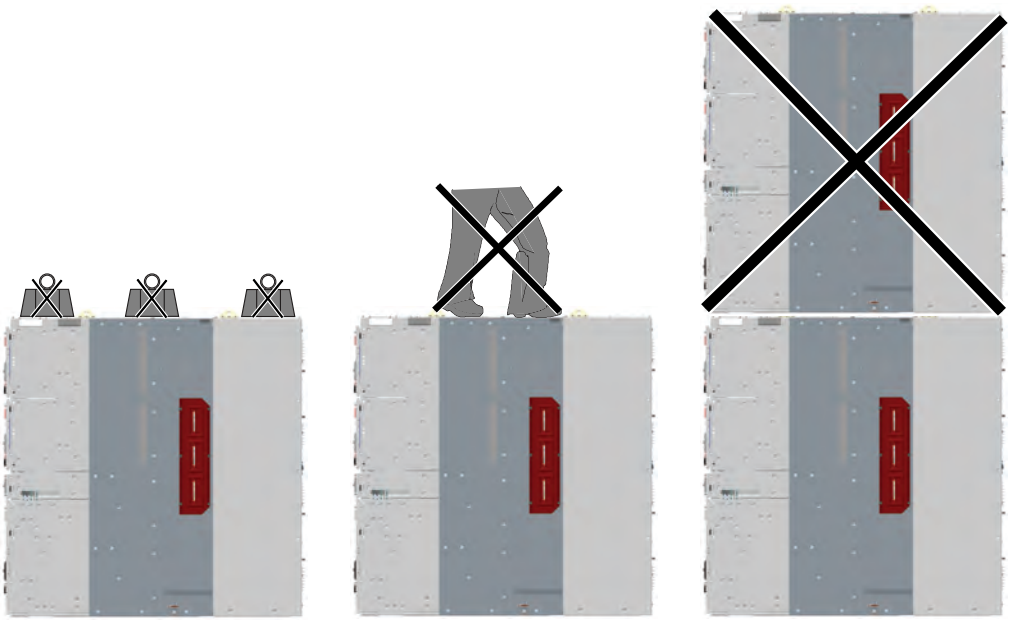
1. Open the CPT secondary circuit breaker.
2. Remove the primary current-limiting fuses.
3. Install an out-of-service tag, at a suitable location, to clearly indicate the CPT has been rendered out-of-service and to instruct electrical personnel to re-install the current-limiting fuses before installing the switchgear.

These actions open the circuit to the CPT to keep the circuit from back-feeding the CPT and, in turn, the main bus.

Observe the following precautions with the switchgear (see the figure Switchgear Precautions, page 16):

1. Do not place anything on the cubicle.
2. Do not step or walk on the cubicle.
3. Do not stack a cubicle on top of another one.

Figure 8 - Switchgear Precautions



If the equipment was stored:

- Between 6 and 12 months, perform basic level preventive maintenance to help ensure correct equipment, circuit breaker, and auxiliary drawer operation.
- Beyond 12 months, contact the local Schneider Electric Service representative for check-up.

After unpacking, check the equipment carefully for:

- Absence of broken or damaged parts
- Absence of condensation marks or droplets
- Absence of visible degradation (color change, rust, deposits, etc.). In case of any degradation detected, the equipment can not be installed.

If any of the above are discovered, do not install the equipment and contact the local Schneider Electric Service representative.

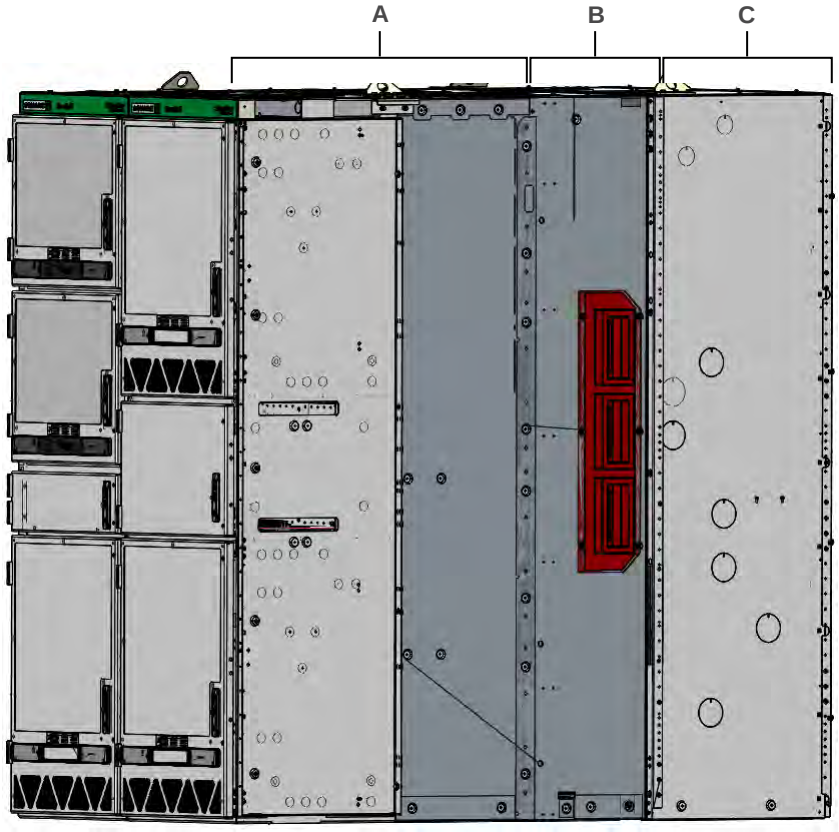
Product Description

SureSeT metal-clad, indoor switchgear is cULus listed.

A SureSeT switchgear line-up assembly consists of individual switchgear sections bolted together. The number of sections in an assembly depends on customer specifications. Each switchgear section is a separate, rigid, self-contained, bolted structure fabricated of heavy gauge steel. A switchgear section (see the figure Switchgear Sections, page 17) typically consists of:

- Front sub-section
- Main bus compartment
- Rear compartment
- Additional switchgear line-up features and information

Figure 9 - Switchgear Sections



A	Front sub-section	**B**	Main bus compartment	**C**	Rear compartment

The standard insulation used for primary bus supports throughout the entire switchgear assembly are of materials from Group A. However, the switchgear assembly could be equipped with Group B materials, if specified (see the table Switchgear Insulation Materials).

Table 2 - Switchgear Insulation Materials

Insulation Group	Breaker Compartment Bushings [1]	Auxiliary Drawer Bushings	Auxiliary Device Standoff Insulators	Switchgear Standoff Insulators	
				Primary Bus	Auxiliary Bus
Group A	Molded fiberglass polyester or bisphenol epoxy	Molded fiberglass polyester	Molded fiberglass polyester	Molded fiberglass polyester	Molded fiberglass polyester
Group B	Cycloaliphatic epoxy	Cycloaliphatic epoxy	Porcelain	Porcelain	Porcelain

Front Sub-Section

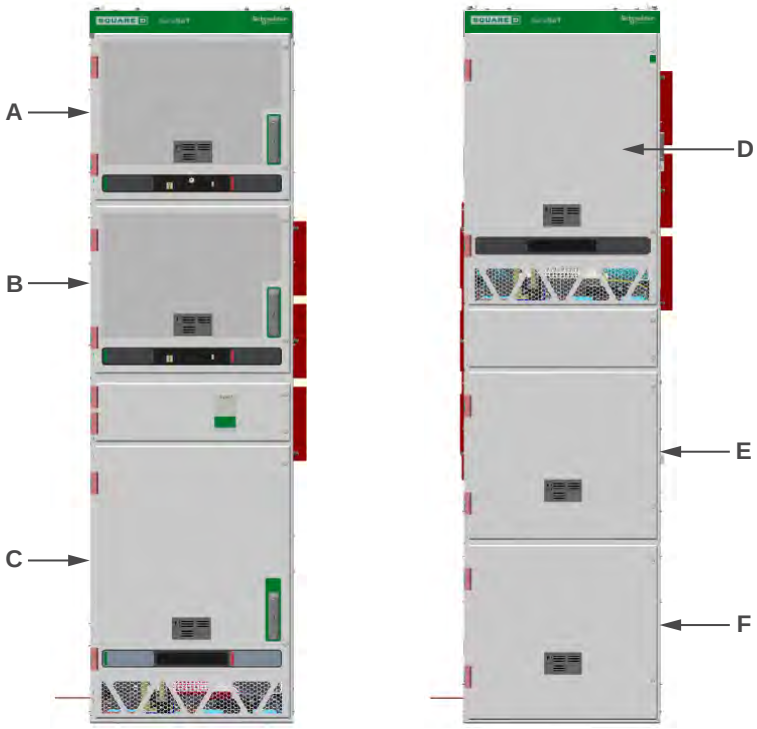
The front sub-section may contain a customer-selected combination of the following:

- Hinged doors with door-mounted low-voltage indication, protection, and control devices
- Dedicated low-voltage, instrumentation compartment
- Circuit breaker compartment(s) (upper/lower compartments)
- Auxiliary compartment(s) (voltage transformer drawers/ control power transformer drawers/ fixed low power voltage transformers)

A switchgear section identifies the circuit breaker compartment position as either upper or lower, and the auxiliary compartments as position A, B, C, or D (see the figure Compartment Positions in a Section).

1. Group A material is determined by the rating of the circuit breaker.

Figure 10 - Compartment Positions in a Section



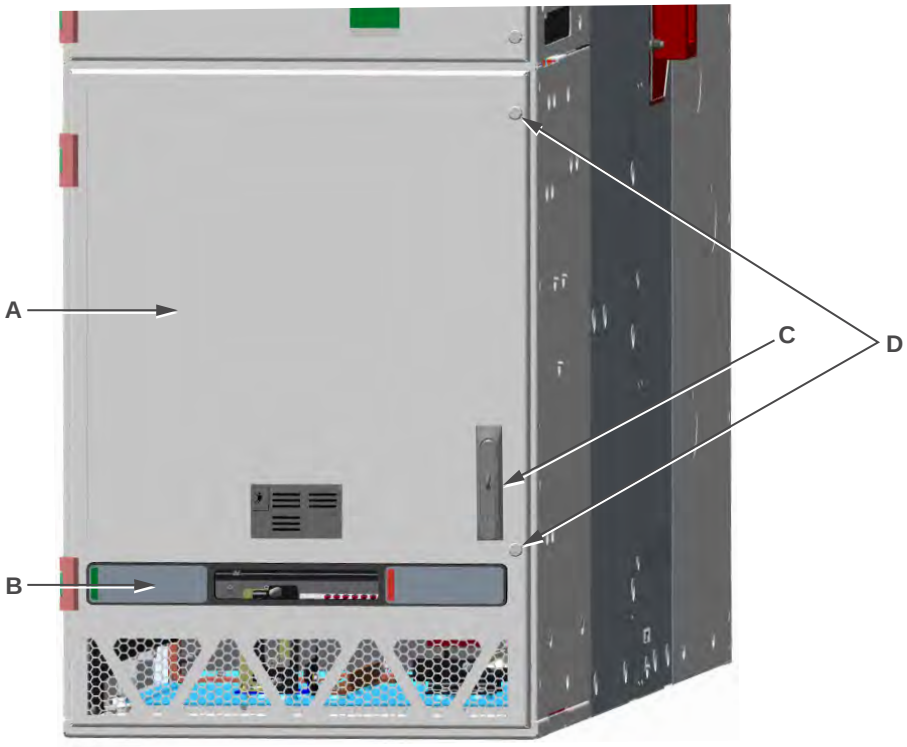
A	Auxiliary compartment—position A	**C**	Lower circuit breaker compartment	**E**	Auxiliary compartment—position C
B	Auxiliary compartment—position B	**D**	Upper circuit breaker compartment	**F**	Auxiliary compartment—position D

Hinged Doors with Door-Mounted, Low-Voltage Indication, Protection, and Control Devices

Each compartment has its own hinged door (see the figure Typical Hinged Door, which comes with thumb screws as standard, but can also be equipped with a handle with padlock and keylock options. The thumb screws are required for the switchgear to achieve seismic performance. All the doors are equipped with a door stay to help block the door from opening further and to help block the door from closing unexpectedly. All door configurations have an automatic door stay latch included as standard (see the figure Hinged Door with Low Voltage Device Panel and Automatic Door Stay Latch), except for specific LV instrument compartment doors which use a manual door stay rod (see the figure Manual Door Stay Rod, page 21).

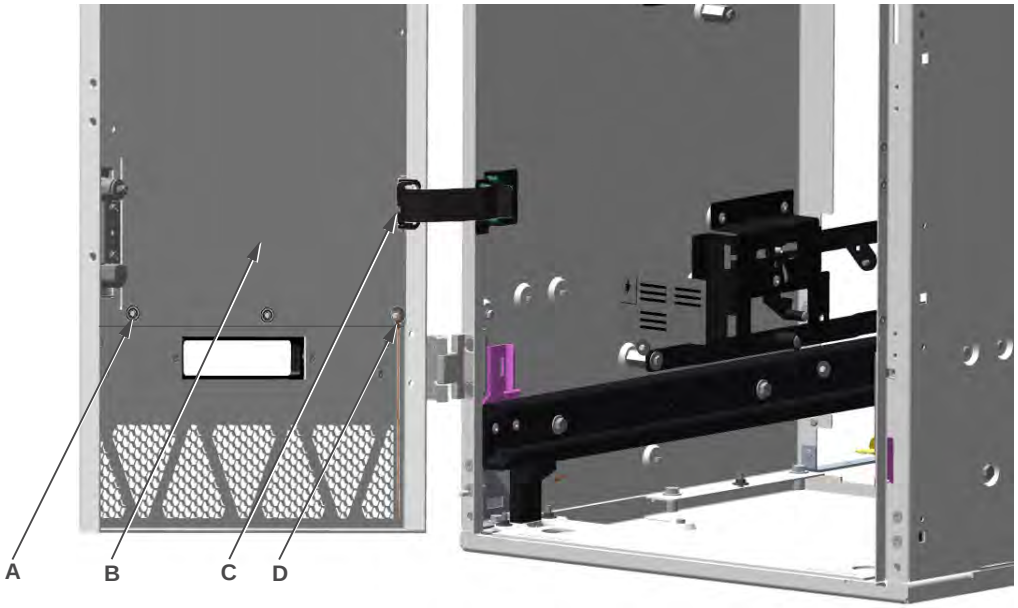
Low voltage instruments, relays, control panels, terminal blocks, fuse blocks, and other indication, protection, and control devices may be mounted on the hinged doors. In some door applications, a flat panel attached to the door frame provides mounting space that can be customized for these low voltage devices (see the figure Hinged Door with Low Voltage Device Panel and Automatic Door Stay Latch, page 20). Flat panels are mounted on studs welded in the hinged door frame and secured with 1/4–20 SAE Grade 5 (minimum) steel nuts and conical spring washers. A ground wire from the compartment would be connected to one of the studs with a steel nut and conical spring washer, plus a 5/16 external tooth steel lock washer.

Figure 11 - Typical Hinged Door



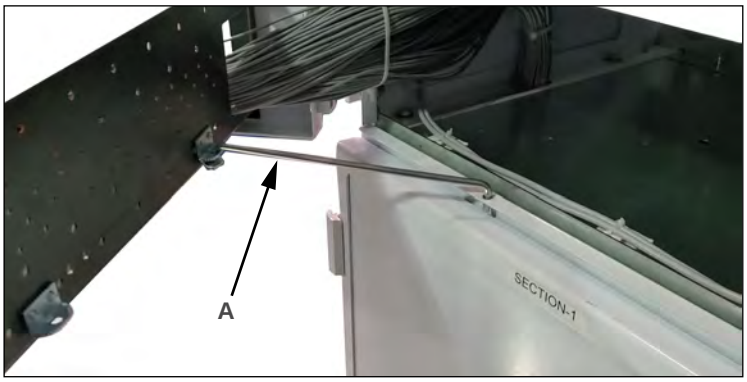
A	Low voltage device panel	**B**	Racking mechanism faceplate	**C**	Door handle	**D**	Door thumb screws

Figure 12 - Hinged Door with Low Voltage Device Panel and Automatic Door Stay Latch



A	1/4–20 nut with conical washer assembly	**B**	Low voltage device panel	**C**	Automatic door stay latch	**D**	Ground wire connection with external tooth lock washer

Figure 13 - Manual Door Stay Rod



A	Manual Door Stay Rod

Dedicated, Low-Voltage Instrumentation Compartments

This dedicated, grounded, compartmentalized, heavy gauge steel compartment houses low-voltage instrumentation devices. The size of the compartment will vary based on the configuration of the section. The compartment may house devices such as:

- Indication devices
- Protection relays
- Control panel
- Terminal blocks
- Fuse blocks
- Power meters
- The wiring space for inter-section wiring and a customer's control wiring connections.

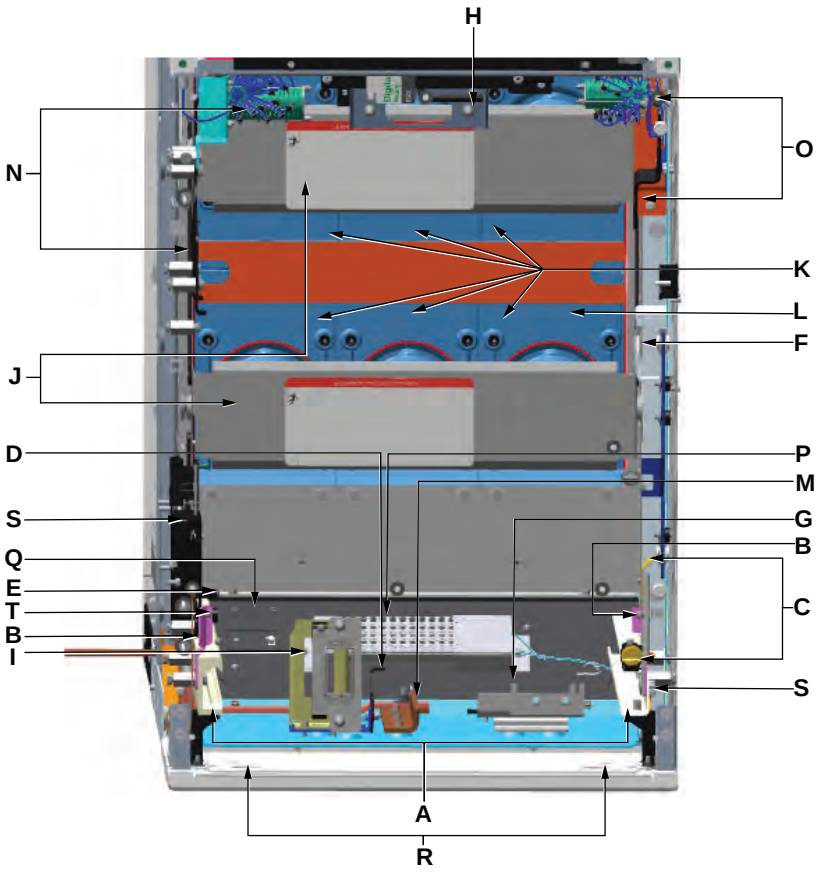
Every section, regardless of configuration, has a dedicated wireway, accessed through the roof, which can also be used for inter-section wiring and a customer's control wiring connections.

Circuit Breaker Compartment Description

Each circuit breaker compartment contains separate, but coordinated, features necessary for circuit breaker operation. Due to the inherent nature of the circuit breaker compartment interacting with the circuit breaker, it will be helpful throughout this section to simultaneously refer to the EvoPacT circuit breaker terminology and descriptions found in the Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* .

- Circuit breaker positioning rails
- Circuit breaker racking mechanism, racking port, and position indicator
- Racking mechanism latch plates
- Compartment lockout for padlock/key-lock
- Compartment interlocks
- Compartment rating code plate
- Secondary disconnect receptacle for circuit breaker power and control
- Low voltage receptacle for additional features
- Shutters
- Primary bushings and high-voltage contacts
- Current transformers
- Ground bus contact bar
- Mechanism-operated contacts (MOC) (Optional)
- Truck-operated contacts (TOC) (Optional)

Figure 14 - Typical Circuit Breaker Compartment with Circuit Breaker Removed



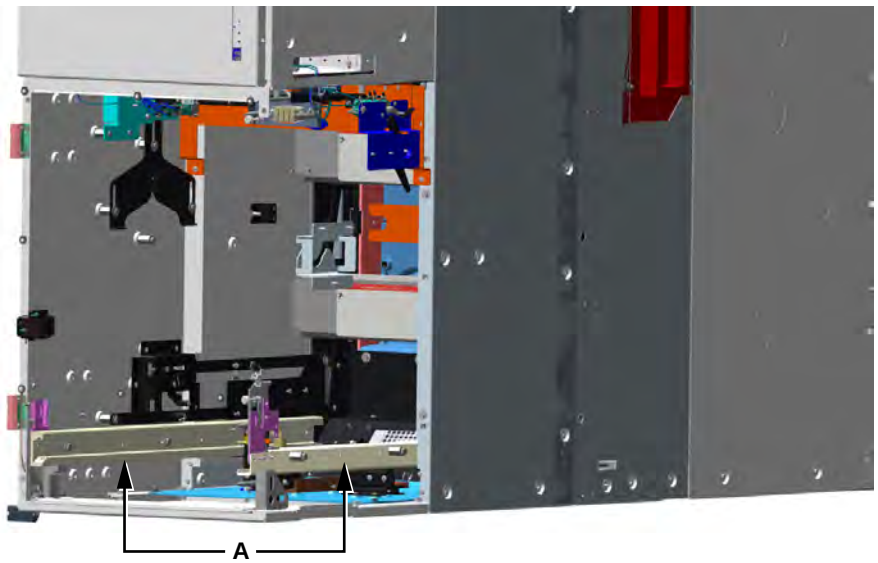
A	Circuit breaker positioning rails	**H**	Secondary disconnect receptacle for circuit breaker power and control	**O**	Truck-operated contacts (TOC) - optional
B	Racking mechanism latch plates	**I**	Low voltage receptacle for additional features	**P**	Heater— optional
C	Compartment lockout for padlock/key-lock	**J**	Shutters	**Q**	Arc flash detection sensor — optional
D	Racking mechanism stop plate (compartment interlock)	**K**	Primary bushings and high-voltage contacts	**R**	Foundation mounting holes — front
E	Shutters interlock (compartment interlock)	**L**	Current transformers mounting location	**S**	Lift truck slot location on front of compartment side sheets (not shown for clarity)
F	Automatic spring discharge plate	**M**	Ground bus contact bar	**T**	Shutter actuator
G	Compartment rating code plate	**N**	Mechanism-operated contacts (MOC) - optional		

Circuit Breaker Positioning Rails

The circuit breaker is equipped with thermoplastic polyolefin wheels for moving the circuit breaker when it is outside the switchgear and metal rollers to guide and position the circuit breaker inside the circuit breaker compartment. The thermoplastic polyolefin wheels allow for the dedicated metal rollers to remain clean and undamaged from movement outside the switchgear. When the circuit breaker is inside the breaker compartment, the four metal rollers are captured in rails (see the figure Positioning Rails), which position the circuit breaker in the vertical and horizontal positions.

The positioning rails, mounted on the interior side walls of the circuit breaker compartment, capture and align the metal rollers on the circuit breaker to guide the circuit breaker during transport into and out of the connected position. This facilitates accurate engagement with the primary conductors. Refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for further information.

Figure 15 - Positioning Rails



A	Positioning rails

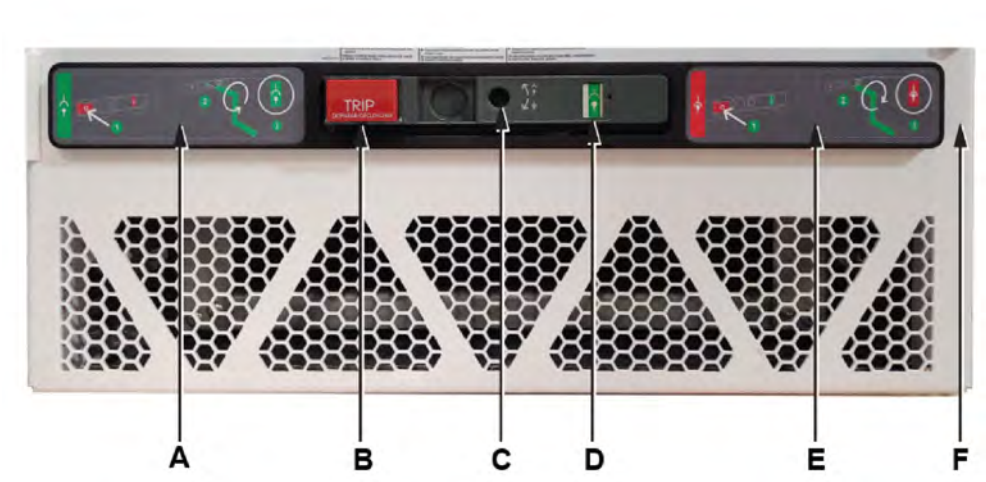
Circuit Breaker Racking Mechanism, Racking Port, and Position Indicator

The circuit breaker racking mechanism, racking port, and position indicator are integrated on the circuit breaker. Further information on the circuit breaker racking mechanism, racking port, and position indicator can be found in the Schneider Electric document number guide JYT3013100, *EvoPacT MV Vacuum Circuit Breaker*. The integrated racking mechanism moves the circuit breaker from the test/disconnected position to the connected position and vice versa. On the door racking mechanism faceplate of every circuit breaker compartment, there are instructions helping to show how to rack the circuit breaker in and out.

The breaker racking mechanism is operated by the removable charging/racking handle.

The position indicator will reflect if the circuit breaker is in the test/disconnected, transport, or connected position. The racking mechanism, racking handle, or circuit breaker compartment can be damaged by over-torquing due to high resistance from the circuit breaker/compartment connection points or from any obstruction in the compartment that inhibits free movement of the circuit breaker through the positioning rail by the racking mechanism. The circuit breaker racking mechanism is designed for 18 lb-ft (24.4 N•m) of maximum torque. Exceeding the maximum torque will damage the racking mechanism. On the first attempt to move a circuit breaker in the compartment, the torque required to rack a circuit breaker into and out of the connected position should be verified and documented for future inspection records. If equipped with a digital system, before electrically racking the circuit breaker, verify the output to help prevent damage to the circuit breaker racking mechanism from over-torquing.

Figure 16 - Circuit Breaker Compartment Door Racking Mechanism Faceplate with EvoPacT Circuit Breaker



A	Instruction label for racking out	**C**	EvoPacT circuit breaker manual racking port	**E**	Instruction label for racking in
B	EvoPacT circuit breaker red push button to access manual racking port/trip circuit breaker	**D**	EvoPacT circuit breaker position indicator	**F**	SureSeT circuit breaker compartment door

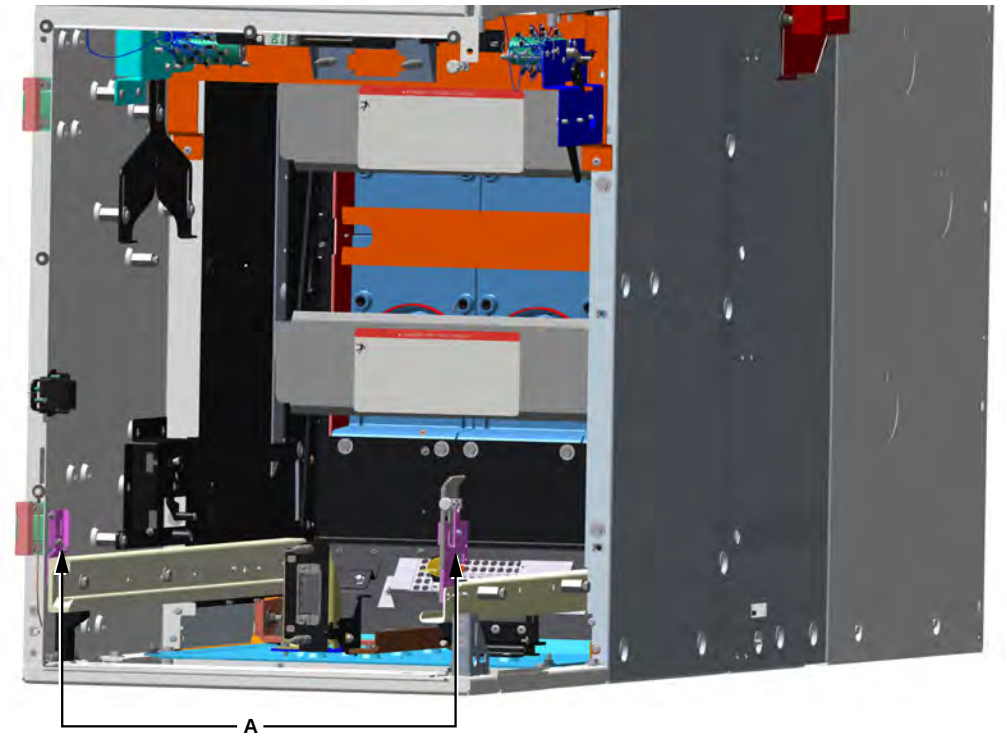
Racking Mechanism Latch Plates

The racking mechanism integrated with the circuit breaker engages with latch plates mounted in the compartment on the circuit breaker positioning rails (see the figures Latch Plates, page 26 and Locking Tabs Fully Extended Into the Latch Plates, page 27). Locking tabs on the left and right sides of the circuit breaker racking mechanism

will enter slots on the compartment latch plates. If the racking mechanism locking tabs are not fully extended into these compartment latch plate slots, it will not be possible to rack the circuit breaker. The green handles located on the left and right sides on top of the beam of the circuit breaker racking mechanism are used to retract and extend the locking tabs into the compartment latch plates. Refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for further information.

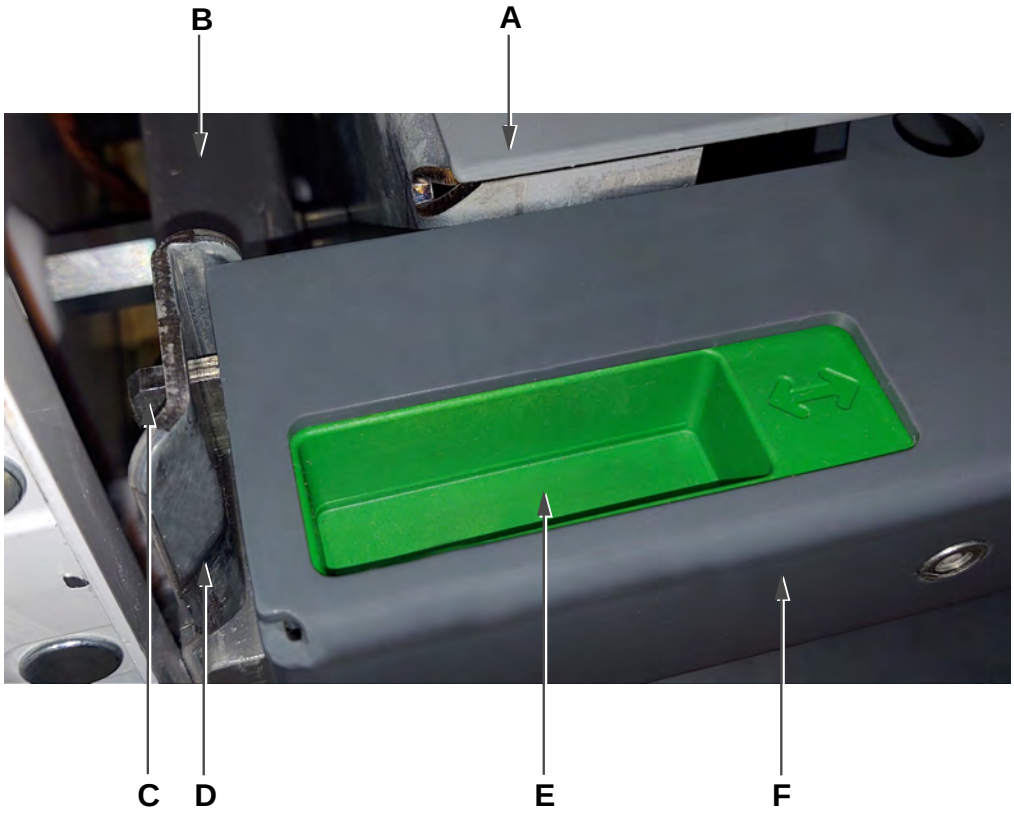
The compartment latch plates also position the circuit breaker to the correct depth in the compartment. The flanges on the latch plates interact with the back side of the beam on the circuit breaker racking mechanism. As the circuit breaker racking mechanism operates, it relies on these locking tabs and latch plates to move the circuit breaker into or out of the test/disconnected or connected position.

Figure 17 - Latch Plates



A	Latch plates

Figure 18 - Locking Tabs Fully Extended Into the Latch Plates

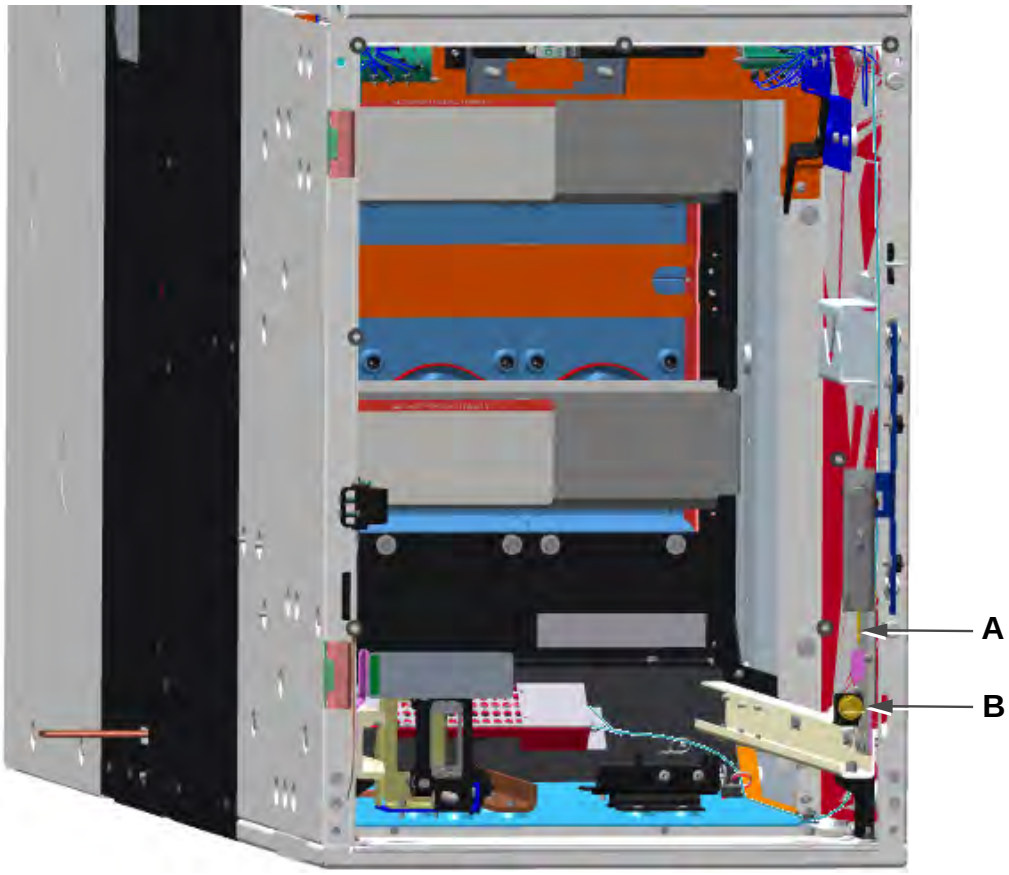


A	Circuit breaker carrier pan flush with racking mechanism beam	**C**	Circuit breaker racking mechanism left locking tab fully extended into latch plate slot (right locking tab will look similar when fully extended into latch plate slot)	**E**	Circuit breaker racking mechanism green handle
B	Circuit breaker compartment left side positioning rail	**D**	Circuit breaker compartment left side latch plate	**F**	Circuit breaker racking mechanism beam

Compartment Lockout for Padlock/Keylock

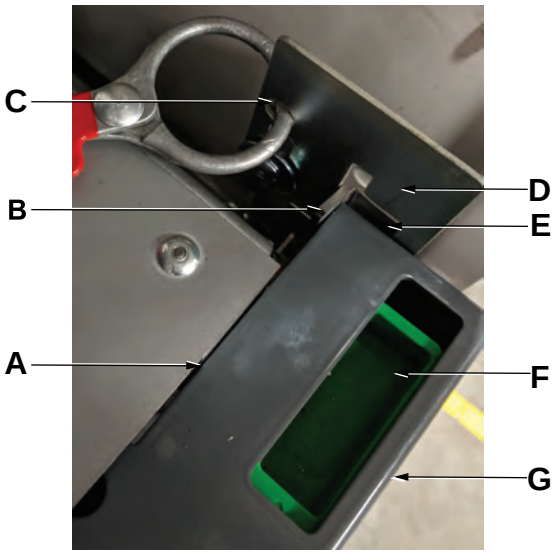
A compartment lockout provision (see the figure **Compartment Lockout for Padlock and Keylock**) is provided in each circuit breaker compartment for locking a circuit breaker out of the connected position. The compartment lockout is located on the right racking mechanism latch plate of each circuit breaker compartment. The compartment lockout provision is equipped with padlock provisions as standard, and can also be equipped with a keylock when specified by the customer. The compartment lockout inhibits racking a circuit breaker into the connected position. A circuit breaker can be stored in the test/disconnected position with the compartment lockout locked. The circuit breaker can also be removed from or inserted into the compartment with the compartment lockout locked.

Figure 19 - Compartment Lockout for Padlock and Keylock



A	Padlock	**B**	Keylock (optional)

Figure 20 - Right Locking Tab Retracted With Padlock Plate Engaged



A	Circuit breaker carrier pan flush with racking mechanism beam	**E**	Circuit breaker compartment right side latch plate
B	Circuit breaker racking mechanism beam flush with back flange on the latch plate	**F**	Circuit breaker racking mechanism green handle moved towards center of circuit breaker
C	A padlock hasp shown engaged with lockout plate	**G**	Circuit breaker racking mechanism beam
D	Circuit breaker compartment lockout plate		

Compartment Interlocks

⚠CAUTION

INTERLOCK DAMAGE

- Do not test or operate interlocks by hand. Test interlocks only by moving the circuit breaker into or out of the compartment.
- Do not attempt to operate interlocks in an incorrect sequence.

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

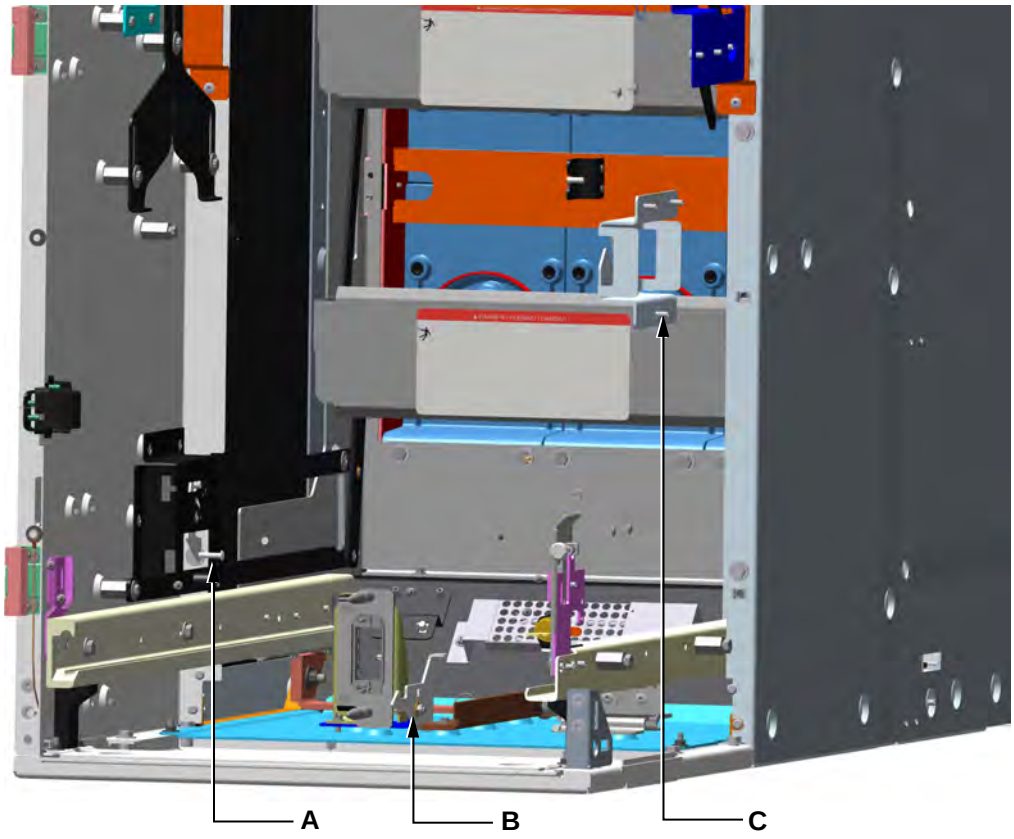
Several of the required circuit breaker interlocks are contained within the racking mechanism integrated on each circuit breaker (see the figure Compartment Interlocks). Additional information on the circuit breaker interlocks can be found in Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* . The following interlocks are contained in the circuit breaker compartment.

- **Shutter Interlocks:** A blocking mechanism will not allow the shutters to open when the circuit breaker is not in the compartment. This interlock can also be used to padlock the shutters closed. See Shutters, page 35 and Padlocked Closed Shutters, page 36.
- **Racking Mechanism Stop Plate:** A stop plate located on the floor of the compartment stops the circuit breaker from being inserted into the compartment when the circuit breaker racking mechanism is not in the racked out position.

- **Automatic Spring Discharge:** A circuit breaker mechanism spring discharge plate mounted on the right side of the compartment will automatically discharge the circuit breaker closing and opening springs, if the circuit breaker is inserted or withdrawn from the compartment with either closed vacuum interrupter contacts or charged springs. The plate engages with the automatic spring discharge interlock pin located on the right side of the circuit breaker. During the removal or insertion of the circuit breaker, the circuit breaker may automatically operate up to three separate times with open-close-open operations. Whether the circuit breaker operates 0, 1, 2, or 3 times depends on:
  - the charged or discharged state of the circuit breaker mechanism,
  - the open or close position of the circuit breaker,
  - and whether the circuit breaker is equipped with a mechanism charging motor.

Each operation will generate a loud noise as the circuit breaker mechanism discharges all of the stored energy. The discharging operations occur at a periodic distance and time of travel as the circuit breaker discharge pin moves down the length of the interlock plate. Do not be alarmed hearing the separate noises as it is intentional by the interlock; however, it is recommended for the user to manually discharge all energy from the circuit breaker mechanism before inserting or withdrawing the circuit breaker. Manually discharge the circuit breaker with control power disconnected from the circuit breaker and alternating pressing the open and close push buttons several times.

Figure 21 - Compartment Interlocks

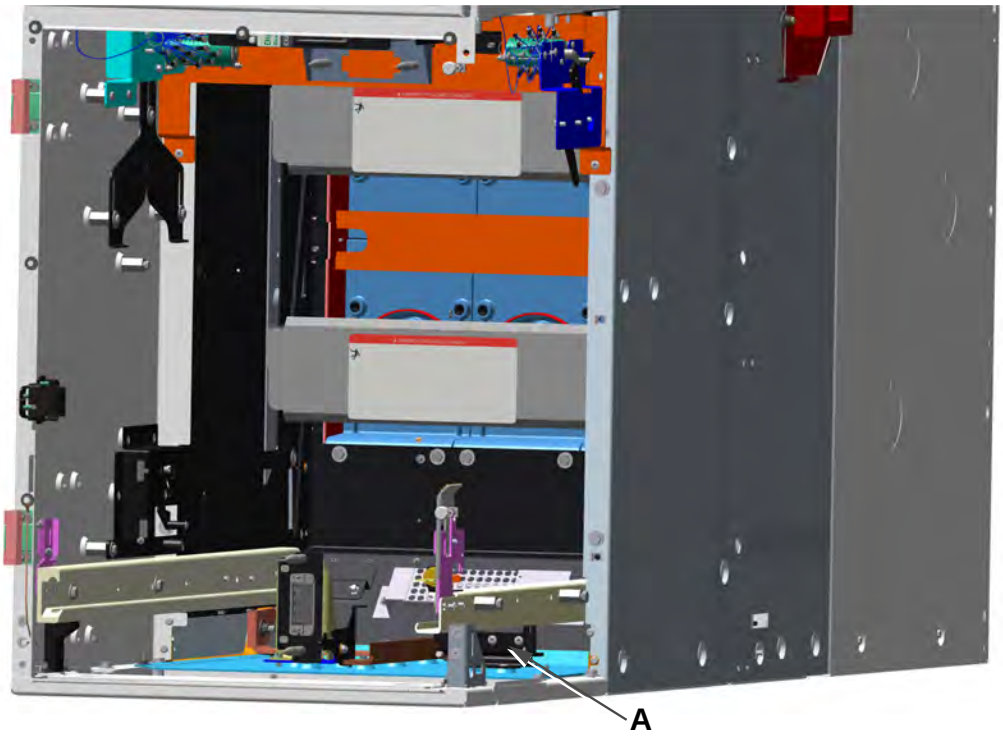


A	Shutter interlock	**B**	Racking mechanism stop plate	**C**	Automatic spring discharge plate

Compartment Rating Code Plate

Rating interlock code plates stop accidental insertion of circuit breakers with incorrect current, voltage, or interrupting ratings into the compartment (see the figure Compartment Rating Code Plate). The stationary interference brackets are mounted on the floor of the compartment. The moving part of the interlock code plate system is mounted on the rear underside of each circuit breaker.

Figure 22 - Compartment Rating Code Plate



A	Compartment Rating Code Plate

Secondary Disconnect Receptacle for Circuit Breaker Power and Control

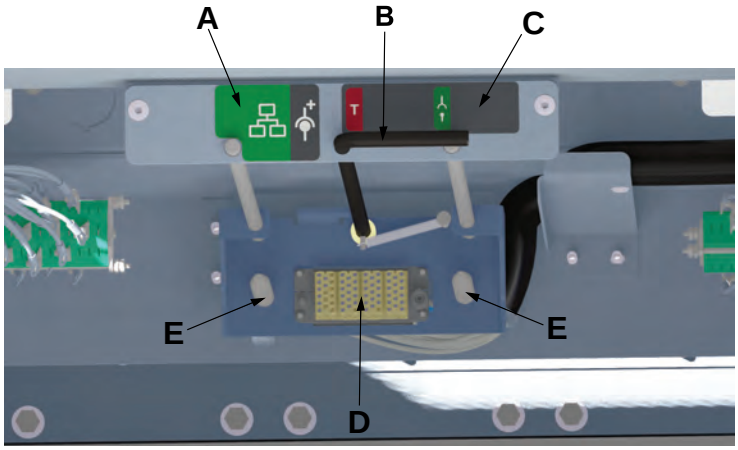
The secondary disconnect receptacle for circuit breaker power and control is located above the circuit breaker in the front, center area of the compartment (see the figure Secondary Disconnect Receptacle Assembly, page 32). The compartment has a molded insulating receptacle containing 33 contacts as standard, but it may be equipped instead with a “Contact Plus” receptacle that offers more circuit breaker auxiliary contacts and has an increased number of racking endurance operations (see the table Secondary Disconnect Labels, page 32). The type of receptacle in the compartment must be coordinated with and match the type of plug on the circuit breaker for all power and control features to operate. This coordination is made based on customer specifications at the time of order is indicated on the equipment by the symbols on the compartment labels and the top cover of the circuit breaker top cover (see the figure Coordinating Circuit Breaker Compartment and Circuit Breaker Top Cover Secondary Disconnect Labels, page 33 and Secondary Disconnect Labels, page 32).

The receptacle mounting assembly has two tapered guide pins which help ensure proper engagement with the secondary disconnect plug for power and control mounted on top of the circuit breaker. Physically, the test and disconnected positions on the racking mechanism are identical. When the circuit breaker is fully racked out, it goes to test/disconnected position and the secondary disconnect plug for power and control is automatically disconnected. When the plug is manually pulled forward to

connect with a circuit breaker in the test/disconnected position, the circuit breaker is considered to have entered into test mode. The control power can be connected to the circuit breaker in the test/disconnected position by rotating the handle attached to the secondary disconnect receptacle in the compartment and pulling it forward to engage with the circuit breaker.
The circuit breaker compartment door must be opened to access the handle for the secondary disconnect receptacle assembly, and the door must remain open if the handle has pulled the receptacle to the test position.

NOTE: When not used for testing, the receptacle should remain latched, at the back of its travel in the location where it connects with the circuit breaker plug in the racked-in, connected position. If the receptacle is not in the latched position, then the handle should be used to manually push the receptacle back to the latched, circuit breaker racked-in position before the circuit breaker is racked-in.

Figure 23 - Secondary Disconnect Receptacle Assembly



A	Circuit breaker compartment secondary disconnect label	**C**	Instruction label	**E**	Guide pin
B	Handle	**D**	Secondary disconnect receptacle for circuit breaker power and control		

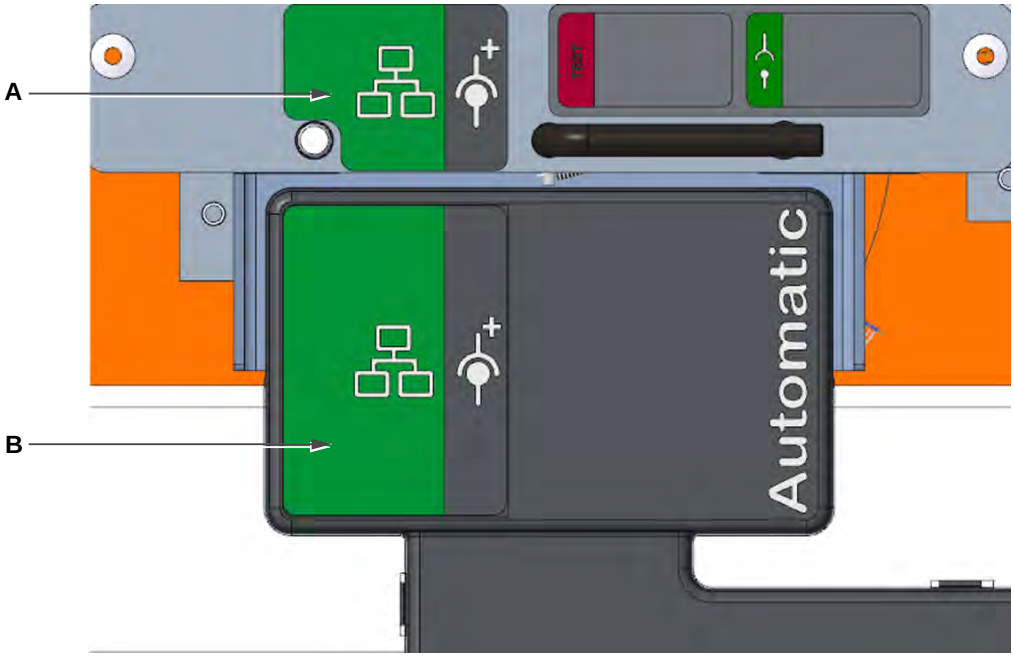
Table 3 - Secondary Disconnect Labels

Secondary Disconnect Label	Secondary Disconnect Receptacle for Circuit Breaker Power and Control	Breaker Features	Maximum Number of Racking Operations	Number of Auxiliary Contacts
None (standard)	Standard	Digital Ready	500	5NO, 4 NC
	Contact Plus	Digital Ready	1000	10NO, 9NC

Table 3 - Secondary Disconnect Labels (Continued)

Secondary Disconnect Label	Secondary Disconnect Receptacle for Circuit Breaker Power and Control	Breaker Features	Maximum Number of Racking Operations	Number of Auxiliary Contacts
	Standard	Digital Monitoring and/or Digital Control	500	5NO, 4 NC
	Contact Plus	Digital Monitoring and/or Digital Control	1000	10NO, 9NC

Figure 24 - Coordinating Circuit Breaker Compartment and Circuit Breaker Top Cover Secondary Disconnect Labels



A	Label on circuit breaker compartment identifying type of secondary disconnect receptacle for circuit breaker power and control	**B**	Label on top cover of circuit breaker identifying type of secondary disconnect receptacle for circuit breaker power and control

NOTE: Before racking in the circuit breaker, verify the label (A) on the circuit breaker compartment and the label (B) on the circuit breaker used in the compartment coordinate with each other.

Low Voltage Receptacle for Additional Features

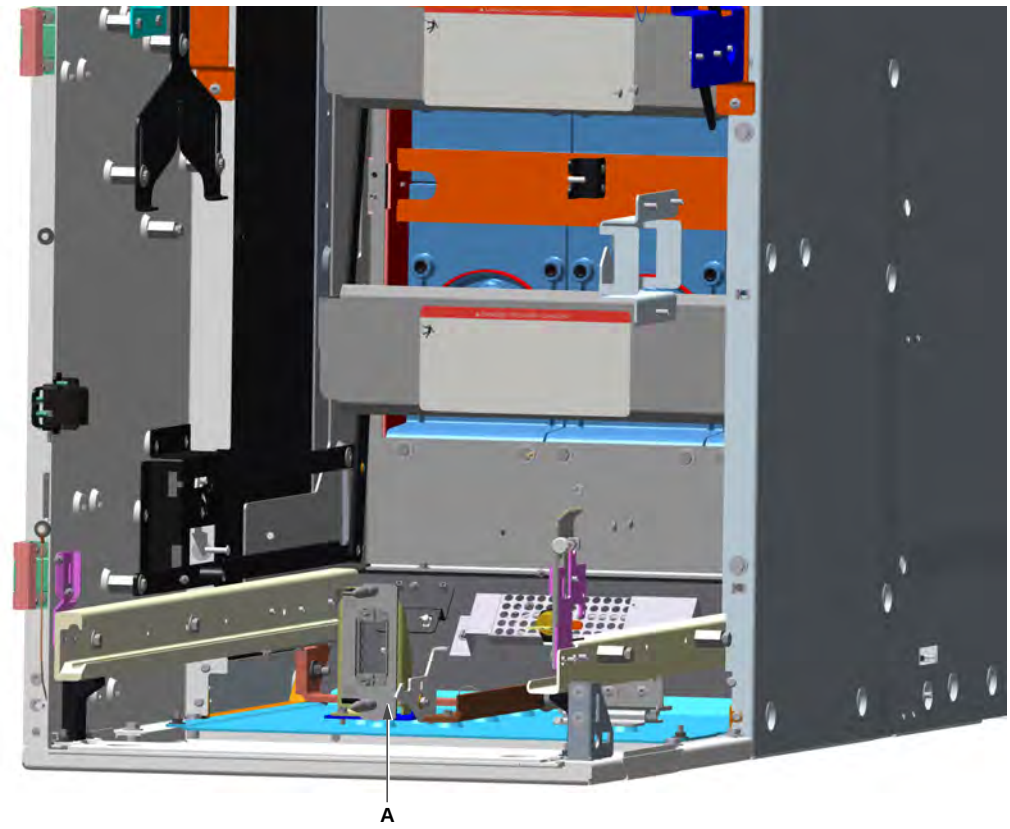
The circuit breaker compartment may also be equipped with a stationary low voltage receptacle for additional features mounted to the rear, left side of the circuit breaker compartment floor (see the figure Low Voltage Receptacle for Additional Features).

The receptacle mounting assembly has two tapered guide pins which help assembly to properly engage the mating plug mounted on the rear, underside of circuit breakers equipped with this feature. The receptacle and plug remain in a fixed position, regardless of the position of the circuit breaker in the compartment. The connection is made when the circuit breaker is inserted into the compartment and reaches the test/ disconnected position.

The number of pins and types of connectors available for this low voltage receptacle will be based on customer-selected features. Refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for further information.

NOTE: The low voltage receptacle for additional features is not used for circuit breaker Open/Trip and Close functions, but for integrated electrical racking and other digital circuit breaker health monitoring options.

Figure 25 - Low Voltage Receptacle for Additional Features



A	Low voltage receptacle for additional features

Shutters

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- Disconnect power to both line and load connections before manually opening shutters or removing any barriers for maintenance or repair.
- Always use a properly rated voltage sensing device to confirm power is off.

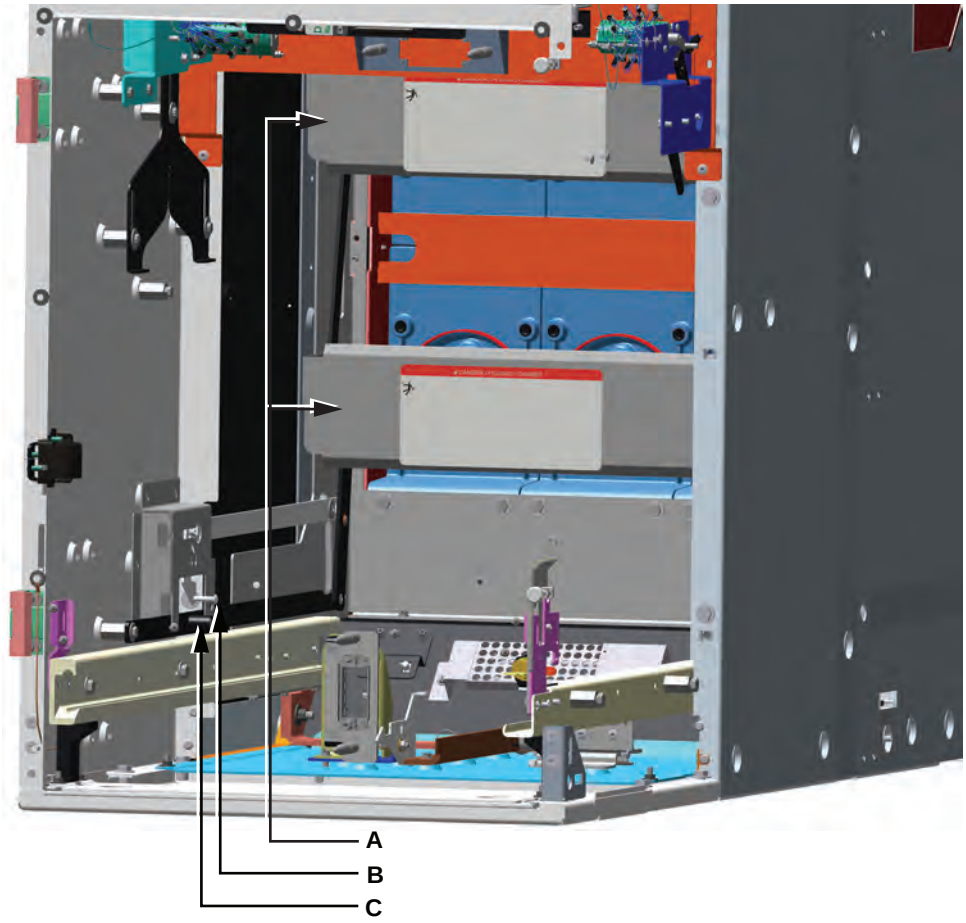
Failure to follow these instructions will result in death or serious injury.

Two metallic shutters (see the figure Shutters, page 35) are mounted directly in front of the primary high voltage contacts. The shutters help to prevent accidental contact with the primary high voltage contacts and do not provide arc flash protection. The shutters move with a rotary motion, actuated by racking in the circuit breaker, which interacts with the shutter actuator in the circuit breaker compartment.

NOTICE
OBSTRUCTION OF BREAKER Shutter padlock must be removed before a circuit breaker can be inserted into the circuit breaker compartment. **Failure to follow these instructions can result in equipment damage.**

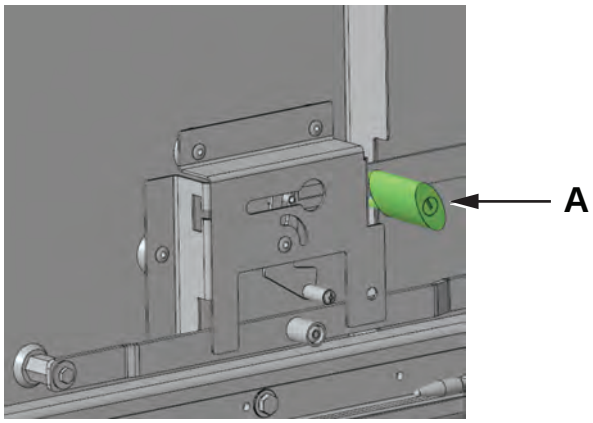
The shutters can be padlocked closed when a circuit breaker is not in the compartment by inserting a lock into the slot on the lever located on the left side of the circuit breaker compartment (see the figure Padlocked Closed Shutters, page 36). The padlock must be removed before a circuit breaker can be inserted.

Figure 26 - Shutters



A	Shutters	**B**	Shutter interlock	**C**	Shutter actuator

Figure 27 - Padlocked Closed Shutters



A	Customer Padlock

Primary Bushings and High Voltage Contacts

The stationary, primary high voltage contacts for each phase are housed in a primary bushing assembly (see the figure Primary Bushings and High Voltage Contacts) consisting of insulating tubes extending toward the front of the circuit breaker compartment. The primary high voltage contacts of the circuit breaker engage these stationary primary contacts when the circuit breaker is in the connected position. The open ends of the bushing insulating tubes are covered by the shutters when the circuit breaker is in the test/disconnected position, or is removed from the compartment.

Depending on the rating, a Group A insulation of either molded fiberglass polyester or bisphenol epoxy bushings are provided as standard. If a customer specifies Group B insulation, cycloaliphatic epoxy bushings are provided.

Figure 28 - Primary Bushings and High Voltage Contacts

A	Primary bushing assembly insulating tube	**B**	Primary high voltage contact

Current Transformers

Front-accessible, bushing/window-type, 600 V rated, single- or multi-ratio current transformers (see the figure Current Transformers (2x 348 CTs Per Phase shown)) can be mounted in the compartment around either the line or load primary high voltage contact bushing assembly insulating tubes. A maximum of four current transformers, depending on accuracy, can be mounted per phase—two on the line side and two on the load side.

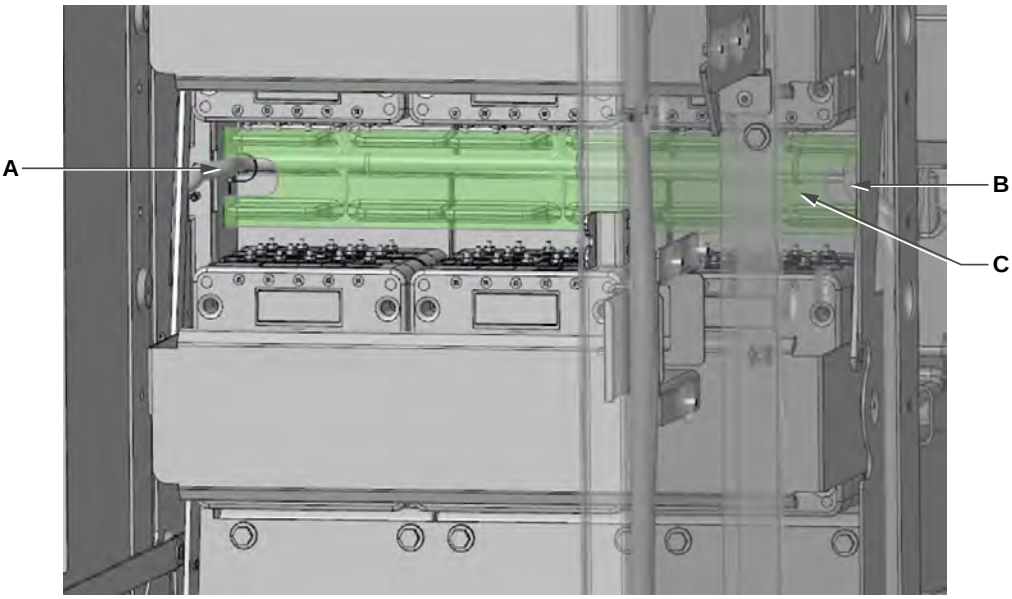
Figure 29 - Current Transformers (2x 348 CTs Per Phase shown)

Higher accuracy or multi-ratio current transformer applications may limit the number of current transformers permitted per phase in a compartment. The current transformer positions and wire routings are identified in the figures Current Transformer Wire Trough, page 39, 4 x 347 Current Transformers Per Phase in Circuit Breaker Compartment, page 39, Position Identification of 347 Current Transformers in Circuit Breaker Compartment, page 40, and Position Identification of 348 Current Transformers in Circuit Breaker Compartment, page 41. The same current transformer can be used on any bushing insulation material. The bushing assembly creates a dedicated wire trough for helping route the current transformer wires. A cover is used to help store, hide, and protect these wires inside the trough, as shown in the figure Current Transformer Wire Trough, page 39.

An analysis should be performed to determine which requirements for relays and current transformers provide optimal protection for the installation.

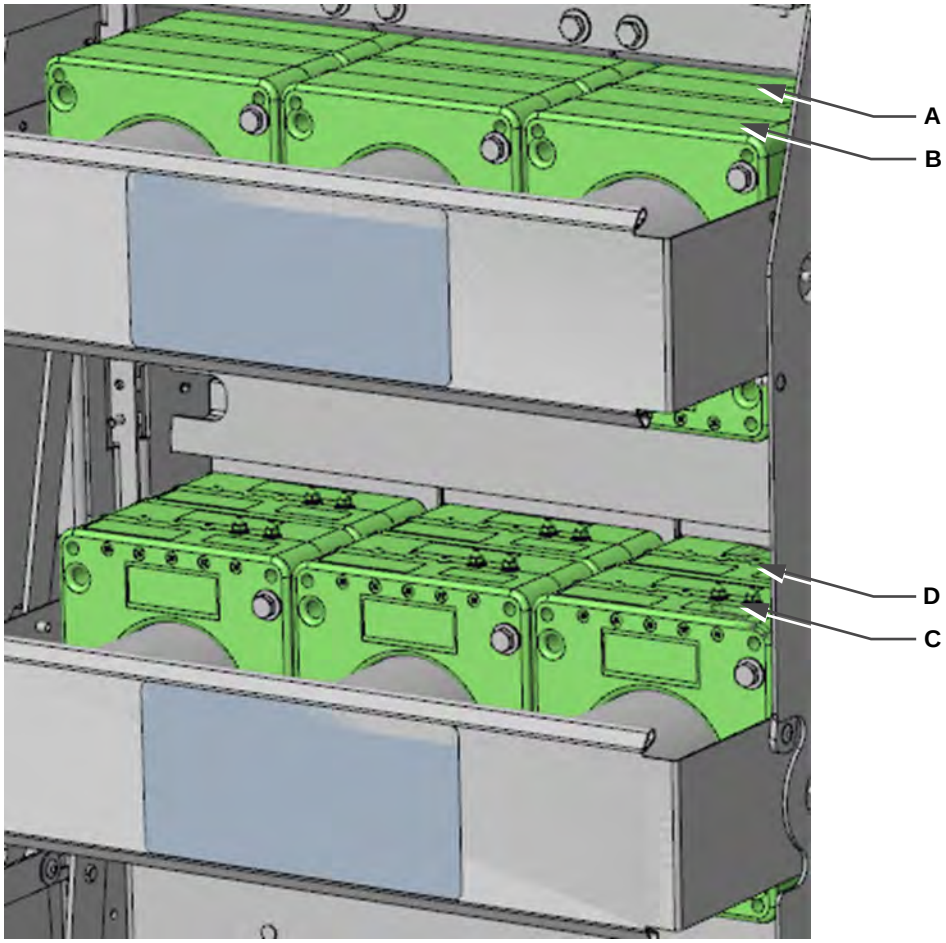
> **NOTE:** For switchgear equipped with an Arc Flash Mitigation System, an arc flash study should be done for the application to consider all the arc flash mitigation means.

Figure 30 - Current Transformer Wire Trough



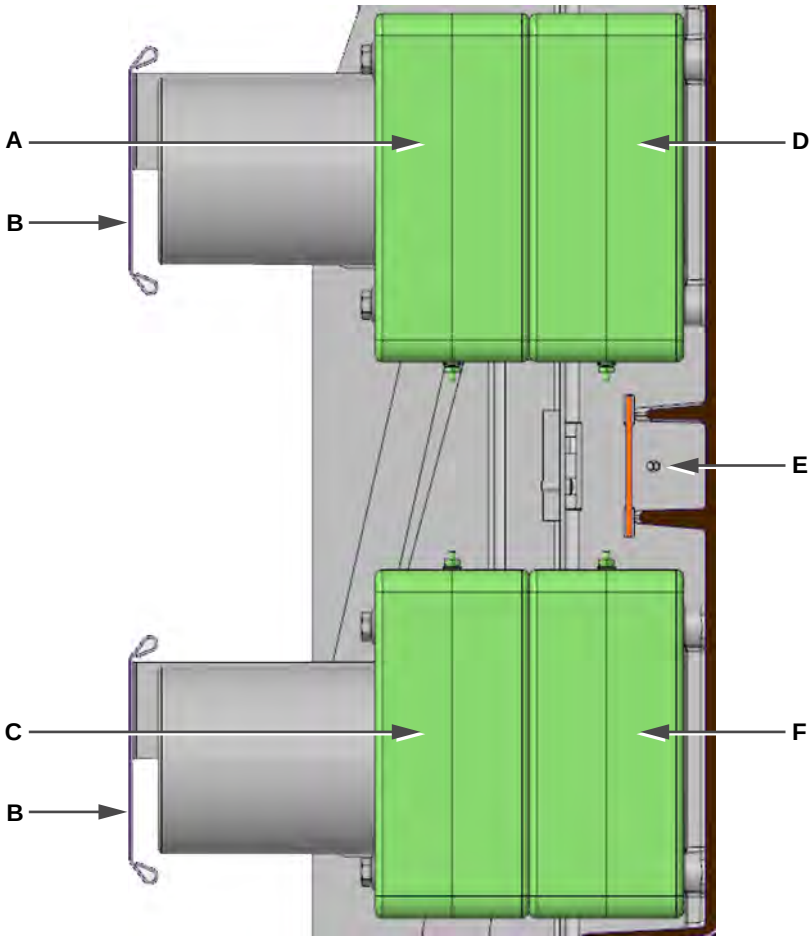
A	CT position 1 and 3 wire routing	**B**	CT position 2 and 4 wire routing	**C**	CT wire trough with cover

Figure 31 - 4 x 347 Current Transformers Per Phase in Circuit Breaker Compartment



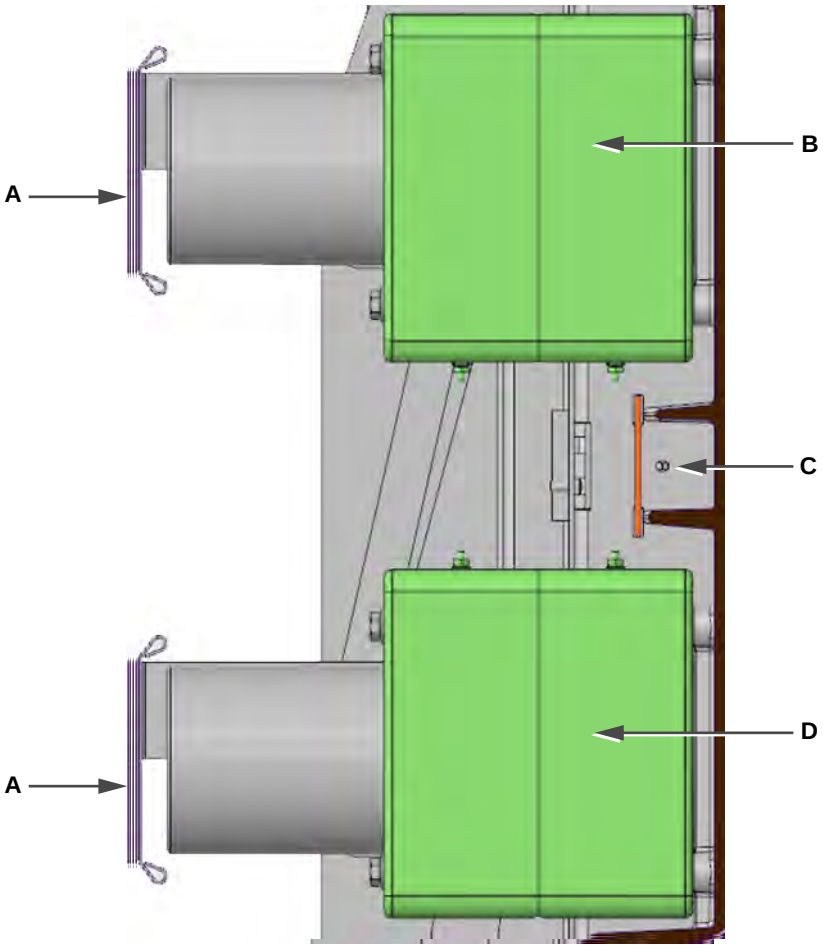
A	CT position 1	**B**	CT position 2	**C**	CT position 4	**D**	CT position 3

Figure 32 - Position Identification of 347 Current Transformers in Circuit Breaker Compartment



A	CT position 2	**C**	CT position 4	**E**	CT wire trough with cover
B	Shutter	**D**	CT position 1	**F**	CT position 3

Figure 33 - Position Identification of 348 Current Transformers in Circuit Breaker Compartment

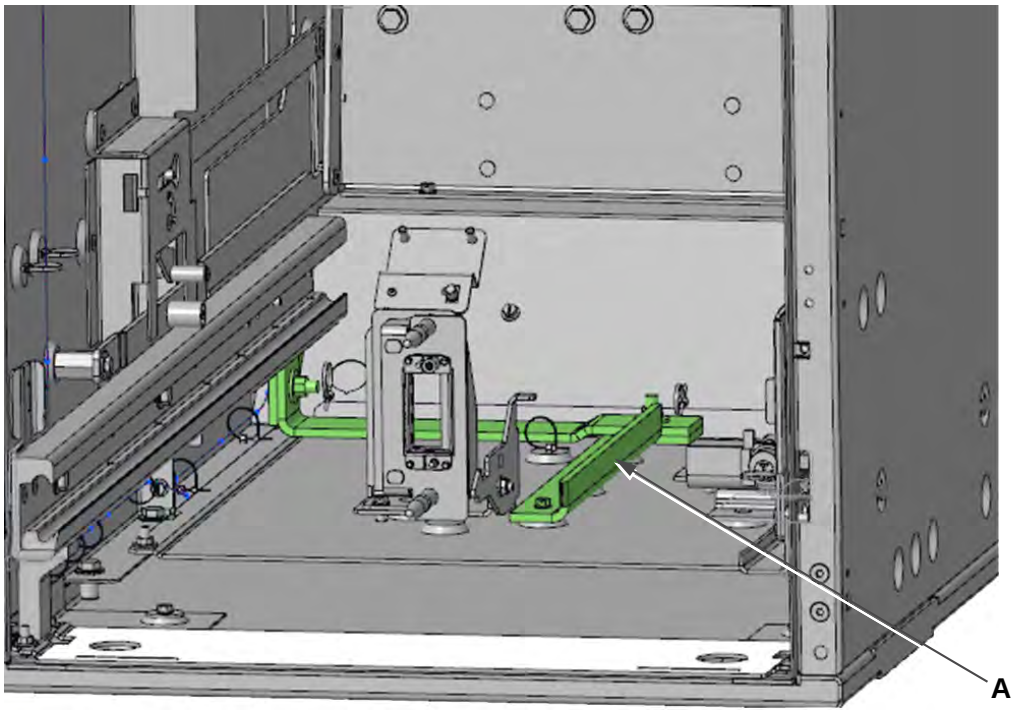


A	Shutter	**B**	CT position 1	**C**	CT wire trough with cover	**D**	CT position 3

Ground Bus Contact Bar

A ground bus contact bar is located on the floor of the circuit breaker compartment (see the figure Ground Bus Contact Bar). It is directly connected to the main ground bus for the equipment, and mates to a sliding ground contact located on the rear underside of the circuit breaker. When a circuit breaker is inserted into a circuit breaker compartment, the sliding ground contact of the circuit breaker engages the ground bus contact bar in the compartment before the circuit breaker reaches the test/disconnected position. The circuit breaker remains continuously grounded in all positions while in the compartment, even in transport when moving between the connected and test/disconnected positions.

Figure 34 - Ground Bus Contact Bar



A	Ground bus contact bar

Mechanism-Operated Contacts (MOC) (Optional)

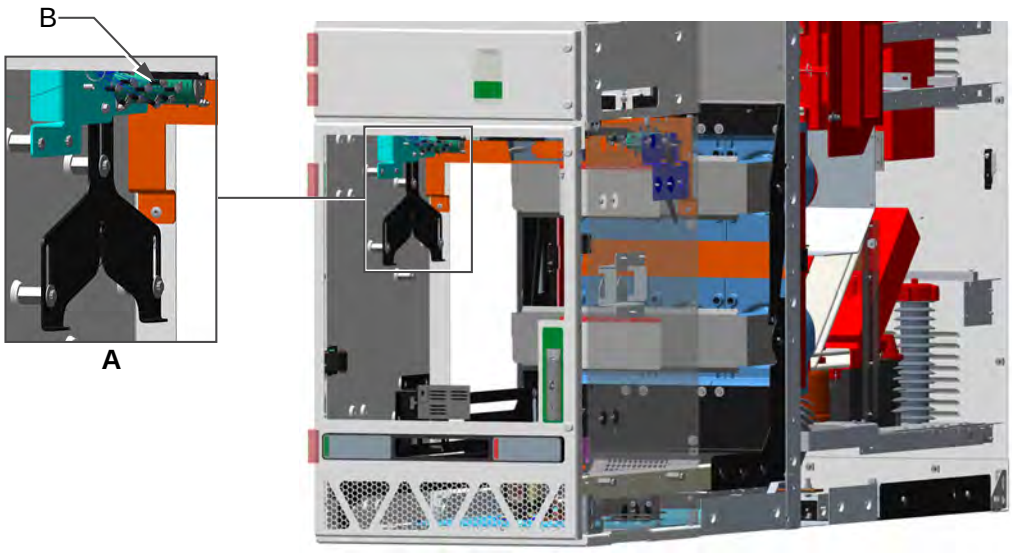
Mechanism-operated contacts (see the figure Mechanism-Operated Contact Unit, page 43) are optional, compartment-mounted, auxiliary contacts operated by the circuit breaker mechanism. Like circuit-breaker-mounted auxiliary contacts, the MOC indicates whether the circuit breaker is in the open or closed position. The MOC operates with the circuit breaker in both the connected and test/disconnected positions.

If a customer application needs more or higher rated breaker status indication contacts than the 10NO/9NC aux contacts offered by the “Contact Plus” breaker (see the table Secondary Disconnect Labels, page 32), then these optional MOC auxiliary switch contacts installed in the circuit breaker compartment can be used. The MOC auxiliary switch can be configured to have 10 contacts (5NO/5NC) or 13 contacts (6 NO/7 NC). Refer to the customer order drawings shipped with the equipment.

> **NOTE:** The provided Normally-Open “A" contacts and Normally-Closed "B" contacts are not convertible.

The MOC unit is mounted on the left side of the circuit breaker compartment. It is operated by a mechanism that is driven vertically by a roller on the left side of the circuit breaker. The auxiliary contact switch is mounted at the top of the MOC unit inside the front area of the circuit breaker compartment.

Figure 35 - Mechanism-Operated Contact Unit



A	MOC	**B**	MOC auxiliary contact switch

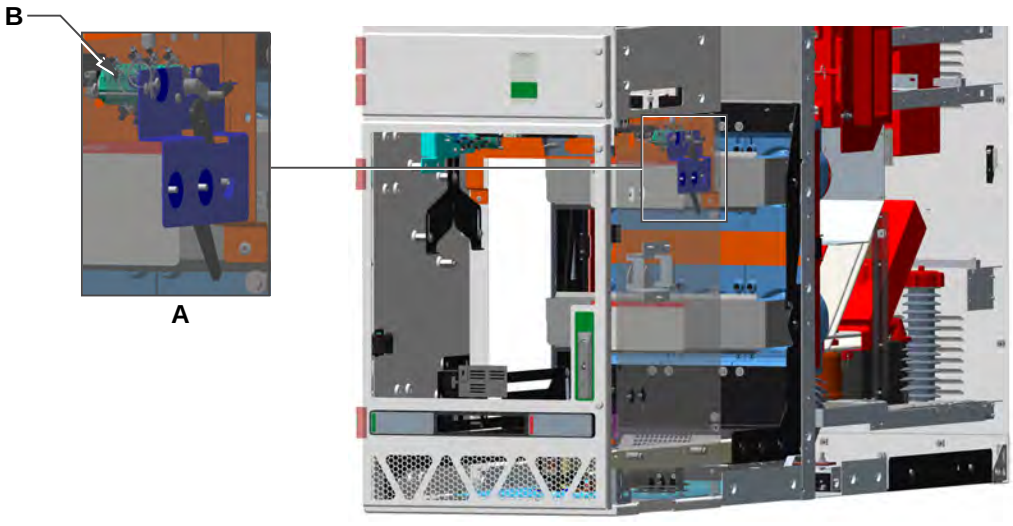
Truck-Operated Contacts (TOC) (Optional)

Truck-operated contacts (see the figure Truck-Operated Contact Unit) indicate the physical position of the circuit breaker in the compartment. The TOC indicates whether the circuit breaker is in the connected or test/disconnected position. The TOC option is configured to have 10 contacts on the auxiliary switch.

> **NOTE:** The TOC unit does not distinguish between the circuit breaker being in the test/disconnected position or withdrawn completely from the compartment. Also, since the TOC activates as the circuit breaker is about to be connected, the position of the circuit breaker should not be based on the TOC alone. The position should be verified by observing the racking truck mechanical position indicator (see the figure Typical Circuit Breaker Compartment with Circuit Breaker Removed, page 23) and, if equipped, the electrical racking should be complete.

The TOC unit with the auxiliary switch is mounted on the right side of the circuit breaker compartment. It is operated by a spring-loaded lever. This lever is activated, just before the circuit breaker reaches the connected position, by a pin on the upper right side of the circuit breaker.

Figure 36 - Truck-Operated Contact Unit



A	TOC	**B**	TOC auxiliary contact switch

Auxiliary Compartments

The auxiliary compartments house the following:

- Control Power Transformers (CPTs)
- Voltage Transformers (VTs)
- Low Power Voltage Transformers (LPVTs)

CPT and VT Overview

The voltage transformer (VT) and control power transformer (CPT) drawers are part of self-contained compartments (see the figure Front Sub-Section with Voltage and Control Power Transformer Compartments in Position A and B, page 46) . The auxiliary compartments are located in the section in positions identified as A, B, C, or D (see the figure Compartment Positions in a Section, page 19).

The auxiliary drawers move from the disconnected to the connected position via two positioning rails mounted on the sides of the compartment. The rails capture and align rollers on the drawers. As a standard, the CPT and VT drawers are moved to and from the connected position by manually pushing or pulling the drawers.

Optionally, the drawer and compartment can be equipped with a mechanical racking system to enable closed door racking. This racking system can also be motorized to enable remote racking. The racking mechanism is located on the floor of the auxiliary compartment. The non-motorized racking mechanism is operated by the same removable racking handle, as the circuit breaker, inserted into the front port. On auxiliary (CPT/VT) drawers equipped with a racking mechanism, the racking mechanism, racking handle, or auxiliary compartment can be damaged by over-torquing due to high resistance from the auxiliary drawer/compartment connection points or from any obstruction in the compartment that inhibits free movement of the auxiliary drawer through the positioning rail by the racking mechanism. The auxiliary racking mechanism is designed for 18 lb-ft (24.4 N•m) of maximum torque. Exceeding the maximum torque will damage the racking mechanism. On the first attempt to move an auxiliary drawer, equipped with a racking mechanism, in the compartment, the torque required to rack an auxiliary drawer into and out of the connected position should be verified and documented for future inspection records. If equipped with a

digital system, before electrically racking the auxiliary drawer, verify the output to help prevent damage to the racking mechanism from over-torquing.

The auxiliary drawer front panel is recessed behind the front compartment door when in the connected position, (see the figure Auxiliary Drawer Position Indicator Symbols, page 47). When a racking mechanism is not installed, the user manually pushes the auxiliary drawer to the connected position (see the figure Auxiliary Compartment without Racking Mechanism Position Indicator (shown in Transport position), page 47) and tightens two thumbscrews to keep the drawer in the connected position (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50). With the racking option, an indicator beside the racking port reflects which position the auxiliary drawer is in: disconnected, transport, or connected (see the figure Auxiliary Compartment Door Faceplate with Racking Mechanism, page 46). For further detailed instructions on moving an auxiliary drawer in the compartment, refer to CPT and VT Drawer Operation, page 88. The auxiliary compartment racking mechanism may have a lockout that can be padlocked to block the insertion of a racking handle into the port on the racking mechanism (see the figure Auxiliary Compartment Door Faceplate with Racking Mechanism, page 46).

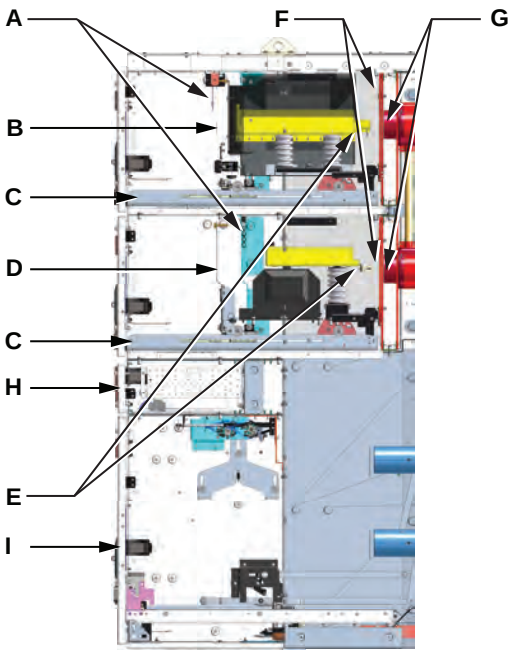
An insulating barrier divides the auxiliary compartment. The stationary primary contacts and associated high voltage parts are mounted in insulator bushings behind the barrier in the compartment. The bushings are furnished with molded fiberglass polyester insulation as standard, but a customer may also specify a Group B insulation of cycloaliphatic epoxy. These insulator bushings also help route auxiliary drawer connections to the specified location.

Self-aligning primary contacts on the drawer engage the stationary primary contacts mounted in the insulator bushings as the drawer is moved into the connected position. As the drawer is disconnected, a static discharge ground contact, mounted on top of the compartment, grounds the primary connection. This primary fuse discharge bar with the static ground contact is located in the front portion of the compartment and is intended to return to ground any remaining voltage that could be accumulated in the transformers. In the disconnected and connected positions and between, there is a sliding ground contact mounted on the bottom of the drawer that maintains continuous grounding through a ground busbar mounted on the floor of the compartment.

A standard auxiliary compartment contains extension rails mounted on the left and right side positioning rails which can slide out to be extended in front of the front face of the section. These extended rails allow the CPT or VT drawer to be rolled out of the compartment. This removed position facilitates access to the auxiliary drawers and the primary fuses.

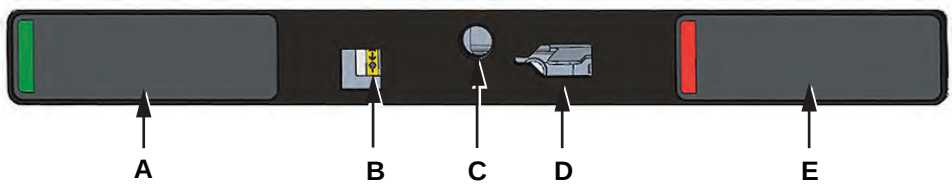
Auxiliary drawers may have connections routed to the main bus or cable load bus in the same section with epoxy coated bus. Auxiliary connections may be routed to cable load bus in an adjacent section with shielded, medium voltage rated cabling. Refer to the specific customer drawings for details on assembly connections.

Figure 37 - Front Sub-Section with Voltage and Control Power Transformer Compartments in Position A and B



A	Static primary discharge ground contacts	**D**	Voltage transformer (VT) drawer	**G**	Insulator bushings and stationary primary contacts
B	Control power transformer (CPT) drawer	**E**	Primary contacts	**H**	Low voltage instrumentation compartment
C	Extension rails (shown not extended)	**F**	Shutter barriers	**I**	Lower circuit breaker compartment

Figure 38 - Auxiliary Compartment Door Faceplate with Racking Mechanism



A	Instruction label for racking out	**B**	Position indicator	**C**	Manual racking port	**D**	Racking Lockout	E	Instruction label for racking in

Figure 39 - Auxiliary Compartment without Racking Mechanism Position Indicator (shown in Transport position)

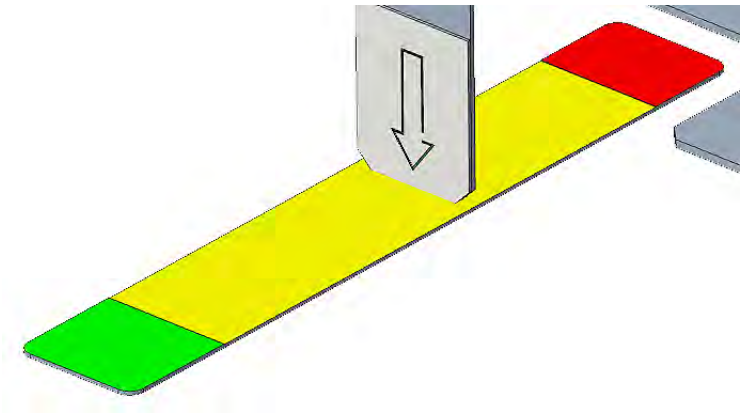
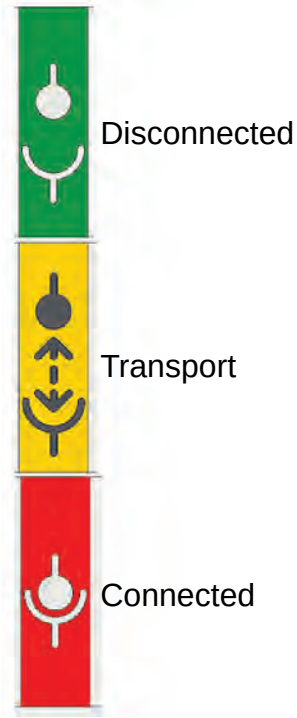


Figure 40 - Auxiliary Drawer Position Indicator Symbols



LPVT Overview

Low power voltage transformers (LPVTs) are stationary-mounted devices equivalent in function to traditional voltage transformer drawers. The compartmental construction of the switchgear isolates the LPVTs from other section compartments. Because of a compact and efficient design, the LPVTs do not require an entire traditional front sub-section auxiliary compartment position and door. This enables the section to have a larger low voltage instrumentation compartment for protection and control devices (see the figures CPT and LVPT in Position A and B Compartments, page 51 and CPT and LVPT in Position C and D Compartments, page 51). LPVTs are wired from the primary high voltage terminal to an insulator bushing assembly similar to the one in a traditional auxiliary compartment and with the same insulator bushing material options. The LPVTs are wired on the secondary terminal out to the low voltage instrumentation compartment.

CPT Description

The control power transformer (CPT) in the figures Front Sub-Section with Voltage and Control Power Transformer Compartments in Position A and B, page 46 and CPT Compartment and Drawer Features, page 49 supplies power for circuit breaker operation and for protection, control, communication, and other low voltage devices. The transformer is sized for the application needs of the specific order. Do not add arbitrary non-specified loads after installation. The maximum capacity of the CPT drawer is 15 kVA.

The CPT, the primary current-limiting fuses, and the secondary molded case circuit breaker are mounted on the auxiliary drawer and are moved as an assembly (see the figure CPT Compartment and Drawer Features, page 49). The secondary circuit breaker handle must be in the OFF position when moving the drawer (see the figure CPT Secondary Circuit Breaker Operation). To release the latch plate from the padlock provision interlock in the connected position or prior to moving into connected position, push the secondary circuit breaker handle to the left (OFF position). To engage the latch plate in the padlock provision interlock, push the secondary circuit breaker handle to the right (ON position) after returning the assembly to the connected position.

Each control power transformer compartment is equipped with a padlock provision (see the figure CPT Compartment and Drawer Features, page 49) which can be used to lock the drawer in the connected position in the compartment. Secondary molded plug contacts are mounted on the bottom right side of the drawer (see the figure CPT Compartment and Drawer Features, page 49). The drawer secondary contacts engage fixed contacts mounted on the floor of the CPT compartment when the drawer is moved into the connected position.

Figure 41 - CPT Secondary Circuit Breaker Operation

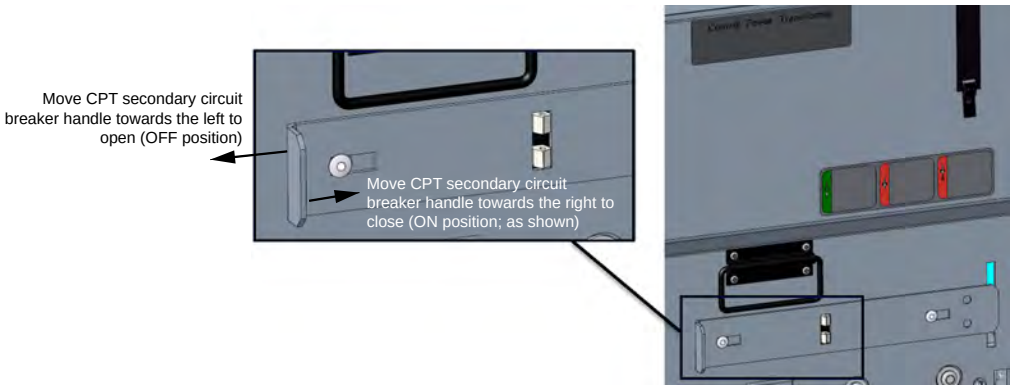
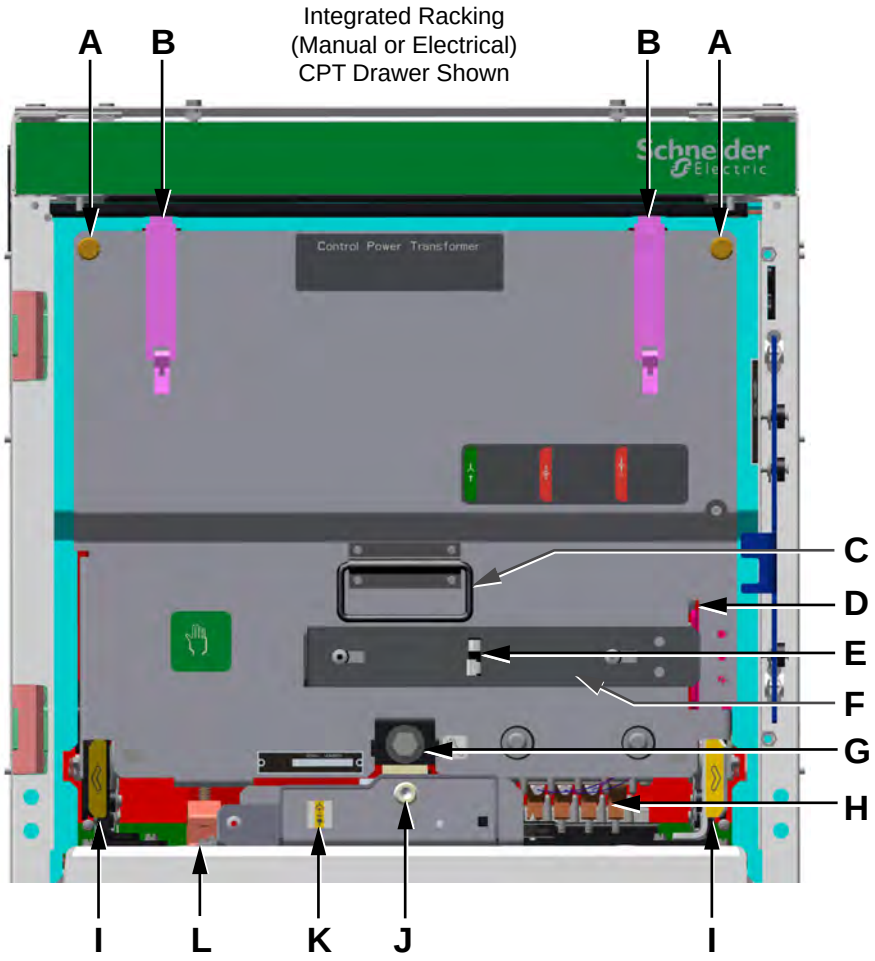


Figure 42 - CPT Compartment and Drawer Features

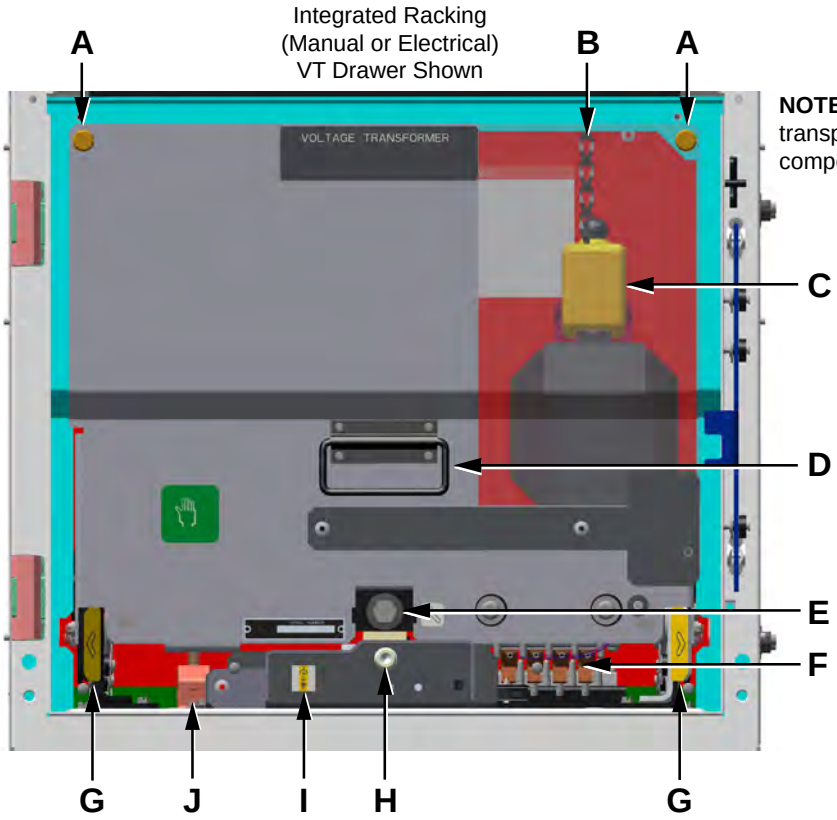


A	Manual drawer in connected position with thumb screws (manual drawers only)	**G**	Racking dismounting bolt (integrated racking drawers only, 1/2–13 x 1.75 in. SAE Grade 5 (minimum) hex head bolt)
B	Static primary discharge ground contacts	**H**	Secondary contacts
C	Pull handle	**I**	Extension rail
D	Padlock provision	**J**	Racking port (integrated racking drawers only)
E	Secondary circuit breaker	**K**	Racking position indicator (integrated racking drawers only)
F	Secondary circuit breaker handle latch plate	**L**	Continuous drawout unit ground contact

VT Description

Voltage transformers (VTs) (see the figures Front Sub-Section with Voltage and Control Power Transformer Compartments in Position A and B, page 46 and VT Compartment and Drawer Features) supply voltage indication for metering and relaying purposes. Primary current-limiting fuses are mounted on each voltage transformer. Secondary molded plug contacts (see the figure VT Compartment and Drawer Features, page 50) are mounted on the bottom right side of the VT drawer. The drawer secondary contacts engage fixed, compartment-mounted contacts when the drawer is moved into the connected position. Secondary fuses for the voltage transformers are located in the front of the compartment or in the low voltage instrumentation compartment. Refer to the customer order drawings provided by Schneider Electric.

Figure 43 - VT Compartment and Drawer Features



NOTE: Cover partially transparent to show components.

A	Manual drawer in connected position with thumb screws (manual drawers only)	**F**	Secondary contacts
B	Static primary discharge ground contact	**G**	Extension rail
C	Primary current-limiting fuse	**H**	Racking port (integrated racking drawers only)
D	Pull handle	**I**	Racking position indicator (integrated racking drawers only)
E	Racking dismounting bolt (integrated racking drawers only, 1/2 -13 x 1.75 in. SAE Grade 5 (minimum) hex head bolt)	**J**	Continuous drawout unit ground contact

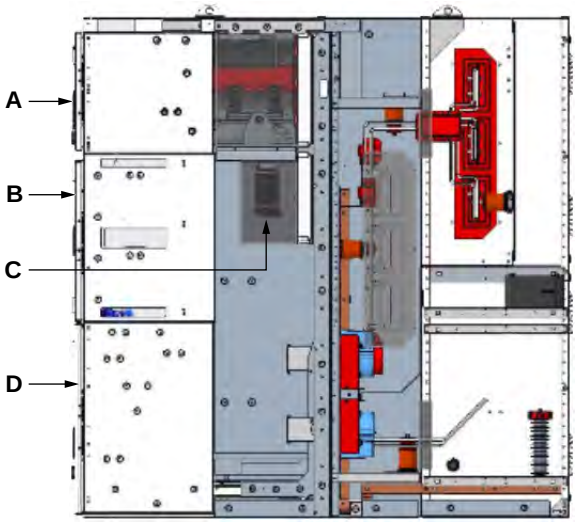
LPVT Description

Low power voltage transformers (LPVTs) are sensor-style VTs (resistive or capacitive dividers) as opposed to traditional iron core transformer style VTs. The LPVTs output a secondary voltage between 0.2 V and 4 V, and can be used in conjunction with a converter box to give a 120 V output to protection relays and meters.

With a one-high circuit breaker section where a CPT is mounted in the top compartment (A Position), the LPVT can be mounted below the CPT compartment and behind the low voltage instrumentation compartment (see the figure CPT and LVPT in Position A and B Compartments). In this position, the LPVT is accessible through the circuit breaker compartment.

With a one-high circuit breaker section where a CPT is mounted in the bottom compartment (D Position), the LPVT can be mounted above the CPT compartment and behind the low voltage instrumentation compartment (see the figure CPT and LVPT in Position C and D Compartments, page 51). In this position, the LPVT is accessible through the CPT compartment.

Figure 44 - CPT and LVPT in Position A and B Compartments



A	CPT compartment	**B**	Low voltage instrumentation compartment	**C**	LPVT	**D**	Lower circuit breaker compartment

Figure 45 - CPT and LVPT in Position C and D Compartments

A	Upper circuit breaker compartment	**B**	Low voltage instrumentation compartment	**C**	LPVT	**D**	CPT compartment

Main Bus Compartment

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- Do not damage or modify busbar insulation.
- Properly close all bus joint boots before energizing this equipment.

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

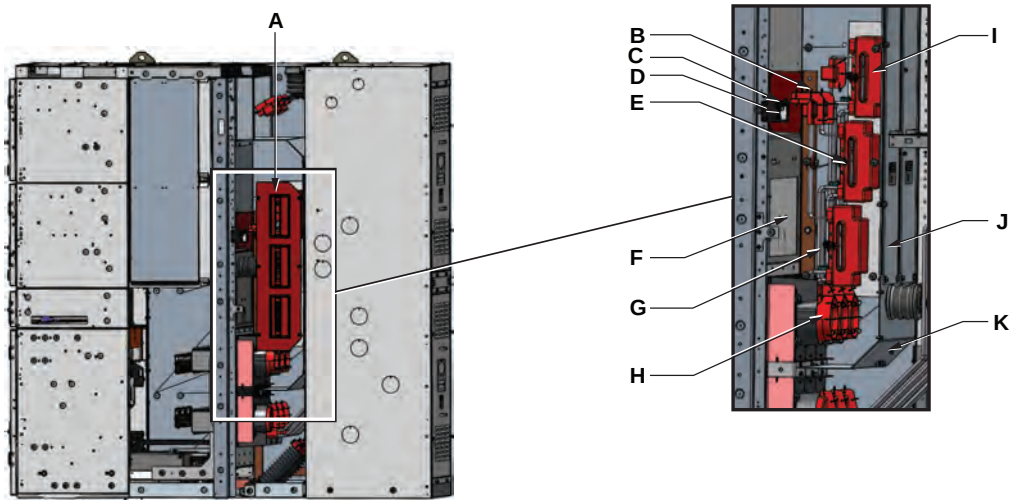
The main bus compartment (see the figure Main Bus Compartment, page 53) is located in the center of the switchgear section. It is isolated from other compartments by the main bus compartment barrier, which consists of removable metal access covers. The main bus compartment is accessible from the back through the rear compartment and from the front through the circuit breaker compartment by removing the metal access covers.

The 1200 A and 2000 A, 40 kA main buses are only available in epoxy-insulated copper. Each busbar has fluidized-bed, epoxy insulation rated for 221°F (105°C) operation. Glass polyester pass-through barriers are used to separate the bus compartments between adjacent sections. There is one pass-through barrier per section installed on the right wall of the main bus compartment.

The main bus is connected either to circuit breakers or tie bus through riser busbars. The main bus can be connected to an auxiliary drawer in the same section using epoxy-insulated copper bus (see the figure Tie Bus, page 53).

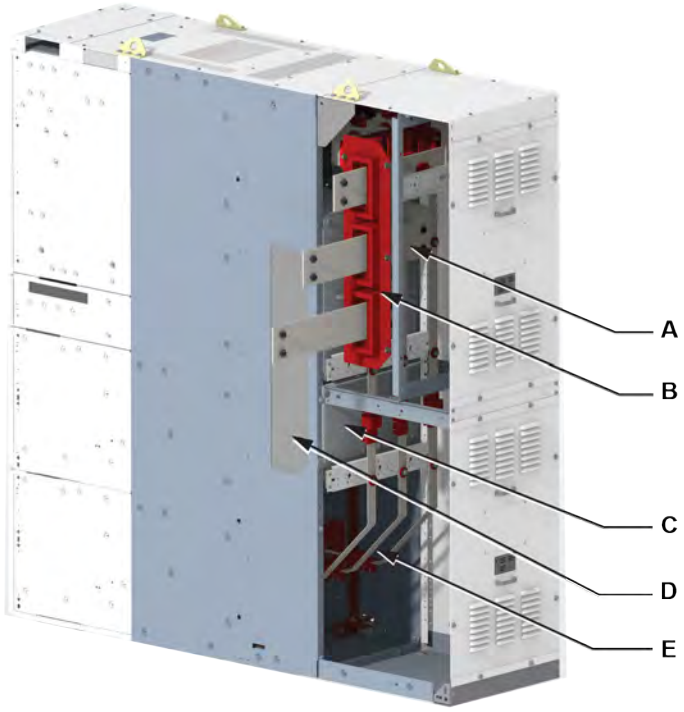
Polyvinyl chloride boots insulate the connection in the main bus compartment, overlapping the epoxy insulation on the busbars. The busbar insulation and boots form an integral insulating system for the equipment to meet the dielectric ratings of the equipment. The insulating boots must be in place and properly closed before energizing the equipment.

Figure 46 - Main Bus Compartment



A	Main bus pass-through barrier	**E**	Main bus	**I**	Main bus boot
B	Auxiliary bus boot	**F**	Removable metal access panels—Main bus compartment front	**J**	Removable metal access panels—Main bus compartment rear
C	Auxiliary bus connection to main bus	**G**	Riser bus	**K**	Main bus compartment barrier
D	Arc flash sensor (optional)	**H**	Circuit breaker bushing riser bus boot		

Figure 47 - Tie Bus



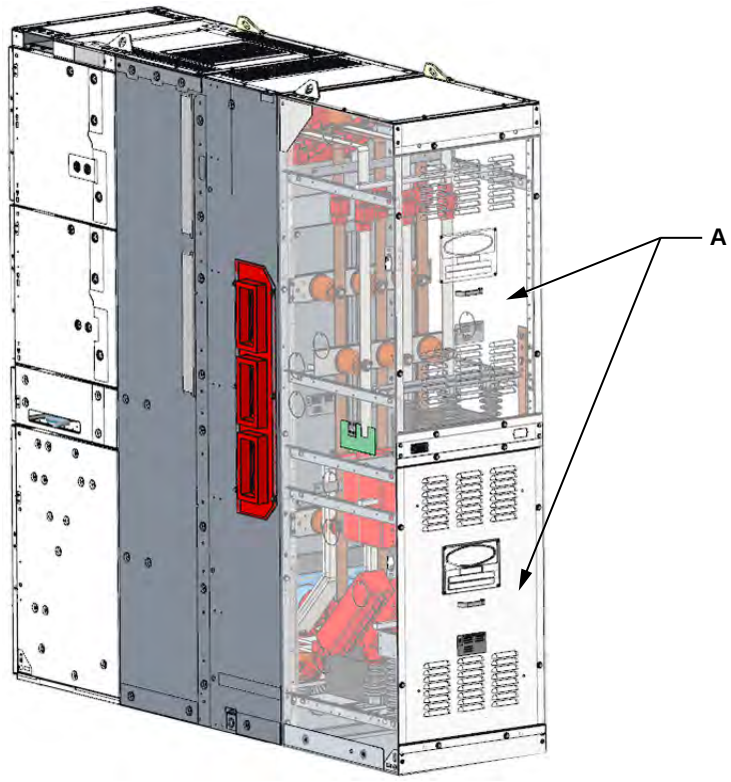
A	Tie bus position	**B**	Tie bus pass-through barrier	**C**	Main bus compartment	**D**	Main bus non-pass-through barrier	**E**	Auxiliary bus connection to tie bus position

Rear Compartment

Each section has a rear compartment that houses some of the switchgear components necessary to support the functions required for the customer's application. The compartment can be accessed by removing one or both of the steel covers on the back of the section (see the figure Rear Compartment Covers, page 55). Available components include:

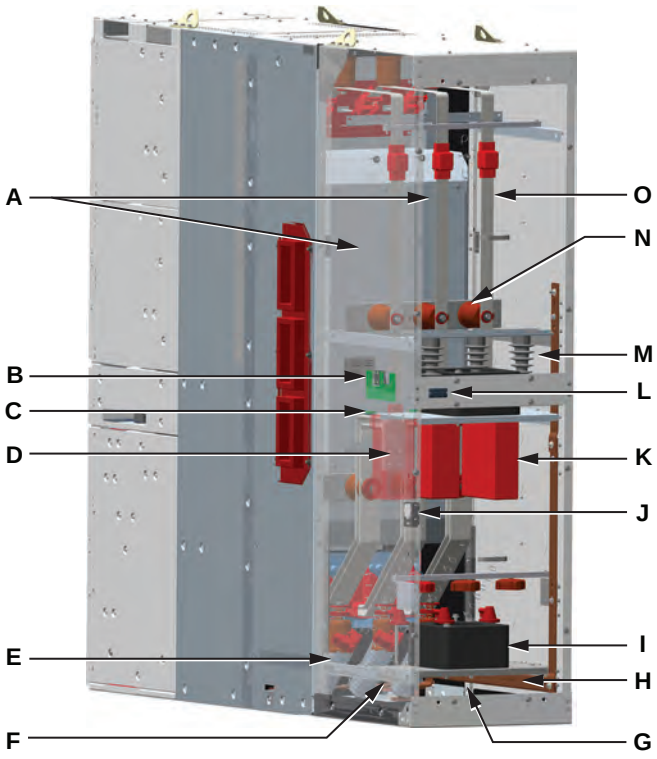
- Insulated primary cable connection bus (see the figures Rear Compartment — One-High Section (rear compartment covers removed), page 56 and Rear Compartment — Two-High Section (rear compartment covers removed), page 57)
- Tie bus (see the figure Tie Bus, page 53)
- Auxiliary compartment connections (see the figure Tie Bus, page 53)
- Ground bus (see the figures Rear Compartment — One-High Section (rear compartment covers removed), page 56 and Rear Compartment — Two-High Section (rear compartment covers removed), page 57)
- Other rear compartment components (see the figures Rear Compartment Covers, page 55, Rear Compartment — One-High Section (rear compartment covers removed), page 56, and Rear Compartment — Two-High Section (rear compartment covers removed), page 57)
  - Surge arrestors (LAs)
  - Live line indicators (LLIs)
  - Zero sequence current transformer (ZSCT)
  - Ground studs
  - Additional cable landing pad adapter
  - Surge capacitors

Figure 48 - Rear Compartment Covers



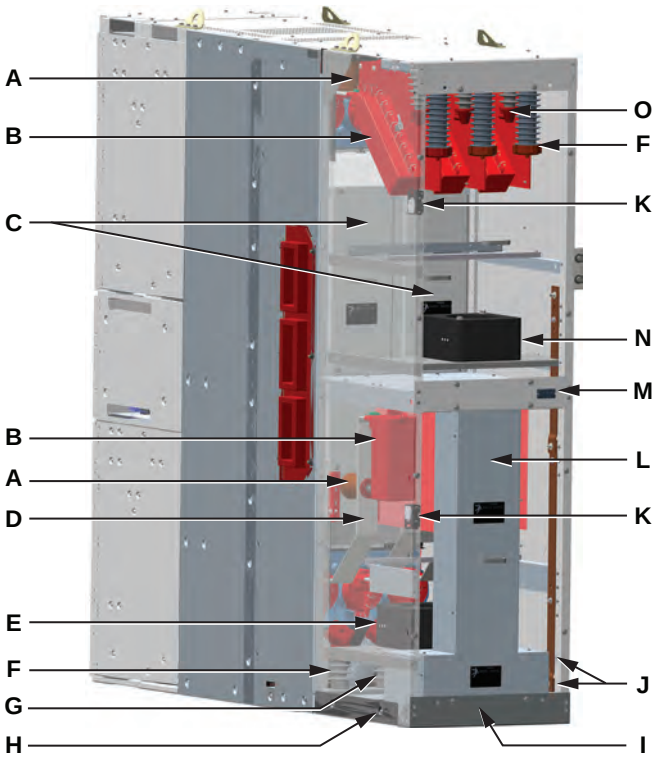
A	Removable rear compartment covers

Figure 49 - Rear Compartment — One-High Section (rear compartment covers removed)



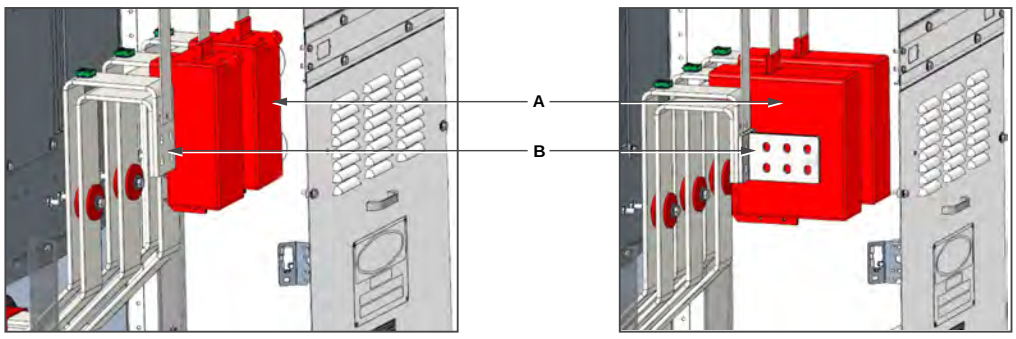
A	Main bus access covers	**F**	Line-up common ground bus	**K**	Load connector bus boot
B	CL110 temperature and humidity sensors	**G**	Cable conduit entry	**L**	LLI HMI—lower circuit breaker
C	TH110 temperature sensors	**H**	Rear extension ground bus	**M**	Live line indicators (LLIs)
D	Primary load connection bus	**I**	Zero-sequence current transformer (ZSCT)	**N**	Support standoffs
E	Surge arrestors	**J**	Arc flash detection sensors	**O**	Auxiliary drawer high voltage insulated bus connections

Figure 50 - Rear Compartment — Two-High Section (rear compartment covers removed)



A	Support standoffs	**F**	Surge arrestors	**K**	Arc flash detection sensors
B	Load connector bus boot	**G**	Line-up common ground bus	**L**	Cable duct
C	Main bus access covers	**H**	Cable conduit entry—lower circuit breaker	**M**	LLI HMI—upper circuit breaker
D	Primary load connection bus	**I**	Cable conduit entry—upper circuit breaker	**N**	Zero-sequence current transformer (ZSCT)—upper circuit breaker
E	Zero-sequence current transformer (ZSCT)—lower circuit breaker	**J**	Rear and vertical extension ground bus	**O**	Live line indicators (LLIs)

Figure 51 - Cable Landings



Standard Cables **Additional Cables**

A	Cable bus boots	**B**	Cable landing

Insulated Primary Cable Connection Bus

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- Do not damage or modify busbar insulation.
- Replace all devices, doors, barriers, plates, panels, and covers before racking the circuit breaker in or out of the connected position and before turning on power to this equipment.
- Put all bus joint boots into place and make sure the insulating boots are properly closed before energizing the equipment.

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

Circuit breakers or main bus in the same section may be routed to a primary high voltage cable connection bus in the rear compartment. This epoxy-insulated cable connection bus is provided for terminating the primary cables by the customer. The bus is supported with a Group A insulation of molded fiberglass polyester standoffs, as standard. Optionally, Group B insulation using porcelain standoffs can be provided to meet the customer's specifications. As standard, the primary cable connection bus ends are punched with two standard NEMA cable two-hole patterns per phase. Schneider Electric can provide lugs upon request; please contact the local Schneider Electric representative. Tape and associated material for insulating cable terminations are not supplied as standard.

Cable conduits must enter the rear compartment, in the areas shown on the customer order drawings, from either the top or bottom of the compartment. A removable steel cable duct is provided to isolate cables when two circuit breakers are installed in one section and the cables enter from the same direction.

> **NOTE:** Cable conduit should be stubbed in the concrete pad as part of the site preparation before the switchgear is installed. However, top entrance cable conduits must be installed after the switchgear is in place. The top and bottom plates can be removed, punched to fit the cable conduit, and put back in place. Refer to the section Installation, page 66 and the figure Rear Compartment Removable Plates for Primary Cable Entry, page 73 for more information.

The front cable conduit area is for the lower circuit breaker when all cables enter from below, and for the upper circuit breaker when all cables enter from above. The entire cable duct may be removed to install the front cables first. Then re-assemble the cable duct, leaving off the cable duct rear panel until the rear cables are installed. After the rear cables are in position, re-install the cable duct rear panel.

Various cable termination systems are used and are detailed on the customer plans and specifications. Solderless or compression lugs can be supplied on the load connectors, if specified by the customer. Potheads, mounted on grounded support brackets, can be supplied as an option. If specified, the electrical insulation compound and tape necessary for internal electrical connections are shipped in a container with other miscellaneous parts. Customer's may supply and use their own equivalently rated materials. Tape and insulating material necessary for completing the field connection at the bus pad are not supplied with the equipment.

Permanent primary cable connection bus joints come with bus joint boots that are closed prior to installation. Before energizing the equipment, the cable connection bus joint boots at the cable terminations must be installed and properly closed by the customer after termination of the primary cables is complete.

Tie Bus

Sections where the breaker is acting as a tie between sources or sections that are adjacent to the tie breaker section may have a second bus position in the rear compartment. This second bus position will be compartmentalized from other areas in the rear compartment. The construction of this tie bus is very similar to the main bus.

Auxiliary Compartment Connections

Connections in the rear compartment, from auxiliary drawers to insulated primary cable connection bus or tie bus in the same section, are made using epoxy insulated copper bus bars.

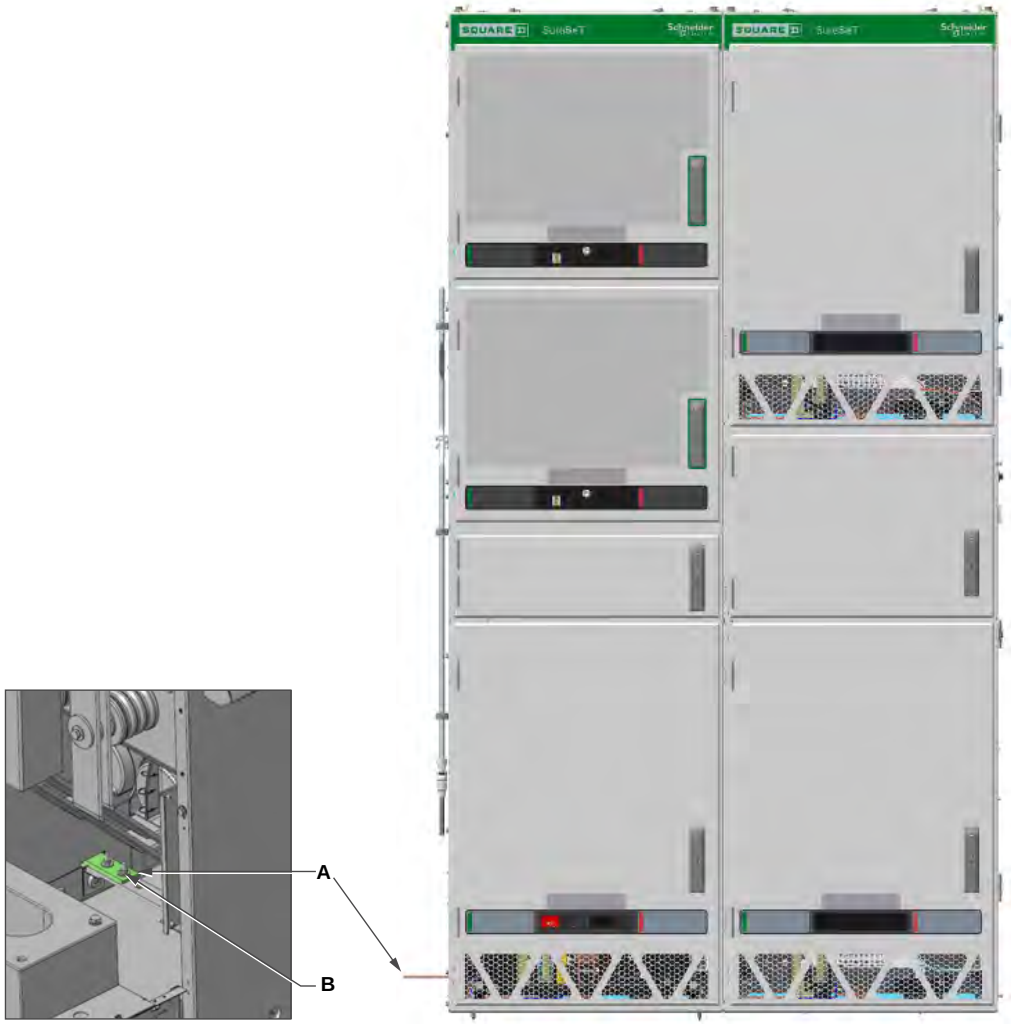
The dimensions for a typical copper auxiliary bus cross section are 0.125 x 2.0 in. (3 x 51 mm). Connections from auxiliary drawers in the rear compartment to insulated primary cable connection bus or tie bus in an adjacent section are made using ground shielded medium voltage cables terminated with lugs and stress cones. Some configurations may require use of grounded, shielded cables for connections within the same section.

Ground Bus

A bare ground bus in the rear compartment may have optional lugs on each end for the switchgear ground connection (see the figuresRear Compartment — One-High Section (rear compartment covers removed), page 56 and Rear Compartment — Two-High Section (rear compartment covers removed), page 57. This ground bus is connected to each circuit breaker compartment ground bus contact bar and to the ground bars in each rear compartment. All instrument transformer, metering, and relaying grounds are also connected to this common ground system. There is a ground bus splice that joins each section and one at each shipping split (see the figure Ground Bus Splice).

The dimensions for a typical ground bus cross section are 0.25 x 2.0 in. (6 x 51 mm).

Figure 52 - Ground Bus Splice



A	Cable bus splice	**B**	3/8–16 x 1.5 in. SAE Grade 5 (minimum) carriage bolt and 3/8–16 Keps™ nut

Other Rear Compartment Components

The components listed below are installed in the rear compartment, as needed, per the requirements of each order specification. These components may be mounted in various positions in the rear compartment based on the design configuration of each section.

The other rear compartment components consist of the following:

- Surge arresters
- Live line indicators (LLIs)
- Zero sequence current transformer (ZSCT)
- Ground studs
- Additional cable landing pad adapter
- Surge capacitors

Surge Arresters

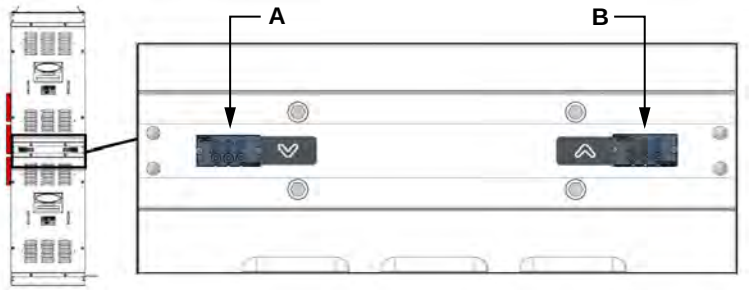
Surge arresters (or lightning arresters (LAs)) of appropriate rating are mounted in the rear compartments containing incoming and outgoing cables, when specified (see the figures Rear Compartment — One-High Section (rear compartment covers removed), page 56 and Rear Compartment — Two-High Section (rear compartment covers removed), page 57). The vulnerability of the incoming and outgoing lines to lightning strikes or other high voltage transient conditions determines surge arrester class (i.e. distribution, intermediate, or station) and justification. Surge arresters must remain disconnected from the main bus during start-up testing. Surge arresters are shipped from the factory disconnected from the main bus to help avoid damage during dielectric withstand testing prior to energizing. Connect surge arrestors after dielectric withstand testing and before energization of the line-up. A switching transient analysis should be performed to determine the surge protection requirements that provide the optimal protection for the installation.

Live Line Indicators (LLIs)

A capacitive circuit connects the LLI lights to the line or load side of the main busbars, when specified. The LLI lights, mounted on the sides of the middle, rear tie channel of the section frame, will indicate voltage is present when the equipment is energized. Test ports on the LLIs are suitable for testing voltage with a properly rated voltage sensing device. The LLIs are not a replacement for voltage indication when working on or inside the equipment. Use properly rated test equipment to confirm no voltage is present before performing any maintenance procedures. Refer to instruction bulletin number 44046-068-01, *Live Line Indicator Replacement*, for further information.

The LLI mounted on the left side of the rear tie channel indicates status of the cable bus in the lower rear compartment, while the LLI mounted on the right side indicates status of the cable bus in the upper rear compartment (see the figure Live Line Indicators, page 61).

Figure 53 - Live Line Indicators



A	Lower rear compartment	**B**	Upper rear compartment

Zero Sequence Current Transformer (ZSCT)

When specified, zero sequence current transformers (ZSCTs) are used for ground fault detection and located in each rear compartment above or below the appropriate cable conduit opening.

Ground Studs

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Do not install ground studs on equipment in the field as the clearances to grounded surfaces may not be adequate. Contact the local Schneider Electric representative for further information.

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

Customers can specify that the insulated primary cable connection bus be equipped with ground studs.

NOTE: Ground studs must not be installed by customers on equipment in the field because the electrical clearances to grounded surfaces might not be adequate, which could lead to internal arcing. If ground studs are required, please contact the local Schneider Electric representative for further information.

Ground studs are mounted on the bus above the area where the lugs of the customer's primary cables are installed. Ground studs allow customers to connect temporary grounding to the section during maintenance. Before connecting grounding to incoming line, customers must follow all safety precautions and must have control of the incoming source.

Additional Cable Landing Pad Adapter

If required, the standard cable termination site for the primary cable connection bus can be equipped with an adapter that will permit the customer to land two additional primary cable lugs per phase.

Surge Capacitors

Surge capacitors, when specified, are mounted in the rear compartments. Sections can be equipped with surge capacitors rated up to 13.8 kV in certain applications. However, certain configurations may limit the space available to install surge capacitors. A switching transient analysis should be performed to determine what surge protection requirements provide optimal protection for the installation.

Additional Switchgear Line-up Features and Information Chapter

Continuous Equipment Health Monitoring Using Substation Monitoring Devices (SMDs)

The switchgear and circuit breaker can be equipped with a continuous health monitoring system to monitor the various conditions and overall health of the equipment, and notify the user when abnormal conditions are detected.

The switchgear and circuit breaker health status can be presented on a digital one-line diagram of the switchgear, accessible using a tablet wirelessly connected to the switchgear and and optional HMI mounted on front panel of switchgear. The health monitoring system incorporates pilot lights that indicate three statuses: Healthy (no alarms), Pre-Alarm (schedule maintenance soon), and Alarm (immediate maintenance required). The system also allows for at least one set of dry contacts to indicate Alarm status.

The health monitoring system can communicate switchgear and circuit breaker health data and alarms to the:

- Electrical Power Management System via Modbus TCP/IP Ethernet network link
- Asset condition monitoring service via Modbus TCP/IP Ethernet or cellular network link

For installation and operation of the SMD, refer to Schneider Electric document number QGH51397, *Substation Monitoring Device for Medium Voltage Switchgear*.

Continuous Switchgear Health Monitoring

The continuous switchgear health monitoring system consists of thermal and environmental monitoring. Environmental monitoring includes sensors to monitor ambient temperature and humidity.

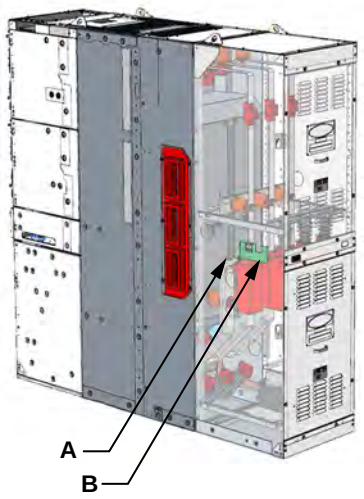
Continuous Thermal Monitoring Using Easergy TH110 Sensors

The switchgear and circuit breaker can be equipped with self-powered TH110 thermal sensors to continuously monitor specific joints of the primary conductors. The sensors utilize a ferromagnetic ribbon placed around the bus bar or cable connections to self-power and wirelessly transmit temperature information via the Zigbee® Green Power protocol. These sensors are integrated into the SMD system, which raises an alarm in case of abnormal temperature conditions. See the figures Rear Compartment — One-High Section (rear compartment covers removed), page 56 and TH110 and CL110 Sensors in Rear Compartment, page 64 for the location of TH110 sensors inside the rear compartment. For additional information, refer to Schneider Electric document number NVE62740,*Easergy TH110 Installation and Operation Manual*.

Continuous Environment Temperature and Humidity Monitoring Using Easergy CL110 Sensors

The switchgear can be equipped with battery powered CL110 temperature and humidity sensors that continuously monitor the ambient environment inside the switchgear and wirelessly transmit temperature and humidity information via the Zigbee Green Power protocol. These sensors are integrated into the SMD system, which raises an alarm in case of abnormal environmental conditions. The sensors are placed in the rear compartment of the switchgear. The SMD system uses two CL110 sensors: one measures the switchgear internal ambient air and the other measures the metal side sheet in direct contact with external switchgear ambient air. The section monitored must be located at the end of the line-up. See the figures Rear Compartment — One-High Section (rear compartment covers removed), page 56 and TH110 and CL110 Sensors in Rear Compartment, page 64 for the CL110 sensor location inside the rear compartment. For further information, refer to Schneider Electric document number QGH40088, *Easergy CL110 Installation and Operation Manual*.

Figure 54 - TH110 and CL110 Sensors in Rear Compartment



A	TH110 sensor	**B**	CL110 sensor

Continuous Circuit Breaker Health Monitoring

The continuous circuit breaker health monitoring system includes sensors permanently installed on the circuit breaker to monitor the following conditions:

- Thermal monitoring of circuit breaker primary connections
- Operating speed of circuit breaker mechanism
- Vacuum interrupter contact erosion gap
- Health of closing and tripping coils
- Health of spring charging motors
- Health of circuit breaker/VT/CPT racking motors, when equipped

The circuit break sensors are integrated into the SMD system which raises an alarm in case of abnormal conditions. For further information, refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker*

Equipment Heaters

When heaters are specified by the customer, the rear compartment and circuit breaker compartment will be equipped with strip heaters. Heaters are controlled by thermostats as standard, but can also be controlled by humidistats as an option.

Active Arc Flash Mitigation System

The switchgear can be equipped with an active arc flash mitigation system. Schneider Electric offers the Easergy P5 advanced relay connected to current transformers and arc flash detection sensors. The P5 relay may be configured to provide an arc flash mitigation system for the entire switchgear line-up. It measures fault current from current transformers and receives input from arc flash sensors detecting light from a developing arc flash. The arc flash detection sensors are located in various compartments within the section.

If an arc fault occurs in the switchgear, the arc flash mitigation system helps to limit the fault from spreading by issuing a trip command to the appropriate circuit breaker in

less than 10 ms. Easergy P5 advanced relays can connect up to four arc flash sensors with continuous self-supervision to check the sensor status. For further information, refer to Schneider Electric document number NRJED313567EN, *PowerLogic Easergy P5*.

Switchgear Information

Standard Fastener Torque Values for the Switchgear

Use a torque wrench to tighten all general hardware and bolts for busbar connections in the switchgear during installation and maintenance steps as specified in the table Switchgear Bolt Torque Value, unless otherwise specified.

Table 4 - Switchgear Bolt Torque Value

Bolt Size	Mechanical Joints	Busbar Connections
1/4–20	4–7 lb-ft (5.4–9.5 N•m)	—
5/16–18	11–15 lb-ft (14.9–20.3 N•m)	—
3/8–16	18–24 lb-ft (24.4–32.5 N•m)	30–40 lb-ft (40.7–54.2 N•m)
1/2–13	32–44 lb-ft (43.4–59.7 N•m)	47–62 lb-ft (63.7–84.0 N•m)

Switchgear Grease Information

⚠ CAUTION

INADEQUATE LUBRICATION

- Do not use any other grease than the one specified in this instruction material.

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

All areas requiring grease in the switchgear, except for the circuit breaker, use Mobilith SCH™ 100 grease (Schneider Electric part number HUA11872). Use this grease as instructed in the sub-sections under Inspection and Maintenance, page 102. Refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* , for more information on circuit breaker greasing and maintenance.

Installation

This section contains instructions for installing SureSeT metal-clad indoor switchgear and devices. This section also covers site selection and preparation, foundation specifications, conduit location, and switchgear and device installation. Carefully read and follow all the safety precautions outlined below and throughout this section before performing any procedures. Continue to treat the equipment per the instructions found in the section Moisture Contamination Avoidance and Mitigation, page 13 until the equipment is under normal operation. This equipment does not achieve its ratings until it is installed per record/as-built drawings, installed per the instructions contained in this document, and has operational environmental controls with appropriate settings to help mitigate environmental influences.

NOTE: If the assembly is stored prior to installation, follow the safety precautions found in the section Storage, page 13.

⚠DANGER

HAZARD OF ELECTRIC SHOCK EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- This equipment must be installed, operated, and serviced only by qualified electrical personnel. Only qualified personnel familiar with medium voltage equipment are to perform work described in this set of instructions. Workers must understand the hazards involved in working with or near medium voltage circuits.
- Install the electrical equipment only in the environment for which it was designed.
- Perform work on the equipment only after reading and understanding all of the instructions contained in this user guide and other associated user guides.
- Turn off all power source to this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume all circuits are live until completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding. Also, check interconnection diagrams and make sure there are no potential backfeed sources.
- Never disconnect the main trip source of energized equipment.
- Always practice lock-out and tag-out procedures according to OSHA requirements. Use out-of-service tags and padlocks when working on equipment. Leave tags in place until the work is completed and the equipment is ready to be put back into service.
- Circuit breaker and switch contacts must be open and all springs discharged before attempting to open any circuit breaker or auxiliary compartment doors or performing maintenance work, disconnection, or removal of a circuit breaker.
- Move circuit breakers to the test/disconnected position before attempting to open any circuit breaker or auxiliary doors or remove any rear compartment covers.
- Conduct electrical testing to confirm no short-circuits were created during installation, maintenance, or inspection.
- Never insert a circuit breaker into a circuit breaker compartment that is not complete and functional.
- The complete assembly arrangement determines if the top or bottom contacts are the line side; both can be energized when the circuit breaker is removed from the compartment.

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK EXPLOSION, OR ARC FLASH

- Do not allow the ambient operating temperatures to exceed the specified limits.
- Provide adequate ventilation at all times to the equipment. Clean, dry, filtered air should be supplied. The ambient operating air must not be polluted by dust, particulates, smoke, corrosive and/or flammable gases, vapors, or salt. Protect the equipment from foreign objects and rodents.
- Disconnect all high-voltage to the switchgear before accessing the horizontal bus compartment.
- Do not use liquid fire extinguishers or water on electrical fires. Before extinguishing fires within the assembly, be absolutely certain the main power source is disconnected and the main and all feeder circuit breakers are open.
- Carefully inspect the work area and remove any tools and objects left inside the equipment.
- Replace all devices, doors, barriers, plates, panels, and covers before racking the circuit breaker in or out of the connected position and before turning on power to this equipment.
- Remove any temporary source of low-voltage power prior to energizing.
- Do not damage or modify busbar insulation.
- Properly close all bus joint boots before energizing this equipment.
- Remove any temporary source of low voltage power prior to energizing.
- Handle this equipment carefully and install, operate, and maintain it correctly in order for it to function properly. Neglecting fundamental installation and maintenance requirements may lead to personal injury, as well as damage to electrical equipment or other property.
- Do not make any modifications to the equipment or operate the system with interlocks or barriers removed. Contact the local Schneider Electric representative for additional instructions if the equipment does not function as described in this user guide.
- All instructions in this user guide are written with the assumption that the customer has taken these measures before performing maintenance or testing.

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

Site Selection and Preparation

Good site selection and preparation is essential for proper installation and reliable operation of the equipment. Carefully compare the plans and specifications with the customer order drawings provided. Be sure to provide adequate:

- Ventilation at all times so the ambient temperature around the equipment does not exceed 104°F (40°C) or fall below 23°F (-5°C), (see Required Ambient Environment Temperatures for Switchgear Operation, page 69). Clean, dry, filtered air should be supplied.
- Lighting in both the front and back aisle spaces. Also provide convenience outlets in both areas for electrical hand tool use.

- Help protect against water damage:
  - Having a foundation with adequate floor drainage.
  - Do not pass the routing of sewer, water, and steam lines over or near the equipment. Dripping liquids that enter the equipment will cause damage.
  - Do not allow water to collect or run under the equipment.
  - Do not install the equipment over locations that could retain moisture, such as a cable vault, without sealing the equipment to not allow moisture to enter the equipment.
  - Understand that water or chemicals from a fire sprinkler system event will damage the equipment.

Figure 55 - Required Ambient Environment Temperatures for Switchgear Operation

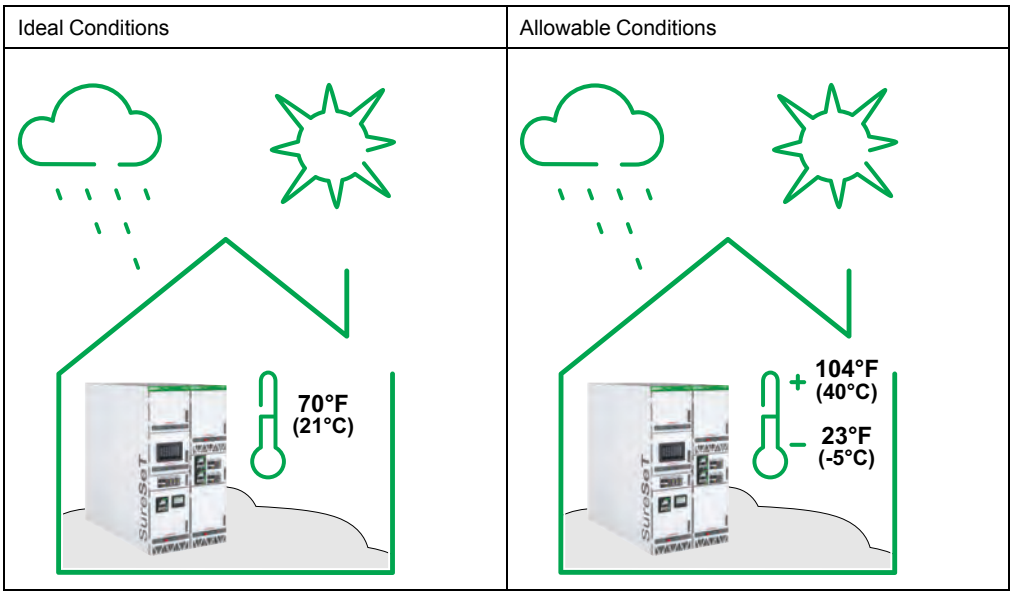


Table 5 - Normal Service Conditions

Ambient Air Temperature	
Minimum value	23°F (-5°C)
Maximum value	104°F (40°C)
Average measured over a 24-hour period	≤ 95°F (35°C)
Average Relative Humidity	
Measured over a 24-hour period	≤ 95%
Measured over a 1-month period	≤ 90%
Average Water Vapor Pressure	
Measured over a 24-hour period	≤ 2.2 kPa
Measured over a 1-month period	≤ 1.8 kPa
Altitude Above Sea Level	
Maximum value	3281 ft. (1000 m)
Atmosphere	
The ambient air should be clean and must not be significantly polluted by dust, particulates, smoke, corrosive and/or flammable gases, vapors, or salt.	

NOTE: The installation site selected must allow the equipment to operate only in the environment for which it was designed as specified throughout this document, particularly in the section Product Technical Datasheet, page 133.

The weight of the average complete switchgear section with circuit breakers and/or auxiliary drawers is 2,800 - 3,600 lbs. (1,270 - 1,630 kg.) for up to 40 kA. Make sure the site can support the weight of a complete switchgear section, as well as the combined weight of the entire switchgear line-up. Refer to the table Approximate Switchgear and Component Weights to determine approximate switchgear and component weights for handling and structural considerations.

Table 6 - Approximate Switchgear and Component Weights

Item	Rating	Weight
Switchgear Section (2 high section)	Up to 40 kA	3,600 lbs (1,633 kg)
Circuit Breaker	1200 A, 40 kA	340 lbs (155 kg)
	2000 A, 40 kA	410 lbs (186 kg)
VT Drawer (three VTs)	15 kV	215 lb (98 kg)
CPT Drawer	15 kVA	348 lb (158 kg)
Surge Arresters (LAs; three intermediate)	15 kV	120 lb (54 kg)
Low Power Voltage Transformers (LPVTs; three)	15 kV	25 lb (11 kg)

Foundation

The switchgear must be installed on a flat, level surface. Schneider Electric recommends installing the switchgear on a concrete pad. The foundation for the switchgear must be leveled to 0.0625 in. (1.6 mm) in any square yard.

NOTE: To maintain seismic qualifications, equipment must be installed per the applicable instruction bulletins and in accordance with anchorage details provided by the Engineer of Record (EOR) for the site. Equipment attachment to a building structure, foundation, or mounting pad is the responsibility of the EOR. The EOR will size equipment installation attachments and supports to withstand the seismic demand at equipment installation location. Do not install equipment before approved seismic anchoring details have been obtained from the EOR and site preparations have been made. See the figure Recommended Switchgear Foundation Mounting, page 71 for the anchor configuration used to qualify for seismic ratings. See the figures Floor Plan for Switchgear Rated Up to 40 kA, page 72, Front Floor Foundation Mounting Locations and Control Wiring Entry Cover Plates, page 73, Rear Compartment Removable Plates for Primary Cable Entry, page 73, and Holes for Anchoring the Switchgear to the Floor, page 73 for anchoring locations of the switchgear.

Pour a 7 ft. (2.1 m)-wide aisle space in front of the mounting pad, finished to the same tolerance as the mounting pad. This level surface is necessary for the circuit breaker/auxiliary drawer lift truck to insert the devices into the section. Schneider Electric recommends including the clearance required for the lift truck to be flush with the mounting pad area. However, if the aisle and mounting pad are at different heights, the pad should:

- extend no further than 8.5 in. (216 mm) in front of the base of the switchgear
- be no more than approximately 4 in. (102 mm) higher than the aisle

Typically, a minimum of 3 ft. (0.91 m) is recommended on the left, right, and rear of the line-up to facilitate door and lift truck clearance when removing a device or performing installation and maintenance. Provide the following minimum clearances on the ends of the line-up to allow insertion and removal of circuit breakers and CPT/VT drawers.

Table 7 - Device Type and Minimum Clearance

Device Type	Minimum Required Clearance	
	Left End [a]	Right End [a]
Circuit breaker	26 in. (0.7 m) [b]	26 in. (0.7 m)[c]
Auxiliary (CPT/VT) drawer		

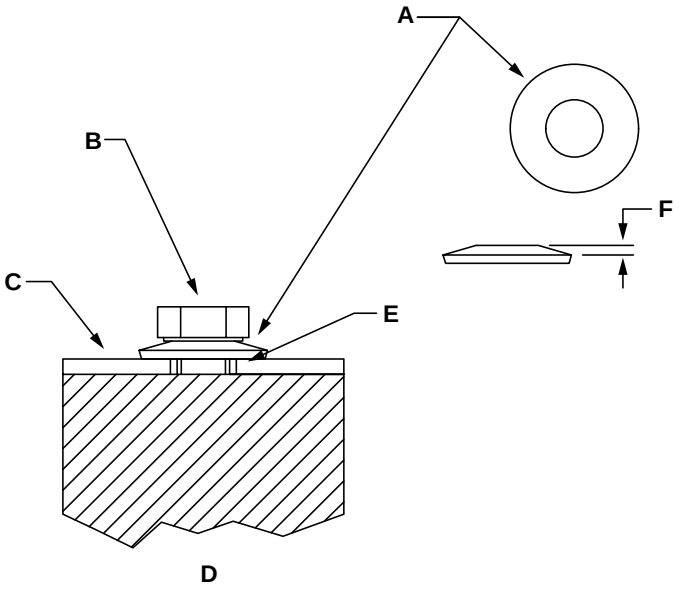
[a] As seen when facing the front of the line-up.

[b] For door clearance.

[c] For lift truck clearance.

Conduits should be stubbed a maximum of 1 in. (25 mm) above floor level. To simplify moving the switchgear into place, keep all conduit flush with the surface of the floor. Position the conduit with extreme accuracy so there is no mechanical interference with the switchgear frame. Verify conduit placement for the entire switchgear line-up is accurate when compared to the customer order drawings. A typical section floor plan is shown for reference in the figure Floor Plan for Switchgear Rated Up to 40 kA, page 72 but the installer should use the customer order drawings for foundation and installation specifications. Eliminate continuous loops of reinforcing rod or structural steel around any single conductor of a three-phase power circuit.

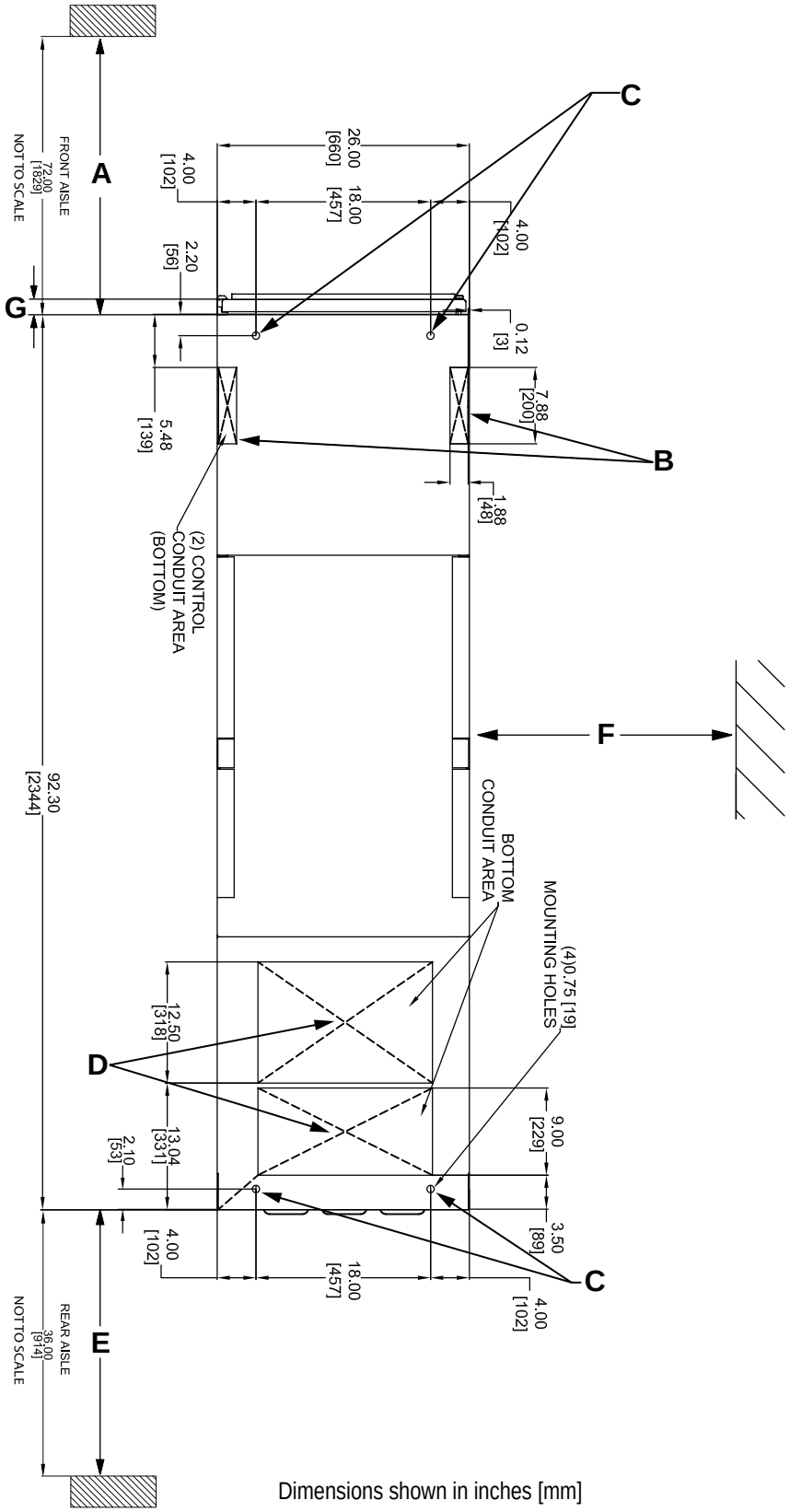
Figure 56 - Recommended Switchgear Foundation Mounting



NOTE: This applied foundation mounting shown in the figure is mandatory to maintain seismic qualifications.

A	1.25 in. (32 mm) OD steel Belleville washer	**C**	Equipment base	**E**	0.88 in. (22 mm) dia. clearance hole
B	1/2-13 UNC SAE Grade 5 anchoring fastener	**D**	Anchor assembly (as tested)	**F**	Crown

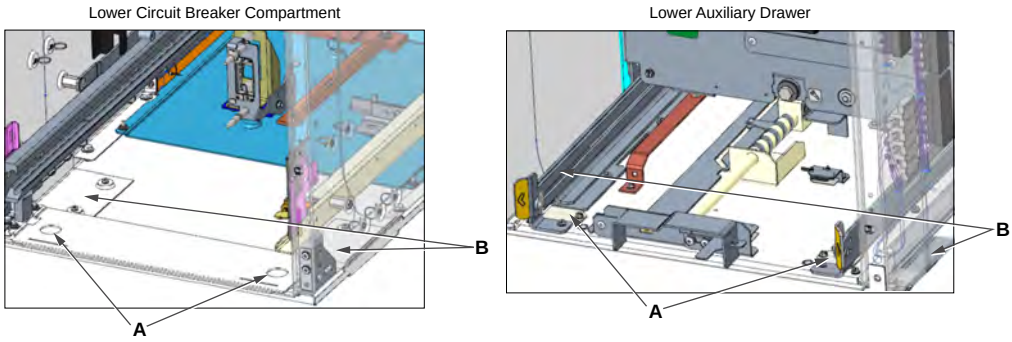
Figure 57 - Floor Plan for Switchgear Rated Up to 40 kA



A	72.0 in. (1829 mm) front aisle; 64.0 in.(1626 mm) minimum (not to scale)	**E**	36.0 in. (914 mm) rear aisle (not to scale)
B	Control conduit area (bottom)	**F**	Distance to wall: 36.0 in. (914 mm) to left or right wall; 26.0 in. (660 mm) minimum (not to scale)

C	Four (4) 0.75 in. (19 mm) diameter mounting holes	**G**	1.6 (40) door
D	Top or bottom cable conduit area		

Figure 58 - Front Floor Foundation Mounting Locations and Control Wiring Entry Cover Plates

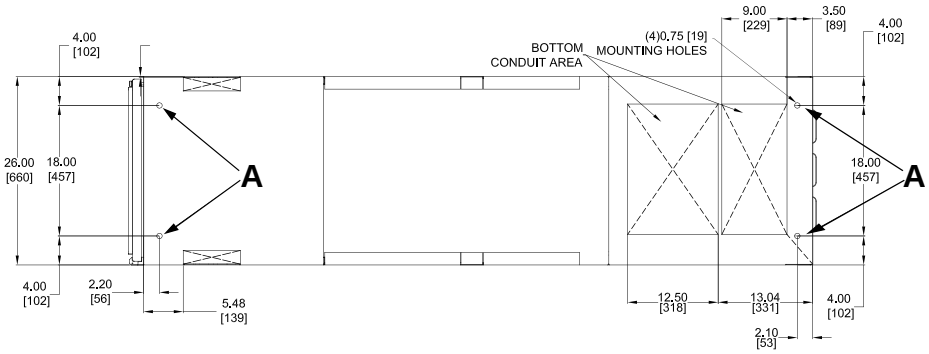


A	Switchgear foundation mounting location	**B**	Control wiring entry cover plate

Figure 59 - Rear Compartment Removable Plates for Primary Cable Entry

A	Top plate	**B**	Bottom plate

Figure 60 - Holes for Anchoring the Switchgear to the Floor



A	Four (4) .75 in. (19 mm) diameter mounting holes

Switchgear Installation

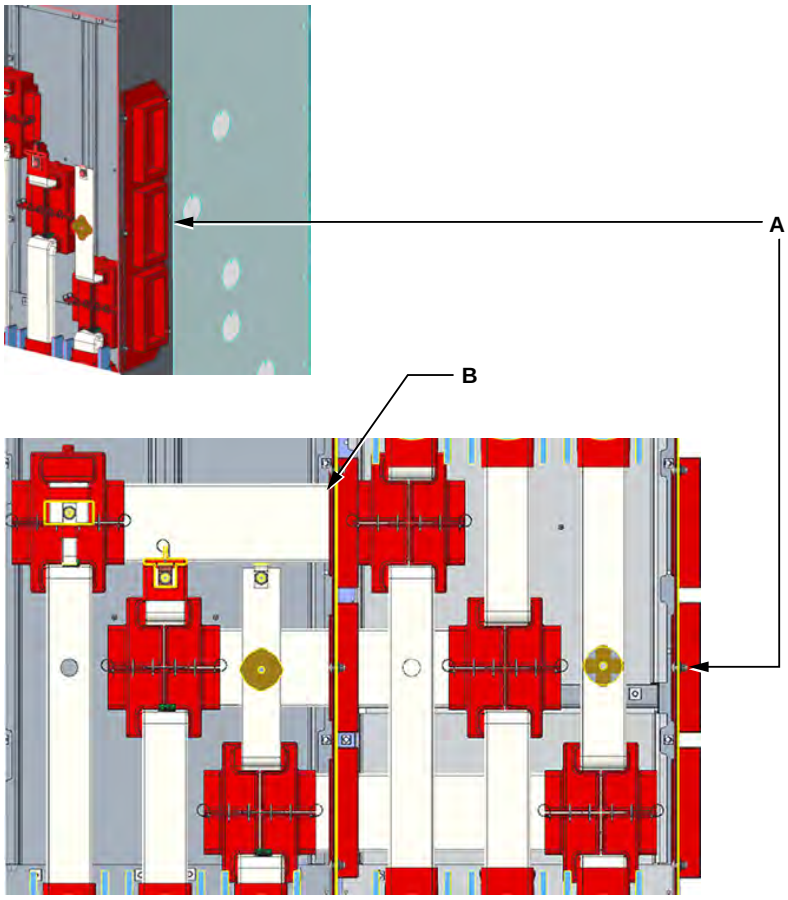
Shipping Group Installation

SureSeT 5/15 kV medium voltage, two-high, indoor metal-clad switchgear may be shipped in one or more shipping groups (typically made up of one or two sections separated by shipping splits), depending on the number of sections in the switchgear assembly. Before installing each shipping group, refer to the customer order drawings and section markings to help with proper alignment. Review the customer order drawings to verify the switchgear sections will be assembled in the correct order. Carefully measure and verify all the conduit placement and spacings on the foundation are accurate according to customer order drawings. Errors in conduit placement could prohibit proper switchgear installation.

When more than two shipping groups are involved, any error in conduit location can cause a cumulative error significant enough to prohibit proper installation by the assembly sequence described in this section. To lessen cumulative error, unload and install the middle shipping group first and work toward either end. Install the end shipping group which allows the most maneuverability first.

Prior to shipping group installation, remove the ground bus splice plate (see the figure Ground Bus Splice, page 60) and the main bus pass-through barrier assembly from each section that is positioned in the switchgear line-up at the end of a shipping split (see the figure Main Bus Pass-Through Barrier Removal, page 75). Carefully and temporarily store the bus and barrier(s) after removal. These parts will need to be reinstalled after the section is in place and prior to making the main bus connections. Prior to installation, if conduits are stubbed up above the surface of the foundation, the floor cover plates for the conduits will need to be removed before moving the sections into position (see the figures Floor Plan for Switchgear Rated Up to 40 kA, page 72, Front Floor Foundation Mounting Locations and Control Wiring Entry Cover Plates, page 73, Rear Compartment Removable Plates for Primary Cable Entry, page 73, and Holes for Anchoring the Switchgear to the Floor, page 73).

Figure 61 - Main Bus Pass-Through Barrier Removal



A	Remove main bus pass-through barrier on right side of bay located at each shipping split prior to installing next section.	**B**	Main bus pass-through barrier on right side of bay not located at shipping split does not need to be removed.

Sweep the pad and remove debris before installing any sections. Move the sections, with pallets intact, into place. If rollers must be used, move with the pallet in place. Remove the pallet only when the switchgear is in proper position on the pad. Lower the first section onto the pad. If necessary, place a 2 ft. x 6 ft. (0.6 m x 1.8 m) board across the assembly and pry it into place. Do not pry directly on the structure, doors, or covers. Before proceeding, verify that:

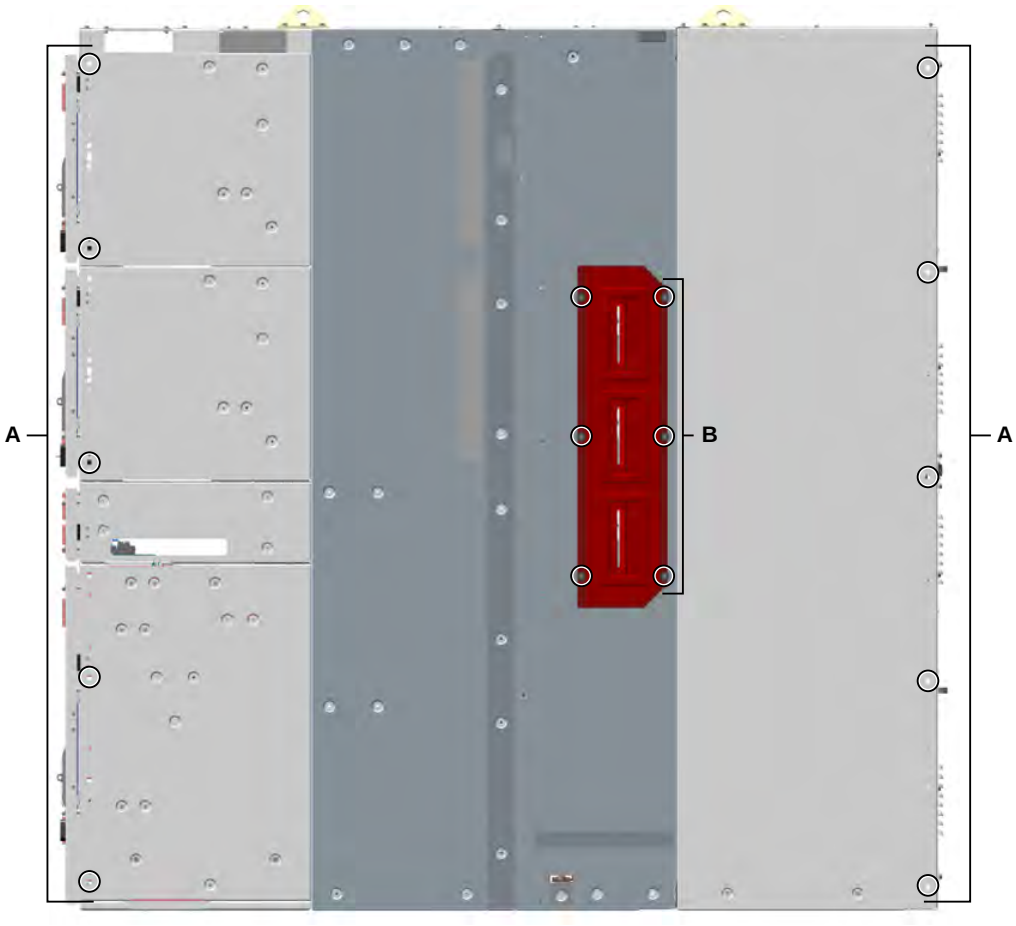
- The primary cable conduits are in the center of the cutouts for each section.
- The control power cable conduits are within the floor opening for each section.
- Each section that is positioned in the switchgear line-up at a shipping split has the main bus pass-through barrier removed before installing the next shipping group.
- The back of the section is square to the pad to help with alignment and has the proper clearance.
- The mounting holes on each section line up with the holes in the mounting channels.

Level each section before installing the next. Move an adjacent switchgear shipping group into place. Install steel shims, when necessary, between floor channels and switchgear. After leveling a section and aligning it to neighboring section, verify that the sections fit snugly together and then bolt it to any previously installed sections before proceeding. If the sections do not fit snugly and properly together, remove the most recently placed section, check for obstructions, and try again. Do not attempt to pull sections together by tightening the hardware.

Bolt switchgear shipping groups together and re-install main bus pass-through barrier (s) at the shipping split(s). See the figure Hardware Sizes and Locations, page 76 for

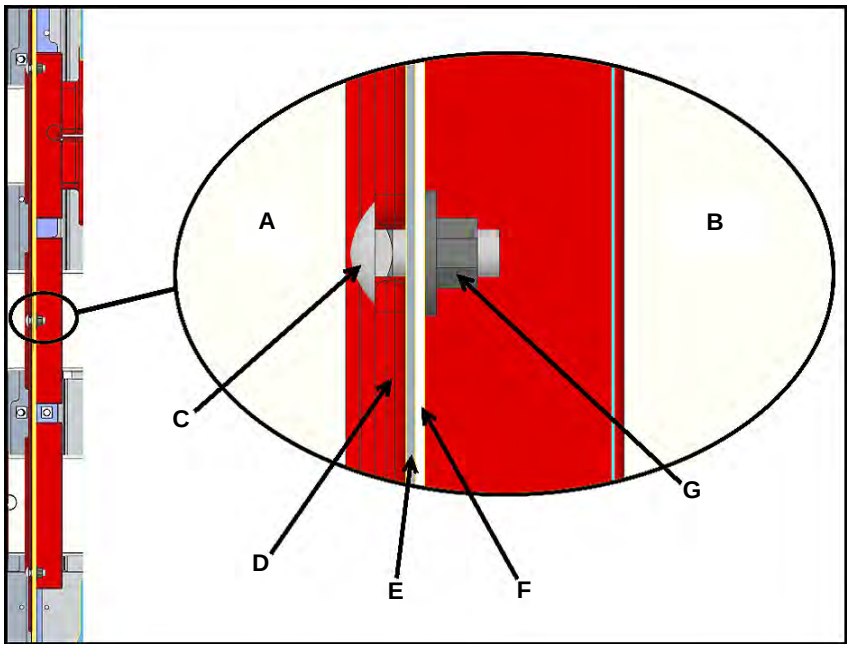
bolt sizes and locations and the figure Bolting Shipping Sections Together, page 77 for bolting details. All shipping groups must be bolted together before bolting sections to the foundation/channel sills, installing the horizontal main busbars, and making the ground bus splice connection. Verify all required section-to-section bolt locations have fasteners in place and the hardware is appropriately torqued (see the section Standard Fastener Torque Values for the Switchgear, page 65). After all the sections are level and bolted together, verify again that all shipping groups are in the correct position according to the customer order drawings. After verifying everything is correct, bolt the switchgear to the pad. For bolting, use four 1/2-13 SAE grade 5 (minimum) bolts with Belleville washers. Refer to the figure Recommended Switchgear Foundation Mounting, page 71.

Figure 62 - Hardware Sizes and Locations



A	Carriage bolt x 10: 3/8–16 x 1 in., round head, short square neck, steel, SAE Grade 5 Keps nut x 10: 3/8–16, steel, SAE J238	**B**	Carriage bolt x 6: 3/8–16 x 1 in., round head, short square neck, steel, SAE Grade 5 Keps nut x 6: 3/8–16, steel, SAE J238

Figure 63 - Bolting Shipping Sections Together



A	Left section	**C**	Carriage bolt x 6: 3/8–16 x 1 in., round head, short square neck, steel, SAE Grade 5	**E**	Left section side sheet	**G**	Keps nut x 6: 3/8–16, steel, SAE J238
B	Right section	**D**	Main bus pass-through insulator face	**F**	Right section side sheet		

Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation

To OPERATE the door handles:

1. To unlatch the door, pivot the handle out/up and then rotate the handle counter-clockwise until the latch system is free and allows the door to open. The door may be either opened or closed with the handle in this raised position.
2. To latch the door, rotate the handle clockwise and then pivot the handle in/down. To fully latch the door the handle must be pushed down until fully vertical and flush with the handle casing. The door may be either padlocked and/or key-locked with the handle in this position.

   NOTE: Do not force the handle during operation, as the latch system and handle are designed to operate freely. Inspect the system and contact Schneider Electric if unable to correct.

To OPEN a door:

1. Unlock the key-lock or remove the padlock from the door handle (if installed).
2. For circuit breaker compartment doors, remove the padlock, if installed, from the red push button or push button blocking cover found on the racking mechanism beam located near the lower, middle area of the circuit breaker compartment door.
3. Unbolt the thumbscrews and/or rotate the door handle to the open position. then pull to open the door.
4. The door can be opened until the door stay latch automatically moves into the bracket on the left side sheet (see the figure Hinged Door with Low Voltage Device Panel and Automatic Door Stay Latch, page 20).

NOTE: All doors come standard with this automatic door stay latch system except for certain low voltage instrumentation compartment doors. These doors have a stay rod that will need to be manually lifted and put into the hole on the front flange to retain the door in the open position (see the figure Manual Door Stay Rod, page 21).

To CLOSE a door:

1. Manually pull the door stay latch out of the bracket on the left side sheet, then slightly push the door closed to move the door stay latch past the point of moving back into the bracket (see the figure Hinged Door with Low Voltage Device Panel and Automatic Door Stay Latch, page 20).

   NOTE: On low voltage instrumentation compartment doors that do not have this automatic door stay latch system, manually lift the stay rod out of the hole on the front flange and put back in the hole on the bracket (see the figure Manual Door Stay Rod, page 21).

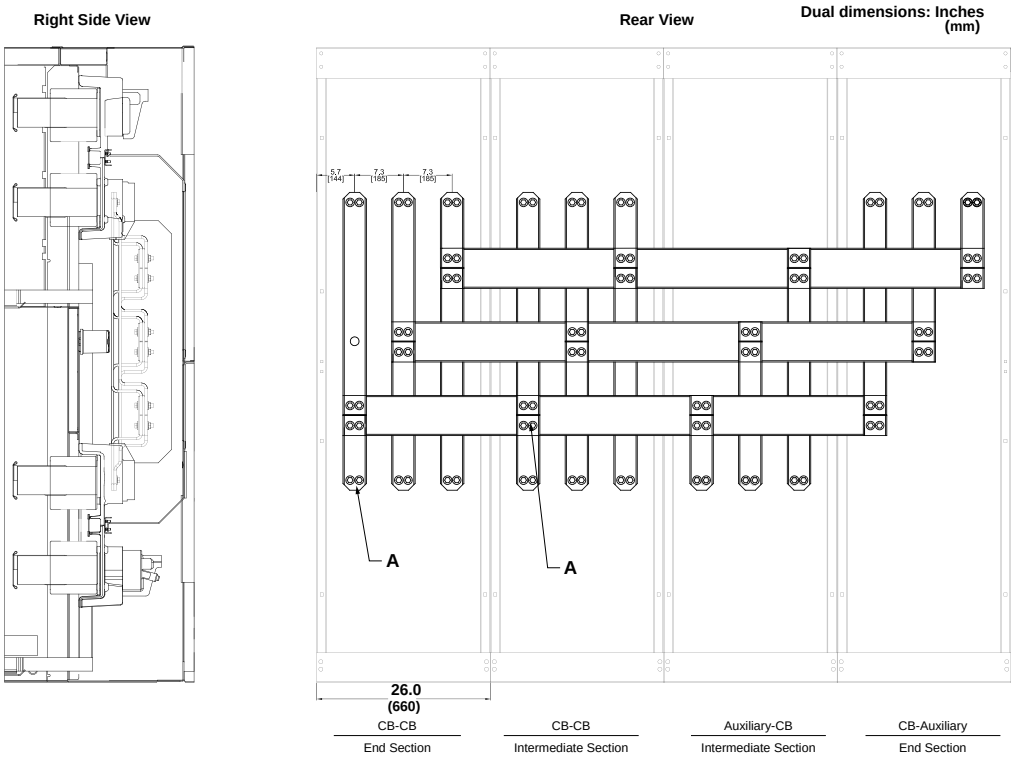
2. The door may be equipped with thumb screws and/or a handle for keeping the door closed. If the door has a handle, make sure the handle is rotated to the up position when closing the door.
3. Push the door to close it, rotate the door handle towards the down position, and/or tighten the thumb screws. This will keep the door in the closed position, making the door ready for normal operation.
4. The door handle (if equipped) may be padlocked or key-locked in the latched position.

Main Bus Installation

Install the main bus at the shipping split only after all sections are securely anchored in place and no additional movement of the assembly will occur. Busbar extensions for shipping splits are shipped with the miscellaneous items. Inspect epoxy bus insulation prior to installation and make sure the bus insulation is not damaged while installing.

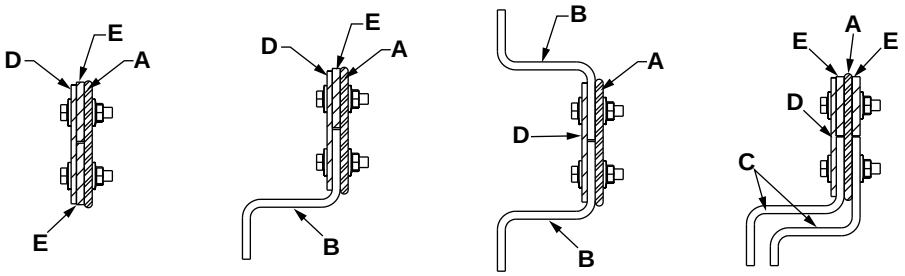
A typical main bus assembly is shown in the figure Main Bus Assembly, page 79. The side and rear views of the assembly show the general arrangement of the main bus and riser bus. The side views (see the figure Main Bus Connections—Right Side View, page 79 show the different bus connections and the orientation of the copper filler and splice plates.

Figure 64 - Main Bus Assembly



A	1/2–13 SAE Grade 5 (minimum) hardware with Belleville washers

Figure 65 - Main Bus Connections—Right Side View



A	Main bus	**D**	Copper Splice Plate
B	1200 A Riser	**E**	Copper Filler Plate
C	2000 A Riser		

⚠DANGER

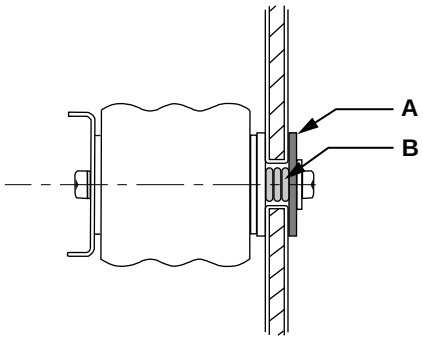
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- Ensure busbar stand-off support insulators with fiberglass/polyester washers, rubber O-rings, and hardware are properly installed.

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

The figure Stand-Off Bus Support for 1200 and 2000 A Bus illustrates a busbar stand-off support insulator installation. The installation is similar for either the standard molded fiberglass polyester standoffs (Group A insulation material) or optional porcelain standoffs (Group B insulation material). Fiberglass/polyester washers and rubber O-rings must be installed as shown to help protect the epoxy busbar insulation, provide dielectric integrity, and provide support under short-circuit conditions.

Figure 66 - Stand-Off Bus Support for 1200 and 2000 A Bus



A	Fiberglass/polyester washer	**B**	Rubber O-rings: 2 for 1200 A; 3 for 2000 A

To install the busbars, remove the rear compartment covers and access the main bus access covers through the rear compartment. Remove the main bus access covers and store the main bus access covers carefully during bus installation. Remove the main bus insulating boots that were shipped with the switchgear, from the section at a shipping split. Install one phase at a time by sliding the horizontal main busbars through the bus pass-through barriers and loosely bolting the horizontal main bus to the vertical riser bus.

NOTE: Do not bend or force the bus to make this connection. If necessary, loosen the pass-through barrier hardware. The barrier has sufficient clearance and adjustment to compensate for minor field misalignment of shipping sections. Properly re-torque the barrier hardware after the main bus hardware is fully torqued. If unable to make the connection without bending or forcing the bus, contact the local Schneider Electric representative.

Tighten the bolts used at the busbar joints only after all three main busbars are in place and properly fitted. Use a torque wrench to tighten the bolts for busbar connections as specified in the table Switchgear Bolt Torque Value, page 65.

After installation of switchgear line-up is complete, use a properly rated multimeter to check for electrical continuity along the full length of the main bus bar in the line-up.

Install supplied boots on main busbar joints. Close the boot joint with supplied tie-wrap. Clean and wipe down main bus compartment. Inspect the compartment for any work tools and remove. Reinstall main bus access covers.

Prior to start-up, re-install all barriers that were removed for installation and properly seal all bus joint boots. Refer to Start-Up, page 98 for more information.

Ground Bus Connection

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Connect the ground bus to the proper equipment ground per the local installation code requirements. The ground bus must be connected for proper operation of relaying and instrumentation, and for personnel safety.

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

Connect the ground bus splice at each shipping split (see the figures Rear Compartment — One-High Section (rear compartment covers removed), page 56, Rear Compartment — Two-High Section (rear compartment covers removed), page 57, and Ground Bus Splice, page 60. Position the splice plate, then replace hardware on both ends.

NOTE: The ground bus must be connected for proper operation of relaying and instrumentation, and for personnel safety.

Use a torque wrench to tighten the bolts for the ground bus splice as specified in the table Switchgear Bolt Torque Value, page 65 for busbar connections.

After installation of switchgear line-up is complete, use a properly rated multimeter to check for electrical continuity along the full length of the ground bus bar in the line-up.

Control Wiring Connections

Consult the customer wiring diagram for reconnection of wiring at the shipping split. Each wire is identified and was connected and verified during assembly at the factory. If the identification is missing or blurred, ring-out before connecting to avoid control circuit and instrument panel problems at start-up.

Circuit Breaker and Auxiliary (CPT/VT) Drawer Installation and Operation

This section contains instructions for operating, installing, and withdrawing the circuit breaker in the switchgear circuit breaker compartment. For further information on the circuit breaker, refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker*. This area also contains instructions for operating, installing, and moving the auxiliary (CPT/VT) drawers in the switchgear auxiliary compartments.

Circuit Breaker Compartment Interlock System Operation

The circuit breaker and the circuit breaker compartment are equipped with an interlock system (see the figure Compartment Interlocks, page 30). The interlocks are designed to:

- help block the circuit breaker from being pushed into the compartment when the circuit breaker is closed
- help block the circuit breaker from being closed while it is moved between the test/disconnected and connected position
- help block the circuit breaker from being moved from the connected position when it is closed
- discharge both the closing and opening springs when the circuit breaker is being removed or withdrawn from the circuit breaker compartment

Circuit Breaker Installation and Operation

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- The circuit breaker must be installed and operated only by qualified electrical personnel. Only qualified personnel familiar with medium voltage equipment are to perform work described in this set of instructions. Workers must understand the hazards involved in working with or near medium voltage circuits.
- Install and operate the circuit breaker only in the environment for which it was designed.
- Perform work on the equipment only after reading and understanding all of the instructions contained in this and other associated user guides.
- Do not open the circuit breaker, close the circuit breaker, or rack the circuit breaker from one position to another with the circuit breaker compartment door open when the switchgear is energized.
- Use only a SureSeT lift truck to insert and remove the EvoPacT MV circuit breaker.
- Do not push on the front breaker covers or at the top of the breaker.
- Do not force the circuit breaker to move inside the circuit breaker compartment. If a mechanism is not operating smoothly or circuit breaker movement is blocked, look for the cause.
- Do not over torque the racking handle once the circuit breaker motion stops. Excessive torque will damage the racking mechanism if the circuit breaker does not move. Determine the cause before continuing if the circuit breaker is not in the desired position.
- Remove the circuit breaker and contact the local Schneider Electric representative if the circuit breaker does not easily rack into the circuit breaker compartment when it is being moved to the connected position.
- Reconnect the circuit breaker and repeat the rack-out process if the circuit breaker does not easily rack out of the circuit breaker compartment when it is being moved to the test/disconnected position. If satisfactory results are not achieved, contact Schneider Electric.
- Only use the provided racking/charging handle or electrically with the optional integrated motorized racking system. Other methods to rack the circuit breaker should not be used and could damage the circuit breaker racking mechanism.
- Do not exceed the racking mechanism maximum torque limit when racking a circuit breaker into or out of the connected position to help prevent damage to the circuit breaker or circuit breaker compartment.

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

Installing the Circuit Breaker into the Circuit Breaker Compartment in the Test/Disconnected Position

SureSeT Switchgear User Guide Video – https://youtu.be/Eim9yb7ZwFw

Typically, the circuit breakers are shipped inside the equipment, but may also be shipped separately. If a circuit breaker is not in the circuit breaker compartment, follow these steps to insert it:

1. Make sure the circuit breaker is OPEN (O).

2. Check the customer order drawings and nameplates, and that the secondary disconnect labels coordinate on the circuit breaker and the circuit breaker compartment (see figure Coordinating Circuit Breaker Compartment and Circuit Breaker Top Cover Secondary Disconnect Labels, page 33) to verify the circuit breaker is installed into the proper compartment.
3. Verify the circuit breaker racking beam position indicator shows the symbol for "Test/Disconnected" and that the racking beam is flush with the front of the circuit breaker carrier pan, (see the figure Locking Tabs Fully Extended Into the Latch Plates, page 27).
4. Open the circuit breaker compartment door (refer to the section Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77) with the automatic door stay latch engaged (see Hinged Door with Low Voltage Device Panel and Automatic Door Stay Latch, page 20).
5. Prepare and use a SureSeT lift truck to insert the circuit breaker into the circuit breaker compartment. According to the instructions in the section SureSeT Circuit Breaker/Auxiliary Drawer Lift Truck, page 116.

   NOTE: A lift truck must be used to insert or remove the circuit breaker from switchgear regardless of whether or not the line-up is on a raised pad.

Racking the Circuit Breaker Into the Connected Position

To rack a circuit breaker into the connected position from the test/disconnected position, follow these steps:

1. Remove the padlock, if installed, from the red push button or push button blocking cover (if equipped) found on the racking mechanism beam located near the lower, middle area of the circuit breaker compartment door.
2. Remove the padlock, if installed, and unlock any key-lock (if equipped) from the compartment interlock plate mounted on the right rail in the circuit breaker compartment.
3. Close and properly latch the circuit breaker compartment door per instructions in this user guide, (refer to Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77).
4. With the circuit breaker compartment door closed and latched, push and hold in the red push button on the circuit breaker racking mechanism beam to open the circuit breaker racking port, and insert the circuit breaker racking/charging handle into the racking port. Engage the racking handle into the racking shaft and rotate the racking handle clockwise to rack the circuit breaker into the connected position. When in the connected position, the inward motion of the circuit breaker stops.

   NOTE: If the racking system is motorized, the circuit breaker may be racked in and out using electrical controls with the circuit breaker compartment door closed and latched.
5. With the circuit breaker compartment door closed, the position indicator on the front of the racking mechanism beam shows that the circuit breaker is in the test/disconnected, transport, or connected position.

   NOTE: When the circuit breaker is being transported to or from the connected position, the racking position indicator will show a symbol for transport.
6. Continue rotating the racking handle clockwise until the racking position indicator shows the symbol for connected position.

   NOTE: When the racking position indicator shows the symbol for connected and is not moving any further, then the circuit breaker is fully racked into the circuit breaker compartment and the circuit breaker primary contacts are connected.

Racking the Circuit Breaker Out of the Connected Position

To rack a circuit breaker from the connected position to the test/disconnected position, follow these steps:

1. Open the circuit breaker electrically with the compartment door closed, and properly latched Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77.

   NOTE: Pushing the red push button on the front of the racking mechanism to access the racking port will also trip a closed circuit breaker and a loud noise will occur as the spring discharges.

2. With the circuit breaker compartment door still closed and latched, push and hold in the red push button on the circuit breaker racking mechanism beam to open the circuit breaker racking port, and insert the racking handle into the racking port on the front of the racking mechanism. Engage the racking handle into the racking shaft and rotate the racking handle in a counter-clockwise direction to move the circuit breaker to the test/disconnected position. When in the test/disconnected position, the outward motion of the circuit breaker stops.

   NOTE: If the racking system is motorized, then the circuit breaker may be racked in and out using electrical controls with the circuit breaker compartment door closed and latched.

3. With the circuit breaker compartment door closed, the position indicator on the front of the racking mechanism beam shows that the circuit breaker is in the test/disconnected, transport, or connected position.

   NOTE: When the circuit breaker is being transported to or from the connected position, the racking position indicator will show a symbol for transport.

4. Continue rotating the racking handle counter-clockwise until the racking position indicator shows the symbol for test/disconnected position.

   NOTE: When the racking position indicator shows the symbol for test/disconnected and is not moving any further, then the circuit breaker is fully racked out of the circuit breaker compartment and the circuit breaker primary contacts and secondary disconnecting plug for power and control are disconnected.

Withdrawing the Circuit Breaker from the Circuit Breaker Compartment

To remove a circuit breaker from the circuit breaker compartment, follow these steps:

1. Make sure the circuit breaker is in the test/disconnected position and the circuit breaker is open.
2. After confirming the opened circuit breaker is in the test/disconnected position, open the circuit breaker compartment door, refer to the section Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77 with the automatic door stay latch engaged, see the figure Hinged Door with Low Voltage Device Panel and Automatic Door Stay Latch, page 20.

   NOTE: Confirm with the circuit breaker compartment door open, when the circuit breaker is in the test/disconnected position, the circuit breaker carrier pan should be flush with the back of the integrated racking mechanism beam, (see the figure Locking Tabs Fully Extended Into the Latch Plates, page 27).

3. Prepare and use a SureSeT lift truck to remove the circuit breaker from the circuit breaker compartment according to the instructions in the section SureSeT Circuit Breaker/Auxiliary Drawer Lift Truck, page 116.

   NOTE: A lift truck must be used to insert or remove the circuit breaker from switchgear regardless of whether the switchgear is on a raised pad or not.

Control Power Plug Operation and Testing the Circuit Breaker in the Test/ Disconnected Position

In normal operation, the top, secondary disconnect control power receptacle in the circuit breaker compartment automatically connects and disconnects to the plug on the circuit breaker as the circuit breaker is moved into and out of the connected position. The secondary disconnect power and control receptacle should remain latched, at the back of its travel in the location where it connects with the breaker in the racked-in, connected position (see the figure Secondary Disconnect Receptacle Assembly, page 32). However, this receptacle also provides a convenient method for electrically testing the operation of the circuit breaker mechanism.

To test the circuit breaker in the test/disconnected position:

1. With the circuit breaker compartment door open, locate the handle attached to the secondary disconnect power and control receptacle. It is above the circuit breaker in the circuit breaker compartment. Rotate the handle downward, in a clockwise direction to an angle of approximately 60–90 degrees.
2. Pull the handle of the top secondary disconnect receptacle forward until the receptacle engages with the secondary disconnect plug on the circuit breaker. The circuit breaker can now be electrically operated in the same way as when in the connected position.

   NOTE: The control circuit of the circuit breaker is now connected to control power. If the control circuit is energized, this connection immediately activates the spring charging motor inside the circuit breaker.
3. After checking all electrical functions, manually push the receptacle back to its normal, latched operating position. As the secondary disconnect receptacle is latching, allow the handle to rotate clockwise while continuing to push the handle until feeling the handle snap, counter-clockwise, into the latched position. The secondary disconnect receptacle should typically be put into this position before racking circuit breakers into the connected position.

Manual Spring Charging Mechanism

In normal operation (when the secondary disconnect power and control plug is engaged), the motor automatically charges the circuit breaker closing springs. The springs can also be charged manually (with the circuit breaker compartment door open) using the circuit breaker racking/charging handle. The circuit breaker charging mechanism uses the same handle as the one used by the circuit breaker and auxiliary compartment racking mechanisms. This feature is provided for testing and maintenance purposes, and for emergency operating conditions.

The circuit breaker charging port is located near the lower, middle area of the circuit breaker front cover. To manually charge the breaker, follow these steps:

1. Insert the racking/charging handle into the charging port.
2. Rotate the handle clockwise until the spring charge status indicator on the circuit breaker shows the spring is fully charged.

   NOTE: The charging port will not provide a hard stop when the circuit breaker is charged and the racking/charging handle will still be free to rotate in the port.

Refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for further detailed information.

Manual CLOSE and OPEN Push-Buttons

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- Never manually close a circuit breaker in the connected position unless the opening source of power and protection relays are connected and operable.
- Do not use the manual OPEN and CLOSE push-buttons on the front of the circuit breaker when the switchgear is energized.

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

The circuit breaker manual CLOSE and OPEN push-buttons are located on the front cover of the circuit breaker. These push-buttons allow manual operation of the circuit breaker after it has been charged (manually or electrically). Use the push-buttons only when testing the circuit breaker during start-up or maintenance. The manual open and close buttons bypass most electrical interlocks on the circuit breaker control circuit.

Refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for more information.

Circuit Breaker Installation in Switchgear

With all primary and secondary disconnect control power circuits de-energized, insert each circuit breaker into its circuit breaker compartment if the circuit breaker was not shipped inside the switchgear. Make sure the racking mechanism locking tabs have engaged the compartment latch plates correctly in the test/disconnected positions. Verify proper connection of the low voltage plugs for additional features, if equipped.

> **NOTE:** If a circuit breaker has been manually charged outside the compartment, manually discharge all stored energy in the circuit breaker mechanism. Otherwise, the automatic spring discharge interlock will discharge the circuit breaker during insertion (refer to the section Compartment Interlocks, page 29). A loud noise will occur as the spring discharges.

Although the circuit breaker racking mechanism will typically not be operated while the circuit breaker is outside of the circuit breaker compartment, make sure the circuit breaker is fully racked out. Verify it is fully racked out by making sure the circuit breaker carrier truck is flush against the back plate of the racking mechanism beam with the mechanical position indicator on the racking beam showing it is in the test/disconnected position. The compartment racking mechanism lockout plate blocks insertion of the circuit breaker if a circuit breaker has been manually racked while outside the compartment and insertion is attempted.

Do not force circuit breakers into circuit breaker compartments. Compartment rating code plates block accidental insertion of circuit breakers with incorrect current, voltage, or interrupting ratings into the compartment. Confirm the label on the cover of the circuit breaker secondary disconnect power and control plug corresponds with the label on the secondary disconnect receptacle assembly in the circuit breaker compartment to provide further confirmation the circuit breaker is in the correct compartment (see Coordinating Circuit Breaker Compartment and Circuit Breaker Top Cover Secondary Disconnect Labels, page 33).

With all primary and secondary disconnect control power circuits de-energized, rack each circuit breaker into the connected position in the circuit breaker compartment. Observe the proper operation of the:

- racking mechanism locking tabs in the latch plates
- ground contacts

- shutters
- secondary disconnect plugs and receptacles connecting
- additional features low voltage
- plugs and receptacles connecting (if so equipped).

Remove each circuit breaker from its compartment. Open the shutters and check that visible signs of circumferential, uniform tracks are made by circuit breaker sliding primary contacts in the grease on stationary primary contacts inside the compartment insulator bushing assembly. Also check that the tracks appear to extend back approximately 0.5 in. (13 mm) from the front edge of each stationary primary contact inside the compartment insulator bushing assembly. Also confirm there are visible signs of uniform contact via tracks in the grease on each contact bar of the circuit breaker sliding primary contacts. Make sure the circuit breaker sliding ground contact leaves visible signs of contact via tracks in the grease and marks on the compartment ground bus contact bar.

CPT and VT Drawer Operation

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- The auxiliary drawer must be installed and operated only by qualified electrical personnel. Only qualified personnel familiar with medium voltage equipment are to perform work described in this set of instructions. Workers must understand the hazards involved in working with or near medium voltage circuits.
- Install and operate the auxiliary drawer only in the environment for which it was designed.
- Perform work on the auxiliary drawer only after reading and understanding all of the instructions contained in this and other associated user guides.
- Do not force the auxiliary (CPT/VT) drawer to move inside the auxiliary compartment. If a mechanism is not operating smoothly or auxiliary drawer movement is blocked, look for the cause.
- Use only a SureSeT lift truck to install and remove an auxiliary (CPT/VT) drawer.
- Verify the auxiliary (CPT/VT) drawer racking mechanism dismounting bolt is connected to the racking mechanism in the compartment and is properly torqued before moving the auxiliary drawer with a racking mechanism.
- Remove the auxiliary (CPT/VT) drawer and contact the local Schneider Electric representative if the drawer does not easily move into or rack into the auxiliary compartment when moving the drawer to the connected position.
- Reconnect the auxiliary (CPT/VT) drawer and repeat the steps to move to the disconnected position if the drawer does not easily move out or rack out of the compartment when moving the drawer to the disconnected position. If satisfactory results are not achieved, contact Schneider Electric.
- Do not over-torque the racking handle once the motion of the auxiliary (CPT/VT) drawer stops on auxiliary drawers and compartments equipped with racking mechanism. Excessive torque will damage the racking mechanism if the auxiliary drawer does not move. Determine the cause before continuing if the drawer is not in the desired position.
- Only use the provided racking/charging handle or electrically with the optional integrated motorized racking system. Other methods to rack the auxiliary drawer should not be used and could damage the racking mechanism.
- Do not exceed the racking mechanism maximum torque limit when racking an auxiliary drawer into or out of the connected position to help prevent damage to the drawer or auxiliary compartment.

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

Moving an Auxiliary Drawer Out of the Connected Position to the Disconnected Position

When a racking mechanism is not installed:

1. Open the compartment door per instructions in this user guide.
2. On CPT compartments, open the secondary circuit breaker on the CPT drawer.
3. Unscrew the two thumbscrews at the top left and right corners of the drawer (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50).

4. Use the black pull handle, located on the front, middle of the drawer, to pull the drawer out of the connected position to the disconnected position (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50).

   NOTE: The arrow on the plate mounted on the middle, bottom of the drawer should align with the symbol for disconnected on the label located on the compartment floor (see the figures Auxiliary Compartment without Racking Mechanism Position Indicator (shown in Transport position), page 47 and Auxiliary Drawer Position Indicator Symbols, page 47).

When a racking mechanism is installed:

1. On CPT compartments, first open the compartment door, open the secondary circuit breaker on the CPT drawer (see the figure CPT Secondary Circuit Breaker Operation, page 48), and then close the compartment door per instructions in this user guide.
2. With the auxiliary compartment door closed, insert the racking handle into the racking port and engage the handle into the racking shaft (see the figures Auxiliary Compartment Door Faceplate with Racking Mechanism, page 46, CPT Compartment and Drawer Features, page 49, and VT Compartment and Drawer Features, page 50).
3. Rotate the racking handle counter-clockwise to rack the auxiliary drawer into the disconnected position. When in the disconnected position, the outward motion of the auxiliary drawer stops.

   NOTE: If the racking system is motorized, the drawer may be racked in and out using electrical controls.
4. With the auxiliary compartment door closed, the position indicator on the front of the racking mechanism reflects if the auxiliary drawer is in the disconnected, transport, or connected position (see the figures Auxiliary Compartment Door Faceplate with Racking Mechanism, page 46, CPT Compartment and Drawer Features, page 49, Auxiliary Drawer Position Indicator Symbols, page 47, VT Compartment and Drawer Features, page 50).

   NOTE: When the auxiliary drawer is being transported to or from the connected position, the racking position indicator will show a symbol for transport (see the figure Auxiliary Drawer Position Indicator Symbols, page 47).
5. Continue rotating the racking handle counter-clockwise until the racking position indicator shows the symbol for the disconnected position (see the figures Auxiliary Compartment Door Faceplate with Racking Mechanism, page 46, CPT Compartment and Drawer Features, page 49, and VT Compartment and Drawer Features, page 50).

   NOTE: When the racking position indicator shows the symbol for disconnected and is not moving any further then the auxiliary drawer is fully racked out of the auxiliary compartment and the auxiliary drawer primary contacts are disconnected, (see the figure Auxiliary Drawer Position Indicator Symbols, page 47).

Moving an Auxiliary Drawer Into the Connected Position from the Disconnected Position

When a racking mechanism is not installed:

1. Open the auxiliary compartment door per instructions in this user guide.
2. Remove padlock, if installed, from a disconnected padlock bracket (if equipped with option) found on the front right side compartment floor area.
3. If equipped with automatic disconnect latch bracket, raise up on the latch.

4. Push on the drawer, in area near the black pull handle, located on the front, lower, middle of the drawer, to move the drawer out of the disconnected position to the connected position (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50).

   NOTE: The arrow on the plate mounted on the middle, bottom of the auxiliary drawer should align with the symbol for connected on the label located on the compartment floor and the auxiliary drawer front pan should come flush with the barriers in the compartment (see the figures Auxiliary Compartment without Racking Mechanism Position Indicator (shown in Transport position), page 47, Auxiliary Drawer Position Indicator Symbols, page 47, CPT Compartment and Drawer Features, page 49, and VT Compartment and Drawer Features, page 50).

5. Screw in the two thumb screws at the top left and right corners of the drawer (see the figures Auxiliary Compartment Door Faceplate with Racking Mechanism, page 46, CPT Compartment and Drawer Features, page 49, and VT Compartment and Drawer Features, page 50).
6. On CPTs, close the secondary circuit breaker.
7. Close the auxiliary compartment door per instructions in this user guide.

When a racking mechanism is installed:

1. Open the auxiliary compartment door per instructions in this user guide.
2. Remove padlocks, if installed, from racking blocking cover and/or disconnected padlock bracket (if equipped with either option) found on the front right side compartment floor area.
3. On CPTs, make sure the secondary circuit breaker is open (see the figures CPT Secondary Circuit Breaker Operation, page 48, CPT Compartment and Drawer Features, page 49, and VT Compartment and Drawer Features, page 50).
4. Verify the auxiliary drawer racking mechanism dismounting bolt is connected to the racking mechanism in the compartment and is properly torqued (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50, and the table Switchgear Bolt Torque Value, page 65).
5. Close the auxiliary compartment door per instructions in this user guide.
6. Insert the racking handle into the racking port and engage the handle into the racking shaft (see the figures Auxiliary Compartment Door Faceplate with Racking Mechanism, page 46, Auxiliary Drawer Position Indicator Symbols, page 47, CPT Compartment and Drawer Features, page 49, and VT Compartment and Drawer Features, page 50).
7. Rotate the racking handle clockwise to rack the auxiliary drawer into the connected position. When in the connected position, the inward motion of the auxiliary drawer stops.

   NOTE: If the racking system is motorized, then the drawer may be racked in and out using electrical controls.

8. With the auxiliary compartment door closed, the position indicator on the front of the racking mechanism reflects if the auxiliary drawer is in the disconnected, transport, or connected position.

   NOTE: When the auxiliary drawer is being transported to or from the connected position, the racking position indicator will show a symbol for transport.

9. Continue rotating the racking handle clockwise until the racking position indicator shows the symbol for connected position (see the figures Auxiliary Compartment Door Faceplate with Racking Mechanism, page 46 and Auxiliary Drawer Position Indicator Symbols, page 47).

   NOTE: When the racking position indicator shows the symbol for connected and is not moving any further then the auxiliary drawer is fully racked into the auxiliary compartment and the auxiliary drawer primary contacts are connected.

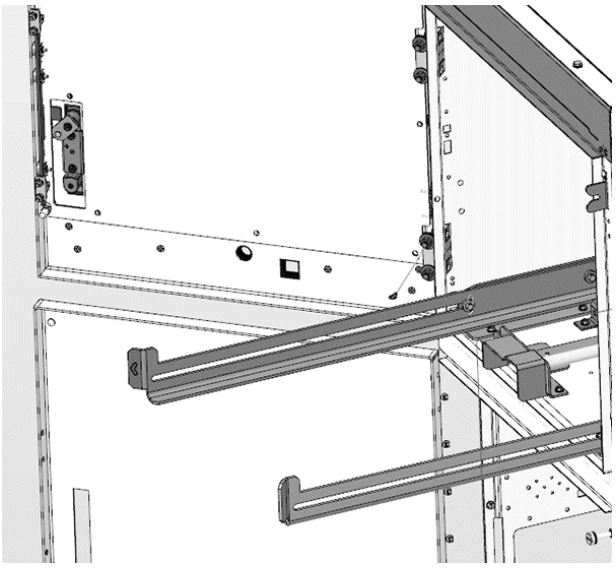
10. On CPT compartments, open the compartment door again, close the secondary circuit breaker (see the figures CPT Secondary Circuit Breaker Operation, page 48, CPT Compartment and Drawer Features, page 49, and VT Compartment and Drawer Features, page 50), and then re-close the compartment door per instructions in this user guide.

Removing an Auxiliary Drawer From a Compartment

1. Open the auxiliary compartment door per instructions in this user guide.
2. Make sure the auxiliary drawer is in the disconnected position.
3. If equipped with a racking system, locate the racking mechanism dismounting bolt located on the middle, bottom of the auxiliary drawer and use a tool to unbolt the auxiliary drawer from the racking system in the compartment (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50). The dismounting bolt should remain with the auxiliary drawer.
4. Pull out the left and right auxiliary compartment extension rails (see the figure Extension Rails in Fully Extended Position).
5. Use the black pull handle, located on the front, middle of the drawer, to pull the drawer out onto the extension rails (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50).

   NOTE: This position can also be used to help perform inspection and maintenance of the auxiliary drawer.
6. Prepare and use a SureSeT lift truck to remove the auxiliary drawer from the auxiliary compartment extension rails according to the instructions in the section SureSeT Circuit Breaker/Auxiliary Drawer Lift Truck, page 116.

Figure 67 - Extension Rails in Fully Extended Position



Installing an Auxiliary Drawer Into a Compartment

Prepare and use a SureSeT lift truck to install auxiliary drawers into an auxiliary compartment according to the instructions in the section SureSeT Circuit Breaker/Auxiliary Drawer Lift Truck, page 116.

CPT and VT Drawer Installation

Typically the auxiliary drawers are shipped in the switchgear in the connected position. If the drawers were shipped outside the equipment or are replacement drawers, use the SureSeT lift truck to move the drawer into the compartment and then follow the steps to move it to the connected position first. Refer to the section SureSeT Circuit Breaker/Auxiliary Drawer Lift Truck, page 116 for further information on how to use the lift truck.

With all of the control power transformer (CPT) and voltage transformer (VT) drawers in the connected position, move all of the drawers to the connected position in all of the auxiliary compartments in the entire switchgear line-up. Observe the movement of the drawers and verify that:

- the static primary discharge ground contacts in the compartments touch the moving drawer contacts
- the primary and secondary contacts make proper contact
- the auxiliary drawer sliding ground contact is swiping down the auxiliary compartment ground bar correctly

Visually inspect fuses for possible damage and make sure insulating boots are installed and properly closed. Replace the fuses if necessary.

⚠ DANGER

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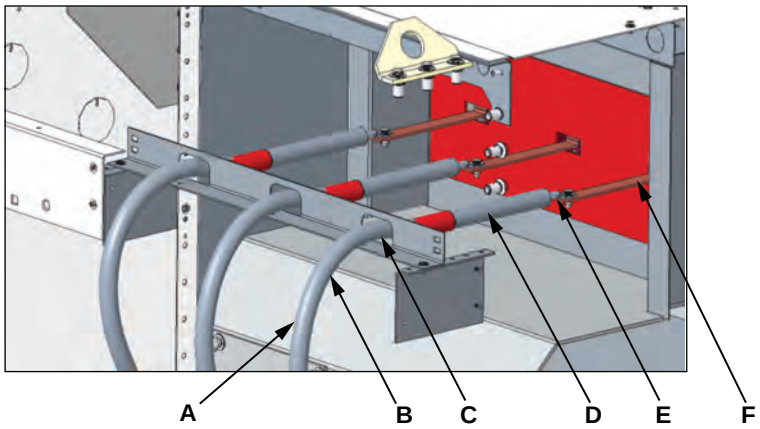
- Make sure CPT or VT drawer ground wires have adequate clearance from primary conductors.
- Properly terminate auxiliary cables and the auxiliary cable shields. The cable shielding must be grounded at both ends of termination to the ground bus of each section and the cable stress cones must have adequate clearance from sources of ground potential and from other phases.
- Properly discharge the residual charge on any previously energized auxiliary cables prior to performing work in the equipment.

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

Prior to energization, verify spacing of all VT and CPT drawer cabling is adequate. If any auxiliary drawer ground wires have been modified or disconnected prior to installation, make sure the wires are re-terminated and routed properly, with adequate clearance from any primary conductors. After inspecting the auxiliary drawers, follow all the installation and start-up steps.

The bus from an auxiliary compartment is not designed to be unbolted from the connections to primary main bus or cable connection bus. The shielded cable connections from auxiliary compartments are designed to run parallel in sections, specifically at the cable termination points. However, when cables pass through side sheets, the cable insulation and grounded shielding of the cable jacket allow the cables to be grouped. The cable connections from auxiliary compartments are also not designed to be unbolted from the connections to primary main bus or cable connection bus. If, for some reason, an auxiliary cable is disconnected in the field, make sure it is properly terminated again. The cable shielding must be grounded at both ends of termination to the ground bus of each section and the cable stress cones must have adequate clearance from sources of ground potential and from other phases (Figure Cable Termination, page 93).

Figure 68 - Cable Termination



A	Shielded MV cable	**C**	Zip tie	**E**	Cable lug
B	Adequate cable bending radius	**D**	Stress cone	**F**	Bus into auxiliary compartment

NOTE: Insulating boots are included in assembly, but not shown in figure for clarity.

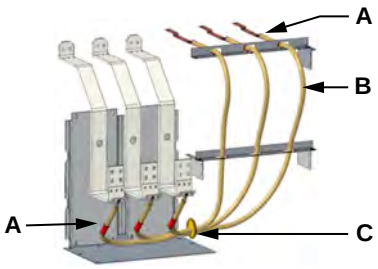
Visually inspect for any damage to the insulation or accumulation of dust on the bus or cable throughout the entire lengths of bus and cable, including on the cable stress cones. Replace the bus or cables in case of any signs of damage. Remove any dust accumulation with a clean, dry, lint-free cloth.

1. Make sure all auxiliary cables adhere to the minimum bend radius or cable length so the cables route through the section without being stressed (see the figure Cables with Correct Routing).

   NOTE: Typically, the cables must have a minimum bend radius of 8 in. (203 mm) and the cable termination points must always maintain adequate dielectric clearances from other phases and ground potentials.

2. Make sure gaskets are firmly in place in the knockout holes in the side sheets through which the auxiliary cables pass.

Figure 69 - Cables with Correct Routing



NOTE: Insulating boots are included in assembly, but not shown in figure for clarity.

NOTE: The external surface of each shielded cable is at ground potential and must be positioned to have adequate dielectric clearances from all electrical conductors.

Dielectric Withstand Testing

Before making external power connections, perform a high-potential dielectric withstand test on the switchgear line-up bus and circuit breakers. To prepare for this test, do the following:

1. Disconnect the surge arresters *i.e.,* lightning arresters (LAs) and surge capacitors, when installed.
2. Disconnect the CPT and/or VT drawer(s), if provided.
3. Place each of the circuit breakers in the proper circuit breaker compartment in the connected position.
4. Charge the circuit breaker operating springs manually, then close each circuit breaker by pressing the **CLOSE (I)** push button located on the front of the circuit breaker.

   Refer to the section Manual Spring Charging Mechanism, page 85 for further circuit breaker operating instructions.

Use a transformer-type tester with a built-in voltmeter and milliammeter for dielectric withstand testing. Capacitor-loaded, bench-type testers with neon bulb indicators do not have sufficient capacity to give reliable results.

The table One-Minute High-Potential Dielectric Withstand Test[2], page 94 provides normal test values for dry, clean, new equipment. Field dielectric withstand tests are made at 75% of factory test voltages in accordance with ANSI standards.

Table 8 - One-Minute High-Potential Dielectric Withstand Test[2]

Switchgear Rated Maximum Voltage	Factory Test Voltage	Field Test Voltage	
		AC	DC
5 kV	19 kV	14 kV	20 kV
15 kV	36 kV	27 kV	38 kV

Phase-to-Phase Test

1. Perform a phase-to-phase dielectric withstand test on the main bus.
   a. Gradually increase the voltage to the levels shown in Table 4.
   b. Verify that the equipment sustains the specified voltage without flashover for one minute.
2. Turn off the test equipment. Discharge the phase bus to ground before removing the test cables.

Phase-to-Ground Test

1. Perform a phase-to-ground dielectric withstand test on the main bus.
   a. Gradually increase the voltage to the levels shown in Table 4.
   b. Verify that the equipment sustains the specified voltage without flashover for one minute.
2. Turn off the test equipment. Discharge the phase bus to ground before removing the test cables.

If satisfactory results are not obtained, locate the problem, correct it, and rerun the test before proceeding. If results are acceptable, the power cables, ground wires, external wiring, and battery (if supplied) can be connected to the switchgear.

2. All voltages are 60 Hz, rms symmetrical.

Phasing

In accordance with the standards, the phase arrangement within the three-phase assembled switchgear buses and primary connections is phased 1, 2, 3, from front to back, top to bottom, or left to right, as viewed from the front of the switchgear (the front-sub-section side). If, for any reason, the bus must be phased differently or identified by the user differently (such as with phases labeled A-B-C), then the different phase will be identified on the bus with a label.

Cable Connections

Be very careful when making all types of cable terminations, as terminations are essential to the successful operation of the electrical distribution system. To keep from exceeding the number of cable terminations permitted per phase per section configuration, refer to the table Recommended Maximum Number of Conductors Per Phase, page 97. Avoid sharp turns, edges, or corners to help prevent damage to the cable insulation. Follow the cable manufacturer's recommendations for minimum bending radius. These instructions will vary, depending on the manufacturer.

Solderless or compression-type cable lugs are the most common method for connecting power cables to metal-clad switchgear. When making the terminations for each type of power cable, follow the cable manufacturer's instructions. After the cable connections are made, insulate the cable connection termination as follows:

1. Place 3M™ Scotchfil™ electrical insulating putty around the lugs and bolts to reduce the concentrated field created by the lug and bolt irregular shapes (see the figure High-Voltage Cable Lug Insulation, page 96).
   a. Apply a layer of 3M Scotch® 13 electrical semiconducting tape over the Scotchfil insulating putty. Half-lap the tape, which must extend onto the conductor.

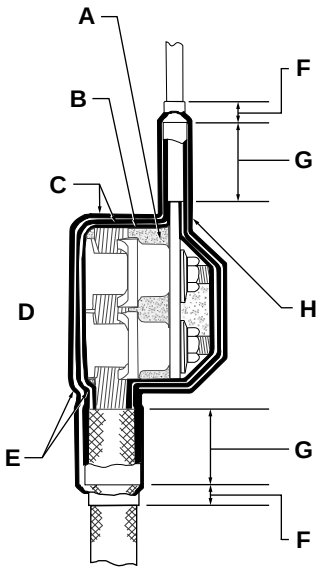
      NOTE: Do not extend the tape up over the bus epoxy insulation.

   b. Apply 3M Scotch 130C splicing tape over the Scotch 13 tape. Half-lap this tape for two layers on 5 kV installations, and four layers on 15 kV installations.

      NOTE: For 5 kV applications, extend this tape 1.5 in. (38 mm) up over the bus insulation and cable insulation. Extend the tape 2 in. (51 mm) for 15 kV applications.
2. Apply two layers of 3M Scotch 22 electrical tape, extending the tape up over the Scotch 130C tape in all directions. The tape and other insulating materials for completing these field connections are not supplied with the switchgear.
3. When potheads or cable terminators are supplied for terminating power cables, follow the cable manufacturer's instructions for terminating the cables on these devices. To facilitate installation of the power cables, the bus side is not taped. After the cables are installed, insulate the pothead-to-bus connections according to the cable lug insulation instructions in this section.

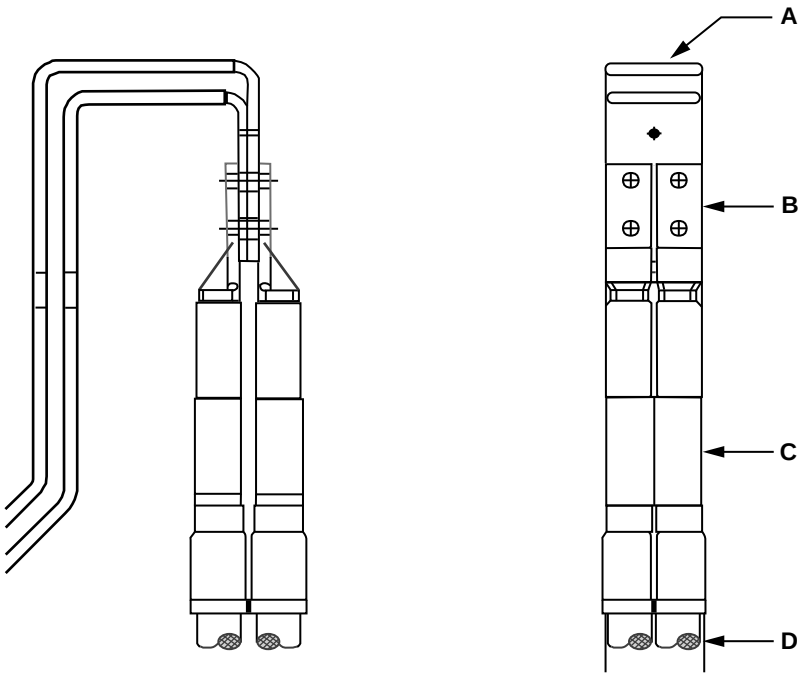
NOTE: The external surface of each shielded cable is at ground potential and must be positioned a minimum of 6 in. (152 mm) from any live part (even if it is of the same phase potential), including insulated busbars.

Figure 70 - High-Voltage Cable Lug Insulation



A	Fill voids with Scotchfil putty	**E**	Two layers of tape
B	One layer Scotch 13 semiconducting tape	**F**	0.5 in. (13 mm) Scotch 22 electrical tape
C	Scotch 130C splicing tape: • Two layers for 5 kV • Four layers for 15 kV	**G**	Overlap Scotch 130C splicing tape over bus insulation: • 1.5 in. (38 mm) for 5 kV • 2 in. (51 mm) for 15 kV
D	**NOTE:** All taping is half-lapped.	**H**	**NOTE:** Scotch 13 semiconducting tape must touch bus or terminals in at least one place. Tape should not overlap bus or cable insulation.

Figure 71 - Cable Connection Example



A	Insulated primary cable connection bus	**B**	2–hole NEMA terminal (FCI-Burndy type YA39A5 lug shown)	**C**	15 kV, shielded indoor termination (TFT-153R-G shown)	**D**	Four 750 kcmil cables from below

Table 9 - Recommended Maximum Number of Conductors Per Phase

Conductor Size (kcmil)	Maximum Number of Conductors Per Phase (Total)				
	Two-High with Cable Duct Applications	Two-High with No Cable Duct Applications	One-High Standard Applications	One-High Applications with Landing Pad Adapters	Tie Bus with Barriers Applications
750	2 (6)	4 (12)	4 (12)	6 (18)	3 (9)
500					
350	3 (9)				
250					

NOTES:

1. Recommended number of conductors per phase is based on section type/application. This will help with the placement of ZSCT, auxiliary primary connection cables, surge arresters, etc.
2. Conduit sizes and placement in foundation and applications with zero sequence current transformer (ZSCT) may reduce the number/size of cables per phase for some applications.
3. Conduit sizes and placement in foundation and applications with zero sequence current transformer (ZSCT) shall be properly selected by the installer to ensure the optimal number of cables per phase.
4. Voltage drop from cable lengths is not considered in table above.
5. This information is only a recommendation and the actual application must be properly configured by the installer for each use.

Start-Up

This section contains instructions for starting up SureSeT metal-clad indoor switchgear with Square D™ brand EvoPacT circuit breakers and VT/CPT auxiliary devices. All safety precaution items stated below and throughout this user guide must be followed prior to working and throughout all procedures. Training of personnel for final start-up can be provided. Continue to treat the equipment per the instructions found in the section Moisture Contamination Avoidance and Mitigation, page 13 until the equipment is under normal operation. This equipment does not achieve its ratings until it is installed per record/as-built drawings, installed per the instructions contained in this document, and has operational environmental controls with appropriate settings to help mitigate environmental influences. Contact the local Schneider Electric representative for information.

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- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- This equipment must be installed, operated, and serviced only by qualified electrical personnel. Only qualified personnel familiar with medium voltage equipment are to perform work described in this set of instructions. Workers must understand the hazards involved in working with or near medium voltage circuits.
- Operate the electrical equipment only in the environment for which it was designed.
- Perform work on the equipment only after reading and understanding all of the instructions contained in this user guide and other associated user guides.
- Turn off all power source(s) to this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume all circuits are live until completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding. Also, check interconnection diagrams and make sure there are no potential backfeed sources.
- Never disconnect the main trip source of energized equipment.
- Always practice lock-out and tag-out procedures according to OSHA requirements. Use out-of-service tags and padlocks when working on equipment. Leave tags in place until the work is completed and the equipment is ready to be put back into service.
- Circuit breaker and switch contacts must be open and all springs discharged before attempting to open any circuit breaker or auxiliary compartment doors or performing maintenance work, disconnection, or removal of a circuit breaker.
- Move circuit breakers to the test/disconnected position before attempting to open any circuit breaker or auxiliary compartment doors or removing rear compartment covers.
- Conduct electrical testing to confirm no short-circuits were created during installation, maintenance, or inspection.
- Never insert a circuit breaker into a circuit breaker compartment that is not complete and functional.
- Do not make any modifications to the equipment or operate the system with interlocks or barriers removed. Contact the local Schneider Electric representative for additional instructions if the equipment does not function as described in this user guide.

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

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- Properly close all bus joint boots before energizing this equipment.
- Review the equipment and site drawings to determine if the top or bottom contacts in the circuit breaker compartment and in the switchgear section are the line side. Both can be energized when the circuit breaker is removed from the compartment.
- Do not allow the ambient operating temperatures to exceed the specified limits.
- Provide adequate ventilation at all times to the equipment. Clean, dry, filtered air should be supplied. The ambient operating air must not be polluted by dust, particulates, smoke, corrosive and/or flammable gases, vapors, or salt. Protect the equipment from foreign objects and rodents.
- Disconnect all high-voltage to the switchgear before accessing the main bus compartment.
- Properly terminate auxiliary cables and the auxiliary cable shields. The cable shielding must be grounded at both ends of termination to the ground bus of each section and the cable stress cones must have adequate clearance from sources of ground potential and from other phases.
- Properly discharge the residual charge on any previously energized auxiliary cables prior to performing work in the equipment.
- Do not use liquid fire extinguishers or water on electrical fires. Before extinguishing fires within the switchgear, be absolutely certain the main power source is disconnected and the main and all feeder circuit breakers are open.
- Carefully inspect the work area and remove any tools and objects left inside the equipment.
- Replace all devices, doors, barriers, plates, panels, and covers before racking the circuit breaker in or out of the connected position and before turning on power to this equipment.
- Remove the temporary source of low-voltage power prior to energizing.
- All instructions in this user guide are written with the assumption that the customer has taken these measures before performing maintenance or testing.
- All personnel involved in the start-up operation should be thoroughly familiar with the information in this user guide and the customer order drawings that were provided before working on this equipment.

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

To start the switchgear, follow these steps:

1. Vacuum out every compartment to remove dust, spiderwebs, etc. Remove all loose parts, tools, miscellaneous construction items, and litter. Wipe off the insulation with a clean, dry, lint-free cloth. For proper cleaning practices refer to the section Cleaning, page 105.
2. Make sure all insulating boots are installed and properly closed.
3. Replace all the main bus access covers and any other barriers or covers which were removed during installation.
4. Install the rear compartment covers.
5. Connect the battery charger and batteries (if used) to the switchgear control bus according to the customer order drawings.
6. Unblock all the relays and set to the relay schedule. Using a relay tester, verify the settings and electrical operation of each relay.
7. Make sure the control power transformer drawer has the current-limiting fuses in place. Pull the drawer out onto the extension rails into the removed position.

8. Place all circuit breakers into the circuit breaker compartments in the test/disconnected position. Refer to the sections Circuit Breaker Installation and Operation, page 82 and Circuit Breaker Installation in Switchgear, page 86 for further information.
9. On the control power transformer, open the secondary circuit breaker and remove the primary fuses. Connect a temporary source of low-voltage power to the stationary secondary contact in the control power transformer compartment or any logical point (consult the customer schematic and wiring diagram).
10. With the circuit breaker compartment doors closed and properly latched (Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77), rack one circuit breaker at a time into the connected position and perform the following steps:
    a. Electrically close and open the circuit breaker with the door-mounted circuit breaker control panel.
    b. Open the circuit breaker by temporarily closing the trip output contacts of each protection relay.
    c. Reset the relay targets after each operation and rack the circuit breaker into the test/disconnected position.
11. Electrically operate using remote control methods and check the indicating lights/status indicators.
12. Operate all electrical interlocks, transfer schemes, lock-out relays, and other control functions to verify proper operation.
13. Test digital health monitoring system using instructions included in Schneider Electric document number QGH51397, *Substation Monitoring Device for Medium Voltage Switchgear*.
14. Test the communication network is performing as expected. Refer to the communication network drawings included in the customer order drawings.
15. Remove the temporary source of low-voltage power, make the permanent connection of low-voltage power and perform the following steps:
    a. Install the primary fuses on the control power transformer drawer.
    b. With the circuit breaker compartment doors closed and properly latched (refer to the section Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77), rack all circuit breakers into the connected position.
    c. Install the control power transformer and voltage transformer drawers into the connected position.
    d. Close the control power transformer secondary circuit breaker when ready.
    e. Close and properly latch all auxiliary compartment doors (refer to the section Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77).
16. Using a properly rated tester, verify again that trip voltage is available at circuit breaker terminals in each compartment.
17. Verify all rear compartment covers are installed and securely bolted.
18. Verify all front compartment doors are closed and properly latched (refer to the section Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77).
19. Energize the incoming high-voltage circuits.
20. Electrically close the main, primary circuit breaker to establish electrical service.
21. Electrically close the feeder primary circuit breakers as desired to establish electrical service.
22. Turn on desired loads one at a time.

Inspection and Maintenance

This section contains instructions for inspecting and maintaining SureSeT metal-clad indoor switchgear unit and devices. All safety precaution items stated below and throughout this user guide must be followed prior to working and throughout all procedures. Continue to treat the equipment per the instructions found in the section Moisture Contamination Avoidance and Mitigation, page 13 until the equipment is under normal operation. This equipment does not achieve its ratings until it is installed per record/as-built drawings, installed per the instructions contained in this document, and has operational environmental controls with appropriate settings to help mitigate environmental influences.

⚠DANGER

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- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- This equipment must be installed, operated, and serviced only by qualified electrical personnel. Only qualified personnel familiar with medium voltage equipment are to perform work described in this set of instructions. Workers must understand the hazards involved in working with or near medium voltage circuits.
- Perform work on the equipment only after reading and understanding all of the instructions contained in this user guide and other associated user guides.
- Turn off all power source to this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume all circuits are live until completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding. Also, check interconnection diagrams and make sure there are no potential backfeed sources.
- Never disconnect the main trip source of energized equipment.
- Always practice lock-out and tag-out procedures according to OSHA requirements. Use out-of-service tags and padlocks when working on equipment. Leave tags in place until the work is completed and the equipment is ready to be put back into service.
- Circuit breaker and switch contacts must be open and all springs discharged before attempting to open any breaker or auxiliary doors or performing maintenance work, disconnection, or removal of a circuit breaker.
- Move circuit breakers to the test/disconnected position and lock-out/tag-out the circuit breaker racking mechanism to block racking into the connected position before removing rear compartment covers.
- Move auxiliary drawers to the disconnected position and remove fuses before removing rear compartment covers.
- Ground the main and feeder circuits before touching the main bus, bus pads, primary contacts or performing any other inspection and maintenance in the equipment.
- Properly terminate auxiliary cables and the auxiliary cable shields. The cable shielding must be grounded at both ends of termination to the ground bus of each section and the cable stress cones must have adequate clearance from sources of ground potential and from other phases.
- Properly discharge the residual charge on any previously energized auxiliary cables prior to performing work in the equipment.
- Short out the secondary wiring of the current transformers (CTs) on the CT terminal blocks prior to performing maintenance and un-short the terminal blocks prior to turning on this equipment.
- Verify all electrical connections are properly torqued prior to turning on power to this equipment.
- Conduct electrical testing to confirm no short-circuits were created during installation, maintenance, or inspection.
- Never insert a circuit breaker into a circuit breaker compartment that is not complete and functional.

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK EXPLOSION, OR ARC FLASH

- Review the equipment and site drawings to determine if the top or bottom contacts in the circuit breaker compartment and in the switchgear section are the line side. Both can be energized when the circuit breaker is removed from the compartment.
- Disconnect all high-voltage to the switchgear before accessing the horizontal bus compartment.
- Do not use liquid fire extinguishers or water on electrical fires. Before extinguishing fires within the assembly, be absolutely certain the main power source is disconnected and the main and all feeder circuit breakers are open.
- Carefully inspect the work area and remove any tools and objects left inside the equipment.
- Remove any temporary source of low-voltage power prior to re-energizing.
- Do not damage or modify busbar insulation.
- Properly close all bus joint boots before re-energizing this equipment.
- Replace all devices, doors, barriers, plates, panels, and covers before racking the circuit breaker in or out of the connected position and before turning on power to this equipment.
- Do not allow the ambient operating temperatures to exceed the specified limits.
- Provide adequate ventilation at all times to the equipment. Clean, dry, filtered air should be supplied. The ambient operating air must not be polluted by dust, particulates, smoke, corrosive and/or flammable gases, vapors, or salt. Protect the equipment from foreign objects and rodents.
- Handle this equipment carefully and install, operate, and maintain it correctly in order for it to function properly. Neglecting fundamental installation and maintenance requirements may lead to personal injury, as well as damage to electrical equipment or other property.
- Do not make any modifications to the equipment or operate the system with interlocks or barriers removed. Contact the local Schneider Electric representative for additional instructions if the equipment does not function as described in this user guide.
- All instructions in this user guide are written with the assumption that the customer has taken these measures before performing maintenance or testing.

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

Perform inspection and maintenance according to the following intervals:

- *For equipment without any digital health monitoring* - perform maintenance every three (3) years or as operating conditions require. Perform circuit breaker compartment maintenance (refer to the Inspection and Maintenance, page 102 on the Circuit Breaker Compartment, page 108) every 100 circuit breaker racking operations or every three (3) years, whichever occurs first, or as conditions require.
- For equipment with digital health monitoring - if the switchgear and circuit breakers are equipped with Level 4 digital health monitoring system options (TH110 sensors on the switchgear and circuit breaker, CL110 sensors, and e-gap, coil, charging motor, and speed sensors on the circuit breaker), then the maintenance period may be extended to occur every five (5) years or as operating conditions require.
- For equipment with MOCs installed in the breaker compartment(s) - maintenance must be performed on the MOC, at a minimum, according to the number of circuit breaker open and close operations in that compartment (as described in the related inspection and maintenance information in the Circuit Breaker Compartment, page 108).

This recommended frequency is for normal operating conditions and should be increased according to the severity of environmental conditions. Abnormal operation or conditions may require immediate corrective action. If operated beyond the normal service conditions, the equipment may be subject to accelerated aging. The equipment may only be used under conditions other than the normal service conditions with express written permission from Schneider Electric. If the switchgear or circuit breakers are equipped with digital health monitoring system options, then any alerts/warnings/ alarms from it should be immediately assessed and addressed accordingly.

During the inspections listed in this section, the inspector should look for damage, contaminants, or pollutants. When following proper procedure for lock-out and tag-out on the equipment for inspection and maintenance, refer to the section Product Description, page 17 for further information on the following locks that can be applied:

- Blocking racking in a circuit breaker with a padlock or keylock (optional) on the right rail in the circuit breaker compartment (standard).
- Blocking racking in or racking out a circuit breaker with a padlock on the red push button located on the beam of the circuit breaker racking mechanism (standard).
- Blocking accidental tripping of a circuit breaker with a padlock on the cover over the red push button located on the beam of the circuit breaker racking mechanism (optional).
- Locking the circuit breaker compartment primary bus shutters closed with a padlock (standard).
- Locking the front door handles with a padlock or keylock (optional).
- Locking an auxiliary drawer in the disconnected position with a padlock on the floor of the compartment (optional).
- Locking a control power transformer drawer in the connected position with a padlock on the front of the drawer (optional).
- Blocking racking port with a padlock to block racking in or racking out an auxiliary drawer with racking system (optional).

Cleaning

Follow these practices when cleaning SureSeT equipment.

NOTICE
IMPROPER CLEANING PRACTICES • Use only a clean, dry, lint-free cloth to clean the equipment. • Do not use water, alcohol, or other solvents. • Do not use high-pressure air, a pressure washer, or other high-pressure cleaning methods. **Failure to follow these instructions can result in equipment damage.**

SOLVENTS AND ALCOHOL FORBIDDEN

HIGH-PRESSURE CLEANER FORBIDDEN

Main Bus Compartment

To perform inspection and maintenance on the main bus compartment, do the following:

1. Remove the access covers from each main bus compartment.
2. Inspect the busbars, primary contact supports, stand-off insulators, insulator bushing assembly, and insulating pass-through barrier(s) for damage.
3. Remove the insulating boots from the bus joints and inspect all busbar connections. If required, torque all 1/2 inch bolts to 55 lb-ft (75 N•m). See the table Switchgear Bolt Torque Value, page 65.
4. Clean the contact surfaces of the busbars and primary contact with a clean, dry, lint-free cloth.

   NOTE: Slight discoloration or tarnishing of the silver plating may be normal and of no concern. Severe discoloration of the silver plating may be an indication of an improper or loose contact and overheating, harsh atmospheric conditions, or other environmental effects. If due to poor connection, correct the cause of severe discoloration before cleaning. For questions concerning cleaning, repairing, or replacing bus bars, contact the local Schneider Electric representative.
5. Wipe off the insulation with a clean, dry, lint-free cloth.
6. Vacuum the compartment to remove dust, spiderwebs, etc.
7. Re-install and properly close all insulating bus joint boots. Remove all cut wire-tie ends.
8. Replace the covers from each main bus compartment.

Rear Compartment

To perform inspection and maintenance on the rear compartment, do the following:

1. Remove the removable rear compartment covers.
2. Inspect the following for indications of damage or insulation deterioration:
   - all busbar connections
   - stand-off insulators
   - primary contact supports
   - insulator bushing assembly
   - all accessible cable terminations
3. If required, remove the insulating boots from the bus joints and inspect all busbar connections. If required, torque all 1/2 inch bolts to 55 lb-ft (75 Nm). See Switchgear Bolt Torque Value, page 65.
4. If required, clean the contact surfaces of the busbars and primary contact with a clean, dry, lint-free cloth.

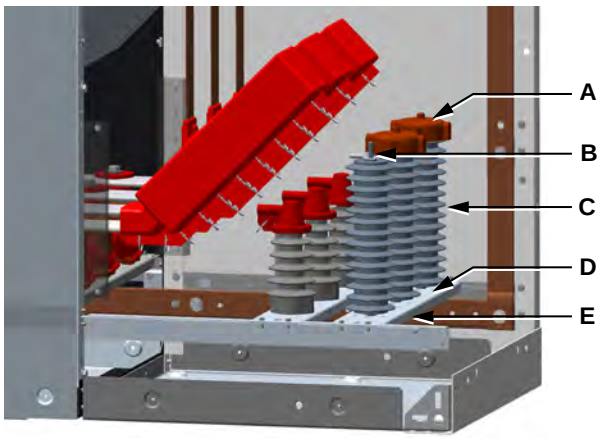
   NOTE: Slight discoloration or tarnishing of the silver plating is normal and of no concern. Severe discoloration of the silver plating may be an indication of an improper or loose contact and overheating, harsh atmospheric conditions, or other environmental effects. If due to poor connection, correct the cause of severe discoloration before cleaning. For questions concerning cleaning, repairing, or replacing bus bars, contact the local Schneider Electric representative.
5. Wipe off the insulation with a clean, dry, lint-free cloth.
6. Vacuum the compartment to remove dust, spiderwebs, etc.

7. If any boots were removed in order to torque busbar connections, reinstall and properly close all the insulating bus joint boots. Remove all cut wire-tie ends.
8. Replace the removable rear compartment covers.

To replace a surge arrester (or lightning arrester (LA)) (see the figure Replacing a Surge Arrester, page 107):

1. Enter through the rear compartment.
2. Remove the surge arrester boot.
3. Disconnect the primary connection at the top of the surge arrester.
4. While supporting the surge arrester, unbolt it from the support pan.
5. Remove the surge arrester from the compartment.
6. Install the new surge arrester by following the steps above in reverse order
7. Torque all fasteners as specified in the table Switchgear Bolt Torque Value, page 65.

Figure 72 - Replacing a Surge Arrester

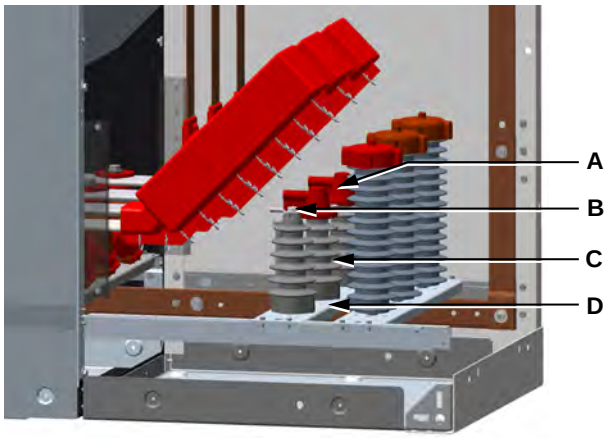


A	Boot	**C**	Surge arrester	**E**	Ground bus (located under support pan)
B	Primary connection (boot removed for clarity)	**D**	Support pan		

To replace a live line indicator (LLI) (see the figure Replacing a Live Line Indicator):

1. Enter through the rear compartment.
2. Remove the LLI boot.
3. Disconnect the primary connection at the top of the LLI.
4. While supporting the LLI, unbolt it from the support pan.
5. Remove the LLI from the compartment.
6. Install the new LLI by following the steps above in reverse order
7. Torque all fasteners as specified in the table Switchgear Bolt Torque Value, page 65.

Figure 73 - Replacing a Live Line Indicator



A	Boot	**B**	Primary connection (boot removed for clarity)	**C**	Live line indicator (LLI)	**D**	Support pan

To replace a surge capacitor:

1. Enter through the rear compartment.
2. Disconnect all wring connections.
3. While supporting the surge capacitor, unbolt it from the support pan.
4. Remove the surge capacitor from the compartment.
5. Install the new surge capacitor by following the steps above in reverse order
6. Torque all fasteners as specified in the table Switchgear Bolt Torque Value, page 65.

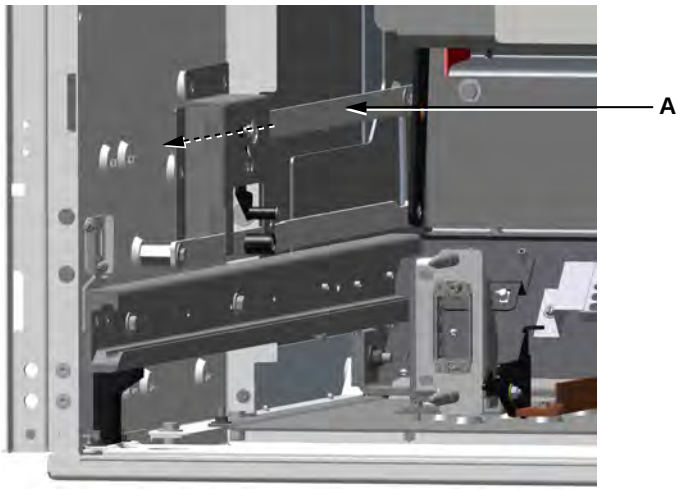
To replace a zero sequence current transformer (ZSCT):

1. Enter through the rear compartment.
2. Disconnect all ZSCT wring connections.
3. Disconnect the primary cable connections.
4. While supporting the ZSCT, unbolt it from the support pan.
5. Remove the ZSCT from the primary cables and compartment.
6. Install the new ZSCT by following the steps above in reverse order
7. Torque all fasteners as specified in the table Switchgear Bolt Torque Value, page 65.

Circuit Breaker Compartment

NOTE: For the purpose of maintenance, the shutter interlock that blocks shutter operation when a circuit breaker is not in the compartment can be defeated by pulling the shutter interlock towards the front of the compartment and holding it in position while simultaneously opening the shutters (see the figures Compartment Interlocks, page 30 and Opening Shutters without a Circuit Breaker). After inspection and maintenance is complete, hold the shutter interlock in the forward position again and simultaneously close the shutters. Make sure the shutters are fully closed so that releasing the shutter interlock blocks opening of the shutters. If the shutter interlock is not in the correct position, the circuit breaker can not be fully inserted into the compartment.

Figure 74 - Opening Shutters without a Circuit Breaker



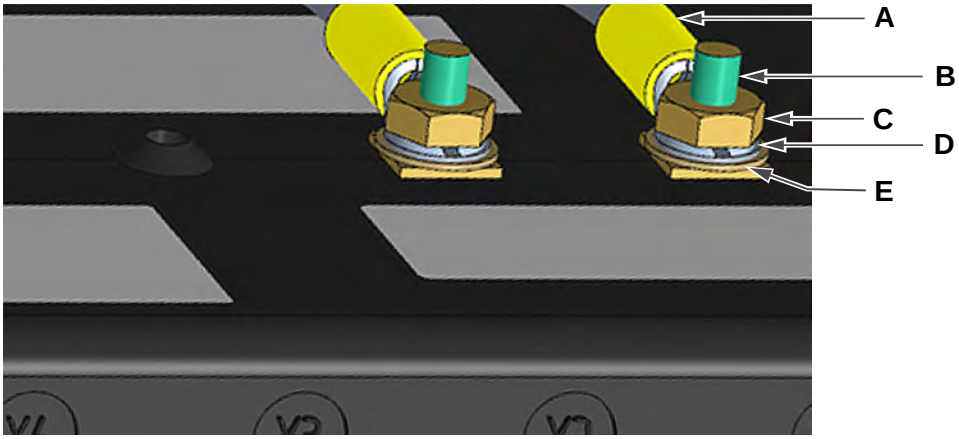
A	Shutter Interlock

1. If the circuit breakers are installed, withdraw each one from its compartment and thoroughly inspect each of the moving mechanisms in the compartment for damage and contamination/pollution.
2. Inspect the shutter hardware and tighten if necessary. The shutters should raise and lower smoothly with no indication of binding, twisting, hesitation, obstruction, or hindrance.
3. Inspect the stationary primary contacts (located inside bushings in the circuit breaker compartment). The stationary primary contacts should have a silver-gray appearance, indicating good contact with the circuit breaker primary contacts. Slight discoloration or tarnish of the silver plating on the primary contact is normal. Severe discoloration of the silver plating may be an indication of excessive heating and must be corrected. For questions on the contacts contact the local Schneider Electric representative. Typical causes of severe discoloration are:
   - Poor contact between the circuit breaker finger cluster and the stationary primary contacts
   - Loose hardware or otherwise improper contact at the riser bus connection
   - Harsh atmospheric conditions or other environmental effects.
4. If there are no overheating issues:
   a. Clean the stationary primary contacts with a clean, dry, lint-free cloth.
   b. Re-apply grease (see Switchgear Grease Information, page 65) to the stationary primary contacts in the area where the circuit breaker finger clusters make contact.
   c. Retighten the riser bus mounting bolts on the rear of the stationary primary contacts to the proper torque. See the table Switchgear Bolt Torque Value, page 65.
5. Inspect the stationary primary contacts and support insulators for damage. Contact Schneider Electric if there is any damage.
6. Inspect the ground bus contact bar. It should have visible signs of contact via tracks in the grease and marks on the bus indicating good contact with the circuit breaker sliding ground contact. Clean the contact surfaces, removing grease and dirt buildup. Inspect and tighten the hardware and re-grease along the entire length of the vertical flange of the ground bus contact bar with grease (see Switchgear Grease Information, page 65).

7. Inspect the secondary disconnect receptacle, verifying the molding is free of cracks, the contact pin holes are clean, and the assembly is free to move. Clean the front and back surfaces of the receptacle to remove any contamination buildup.
8. Vacuum the compartment to remove dust, spiderwebs, etc.
9. Wipe off the primary contact high voltage insulating tubes of the bushing assembly and support insulation with a clean, dry, lint-free cloth.
10. Lightly lubricate the moving primary and secondary contacts and fingers with grease (see Switchgear Grease Information, page 65).
11. Lubricate all moving joints on the shutter mechanisms, TOC (if installed), and others with grease (see Switchgear Grease Information, page 65).
12. Lubricate the path of the circuit breaker pin along the automatic discharge plate with grease (see Switchgear Grease Information, page 65).
13. Check all terminal block connections for loose connections and crimps.
14. Check all current transformer (CT) wires for loose connections and crimps. CT secondary terminal connections should have one brass plain washer, one bronze lock washer, and one brass nyloc nut for each #8-32 brass stud (see the figure Current Transformer Secondary Terminal Connection). The nyloc nut should be torqued to 18–21 in-lbs (2.0–2.3 N•m). Do not torque over the maximum of 21 in-lbs (2.3 N•m).

    NOTE: The secondary wiring of the current transformers (CTs) should be shorted-out on the low voltage compartment CT terminal blocks prior to performing maintenance and un-shorted prior to re-energizing the switchgear.

Figure 75 - Current Transformer Secondary Terminal Connection

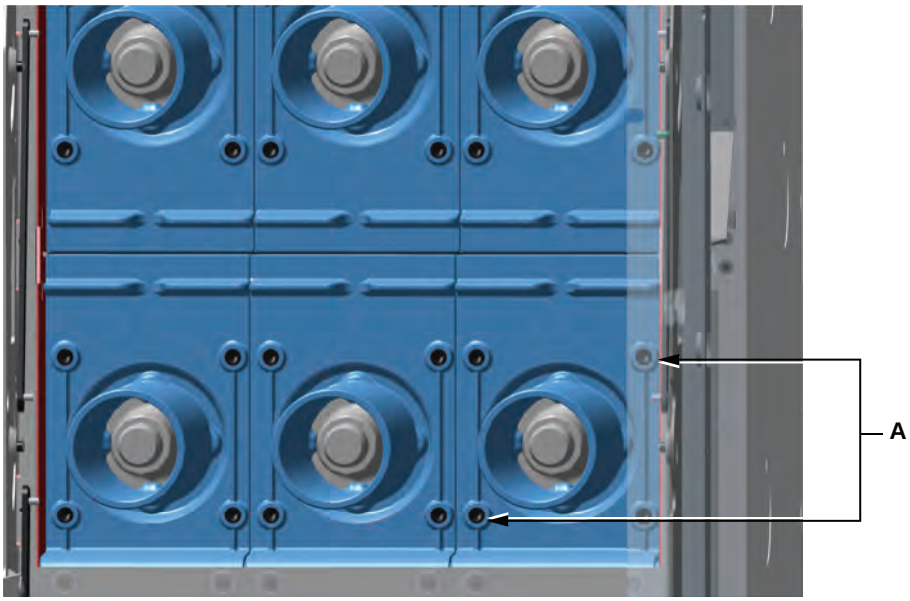


A	CT secondary wire termination	**C**	Brass nyloc nut	**E**	Brass plain washer
B	#8-32 brass stud	**D**	Bronze lock washer		

15. Check all CT mounting bolts for loose connections (see the figure Current Transformer Mounting Hardware, page 111). All CT mounting bolts (see the Figure Current Transformer Mounting Hardware, page 111) should be torqued to 7–10 ft-lbs (9.5–13.5 N•m) and Loctite 242 Removable Strength applied to clean threads of each bolt and threaded insert on bushing assembly. Do not torque over the maximum of 10 ft-lbs (13.5 N•m). If a CT must be replaced, hold the CT centered on the axis of the tube of the bushing and do not rest the weight of the CT on the tube of the bushing during removal or installation of the CTs. To replace the CT, the shutters will need to be fully open. Refer to the note at the beginning of the Circuit Breaker Compartment, page 108 section and the figure Compartment Interlocks, page 30 for shutter opening instructions.

    NOTE: The secondary wiring of the current transformers (CTs) should be shorted-out on the low voltage compartment CT terminal blocks prior to performing maintenance and un-shorted prior to re-energizing the switchgear.

Figure 76 - Current Transformer Mounting Hardware



A	3/8 in Belleville (conical) washer (~0.4 in. ID x 0.88 in. OD) with 4.5 in. or 8.0 in. long, 3/8–16 SAE Grade 5 (minimum) hex head bolt (length is determined by the CT configuration)

16. If installed, check all MOC and TOC auxiliary switches for loose connections and crimps. All screws should be torqued to 9–12 in-lbs (1.0–1.3 N•m). Do not torque over the maximum of 12 in-lbs (1.3 N•m)
17. If a MOC is installed, after the stated number of operations of a circuit breaker opening and closing it, contact the local Schneider Electric representative to perform the following required routine maintenance on the MOC unit in the circuit breaker compartment:
    - after the first 6,000 cycles and every 5,000 cycles after - lubricate all moving contact surfaces and joints with grease (see Switchgear Grease Information, page 65).
    - after every 10,000 cycles - replace the MOC welded plate and return spring (see Current Transformer Mounting Hardware, page 111).
18. Make sure the hinge wiring to the door is not frayed and has no insulation damage.
19. Make sure all wires are routed through the hinge loop.

Circuit Breakers

Consult the circuit breaker user guide for instructions on inspection, maintenance, cleaning, adjustment, and lubrication.

Refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for more information.

CPT and VT Compartment and Drawer

Follow these steps to perform inspection and maintenance procedures on CPTs and VTs:

1. Pull the drawer onto extended extension rails to the fully removed position.
2. Inspect the moving and stationary primary and secondary contacts and the static ground contacts. Inspect for any signs of burns or pit marks.
3. Clean the contact surfaces with a clean, dry, lint-free cloth.
4. Remove the insulating boots from the primary fuses, if installed. Visually inspect the primary current-limiting fuses for possible damage. While wearing personal protective equipment such as insulated gloves, a face shield, and other appropriate personal protective equipment (PPE) per NFPA 70E, NOM-029-STPS-2011, or CSA Z462, remove each fuse by grasping the fuse near the fuse clip on the fuse cap and pulling while rotating the fuse. If unable to remove the fuse by hand, a flat head screwdriver may be used to gently pry between the fuse clip and the fuse cap to assist in removing. After one end of the fuse is out of the fuse clip, the other end should easily rotate out of the fuse clip.

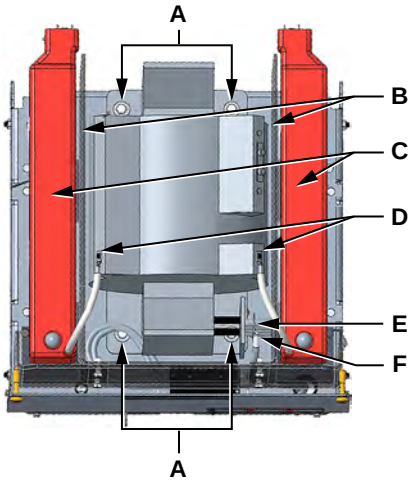
   NOTE: When removing or inserting fuses, handle the fuses carefully to avoid breakage. Do not grasp a fuse in the middle. Only apply force on the end of the fuse at the fuse cap area. If even one fuse is damaged, the cause should be identified and corrected, and all fuses in the drawer must be replaced.
5. Once all fuses are removed, inspect the fuse clips and fuse contact surfaces.
6. Inspect the transformer for indication of insulation deterioration.
7. Check all hardware, including the secondary contact wiring terminals, for tightness. Refer to the torque values in the table Switchgear Bolt Torque Value, page 65.
8. Vacuum the compartment and drawer to remove dust, spiderwebs, etc.
9. Wipe off the auxiliary compartment and drawer insulation and the control power or voltage transformer with a clean, dry, lint-free cloth.
10. Lightly lubricate the moving primary and secondary contacts and fingers with grease (see Switchgear Grease Information, page 65).
11. Lubricate all shutter rollers and sliding parts with grease (see Switchgear Grease Information, page 65).
12. Inspect all applicable interlock mechanisms in the auxiliary compartments for proper operation, i.e., CPT secondary circuit breaker interlock lever, padlock mechanisms, etc.
13. Reinstall all the current-limiting fuses by inserting the fuses one end at a time into the fuse clips.
14. If any insulating boots were removed, reinstall and properly close all boots. Remove all cut wire-tie ends.
15. Leave the drawer in the removed position until all inspection and maintenance procedures are complete.

To replace the CPT, it is recommended to remove the CPT drawer from the extension rails and place on a secure working surface. Prepare and use a SureSeT lift truck to remove the auxiliary drawer from the auxiliary compartment. For instructions on using

the lift truck, refer to the section SureSeT Circuit Breaker/Auxiliary Drawer Lift Truck, page 116. Then perform the following steps:

1. Unbolt the polycarbonate barrier but do not remove.
2. Disconnect the primary wiring connections from the CPT.
3. Remove the fuse assembly and temporarily set aside.
4. Remove the polycarbonate barrier and temporarily set aside.
5. Disconnect all the secondary wiring connections from the CPT.
6. Disconnect the ground wiring connection from the CPT.
7. Unbolt the CPT from the drawer pan.
8. Remove the CPT from the drawer using an appropriate lifting device.
9. Install the new CPT by following the steps above in reverse order and applying proper torque to all fasteners per the table Switchgear Bolt Torque Value, page 65.

Figure 77 - CPT Drawer



A	3/8–16 x 1.25 in. SAE Grade 5 (minimum) hex head bolt with 3/8 in. Belleville (conical) washer	**C**	Primary current-limiting fuse insulating boots and fuse assembly	**E**	Secondary low voltage connections
B	Polycarbonate barriers	**D**	Primary high voltage connections	**F**	Ground connection

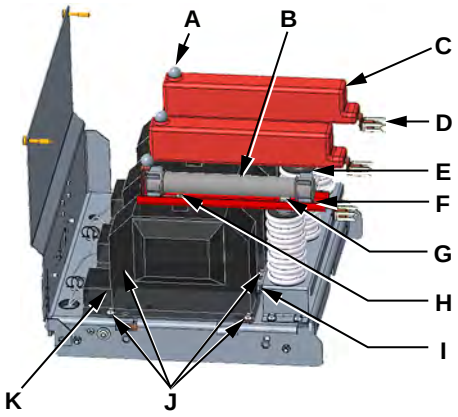
To replace the VT, it is recommended to remove the VT drawer from the extension rails and place on a secure working surface. Prepare and use a SureSeT lift truck to remove the auxiliary drawer from the auxiliary compartment. For instructions on using the lift truck, refer to the section SureSeT Circuit Breaker/Auxiliary Drawer Lift Truck, page 116. Then perform the following steps:

1. Remove the primary fuse insulating boot.
2. While wearing personal protective equipment such as insulated gloves, a face shield, and other appropriate personal protective equipment (PPE) per NFPA 70E, NOM-029-STPS-2011, or CSA Z462, remove each primary fuse by grasping the fuse near the rear fuse clip on the fuse cap and pulling while rotating the fuse. If unable to remove the fuse by hand, a flat head screwdriver may be used to gently pry between the fuse clip and the fuse cap to assist in removing. After one end of the fuse is out of the fuse clip, the other end should easily rotate out of the fuse clip.

   NOTE: When removing or inserting fuses, handle the fuses carefully to avoid breakage. Do not grasp a fuse in the middle. Only apply force on the end of the fuse at the fuse cap area. If a fuse is damaged during removal/insertion, it must be replaced.

3. Unbolt the primary fuse support tray.
4. Disconnect the secondary wiring connections from the VT.
5. Disconnect the ground wiring connection from the VT.
6. Unbolt the VT from the drawer pan.
7. Remove the VT from the drawer.
8. Install the new VT by following the steps above in reverse order and applying proper torque to all fasteners per the table Switchgear Bolt Torque Value, page 65.

Figure 78 - VT Drawer



A	Primary ground	**E**	Primary contacts	**I**	Ground connection
B	Primary fuse (boot not shown for clarity)	**F**	Primary fuse support tray	**J**	3/8–16 x 0.75 in. SAE Grade 5 (minimum) flanged hex head bolt
C	Primary fuse insulating boot	**G**	1/2–13 x 1 in. SAE Grade 5 (minimum) hex head bolt with 1/2 in. lock washer and 1/2 in. flat washer (~1.06 in. O.D.)	**K**	Secondary connection
D	Rear primary fuse clip	**H**	M10 x 1.5 x 20 mm Grade 10.9 (minimum) button head hex socket bolt with M10 Belleville (conical) washer (~0.84 in. O.D.)		

Low Power Voltage Transformers (LPVTs)

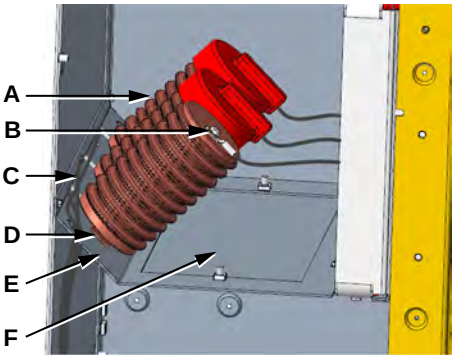
Follow these steps to perform inspection and maintenance procedures on LPVTs :

1. Enter through the compartment below the LPVT compartment and remove the access panel to the LPVTs (see the figure LPVT Compartment).
2. Inspect the LPVT and wiring.
3. Inspect the insulating boots and auxiliary bushings for indication of insulation deterioration.
4. Check all hardware, including both ends of the primary connection wiring, for tightness. Refer to torque values in the table Switchgear Bolt Torque Value, page 65.
5. Vacuum out the compartment to remove dust, spiderwebs, etc.
6. Wipe off the insulation and LPVTs with a clean, dry, lint-free cloth.
7. Reinstall insulating boots and the access panel.

To replace an LPVT (see the figure LPVT Compartment):

1. Enter through the compartment below the LPVT compartment and remove the access panel to the LPVTs.
2. Remove the insulating boot on the LPVT.
3. Disconnect the primary connection from the top of the LPVT.
4. Disconnect the LPVT secondary cable from the low voltage instrumentation compartment wiring.
5. While supporting the LPVT, unbolt it from the LPVT support pan.
6. Remove the LPVT and its secondary cable from the compartment.
7. Install the new LPVT by following the steps above in reverse order and applying proper torque to all fasteners per the table Switchgear Bolt Torque Value, page 65.

Figure 79 - LPVT Compartment



A	LPVT	**C**	Secondary wiring	**E**	Support pan
B	Primary connection (boot not shown for clarity)	**D**	Ground bus	**F**	Access panel

Re-energizing

To re-energize the equipment, perform the following steps:

1. Insert all the circuit breakers in each section to the test/disconnected position.
2. Engage the top secondary disconnect receptacles for circuit breaker power and control into the circuit breaker plugs in the test/disconnected position.
3. Remove the ground from the main and feeder circuits. Make sure all insulating boots are properly closed.
4. Install and bolt all rear compartment covers.
5. Connect and close the control power source.
6. Operate each circuit breaker electrically in the test/disconnected position.
7. If all controls are functioning properly, disconnect the top secondary disconnect receptacles and push each of the receptacles back to the latched, circuit breaker racked-in position.
8. Properly close and latch all front compartment doors (refer to the section Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77).
9. Rack the circuit breakers into the connected position.
10. Energize the incoming high voltage circuits.
11. Electrically close the main circuit breaker, then the feeder breakers, and then turn on loads one at a time and resume normal operation.

Accessories

This section provides information about the accessories for use with the SureSeT assembly, such as the following:

- Racking and Charging Handle
- SureSeT Circuit Breaker Lift Truck
- Test Cabinet—(Optional)

Racking/Charging Handle

The racking/charging handle can be stored in clips mounted on the end sheet of the section at the end of a line-up. This handle is used to:

- Rack a circuit breaker into and out of the connected position
- Manually charge the springs of the circuit breaker
- Rack an auxiliary drawer into and out of the connected position within the auxiliary compartment, if the drawer/compartment is equipped with a racking system

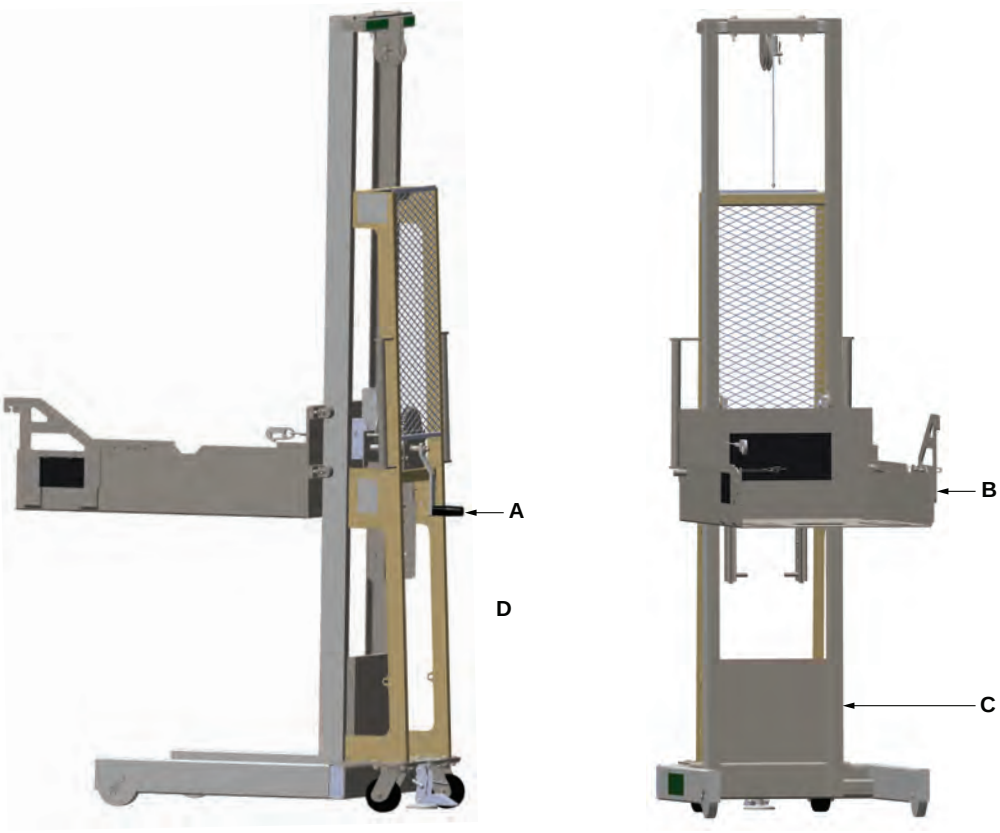
SureSeT Circuit Breaker/Auxiliary Drawer Lift Truck

This section provides operating instructions for the SureSeT lift truck. This lift truck can be used only for Square D™ brand EvoPacT circuit breakers and auxiliary drawers in SureSeT switchgear, including:

- EvoPacT circuit breakers of all ratings
- Control Power Transformer (CPT) Drawers for SureSeT switchgear
- Voltage Transformer (VT) Drawers for SureSeT switchgear

NOTE: One circuit breaker lift truck (see the figure SureSeT Lift Truck, page 117) is required for a SureSeT switchgear line-up. Do not use other lift trucks with SureSeT switchgear.

Figure 80 - SureSeT Lift Truck



A	Winch handle	**B**	Platform	**C**	Base	**D**	Operator's position

The SureSeT lift truck features a self-braking worm and pinion drive system with a winch and wire cable. No ratchet release or locking is required because of the automatic, load-retaining, clutch feature. The platform is raised and lowered using the winch handle. Rotating the handle clockwise raises the platform. Rotating the handle counterclockwise lowers the platform.

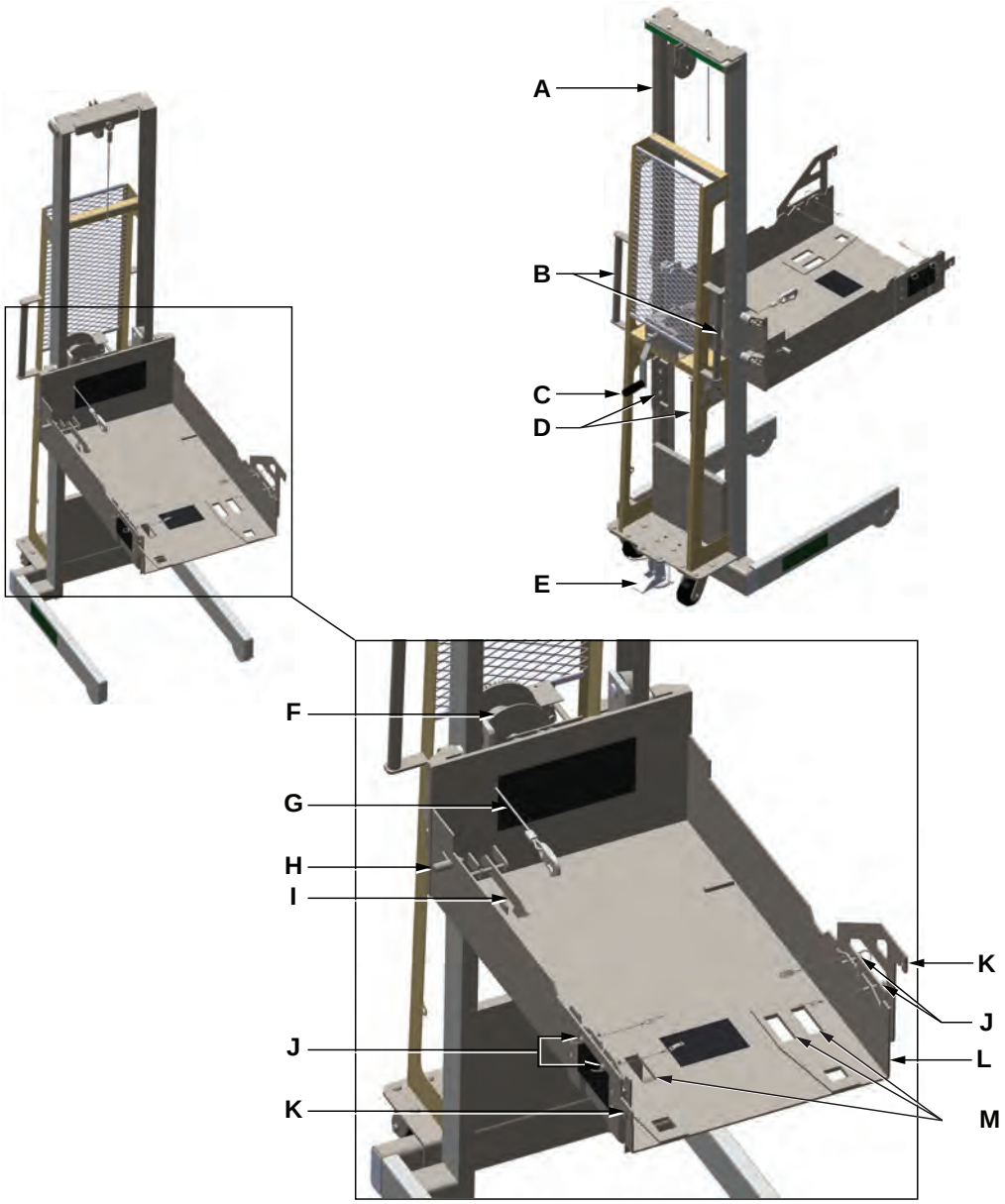
NOTE: The lift truck is designed to service Square D™ brand EvoPacT circuit breakers and auxiliary drawers (VTs/CPTs) only in SureSeT switchgear. Please refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for more information.

Lift Truck Specifications

The specifications for the lift truck are:

- Maximum capacity: 425 lbs. (193 kg)
- Maximum raised height: 76 in. (1.93 m)

Figure 81 - Lift Truck Components



A	Base	**F**	Winch	**K**	Front hook—circuit breaker compartment
B	Handle	**G**	Safety cable—circuit breaker	**L**	Platform
C	Winch handle	**H**	Automatic latch release handle	**M**	Hoist attachment points—D-position auxiliary drawer
D	Auxiliary adapters storage	**I**	Automatic latch hook—circuit breaker		
E	Foot pedal locking brake	**J**	Quick release pins—A,B,C-position auxiliary drawer		

Lift Truck Usage

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- Turn off all power sources to this equipment before working on or inside the equipment or performing maintenance on the equipment. Assume all circuits are live until completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power. Check interconnection diagrams and make sure there are no potential backfeed sources.
- Always use a properly rated voltage sensing device to confirm power is off.
- Operate the lift truck only after reading and understanding the instructions contained in this user guide, all labeling on the lift truck, and other user guides referenced in this material.

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

A lift truck is required for inserting or removing devices at the following locations (see the figure Compartment Positions in a Section, page 19):

- Upper and lower circuit breaker compartments
- Auxiliary drawer compartments A, B, C, and D

⚠WARNING

LIFT TRUCK TIPPING

- The lift truck must be operated only by qualified personnel. Only qualified personnel familiar with the lift truck are to perform work described in this set of instructions. Qualified personnel must be trained to use the lift truck with SureSeT equipment and understand the hazards involved in working with the lift truck.
- Operate the lift truck only after reading and understanding the instructions contained in this user guide, all labeling on the lift truck, and other user guides referenced in this material.
- Understand the lift truck limitations and operate the lift truck in a safe manner so as not to cause injury to personnel. Safeguard pedestrians at all times.
- Never use a lift truck that shows signs of wear or damage. Visually inspect the lift truck before each use. Check for abnormal conditions such as cracked welds, damaged parts, missing parts, or loose parts. Inspect the lift truck immediately if the lift truck is believed to have been subjected to an abnormal load or shock. If damage has occurred to the lift truck, remove from service immediately until repairs have been properly made.
- Use the lift truck only to service Square D™ brand EvoPacT circuit breakers and auxiliary drawer compartments in SureSeT switchgear.
- Only use the lift truck with Square D™ brand EvoPacT circuit breakers and auxiliary drawers. Never use this lift truck with other any other devices, objects, equipment, or personnel.

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

⚠WARNING

LIFT TRUCK TIPPING

- Do not use the lift truck to lift more than one device at a time.
- Do not operate the lift truck from any other place than behind the lift truck at the operator's position.
- Do not push on the lift truck from the side.
- Do not modify the lift truck.
- Do not touch the lifting mechanism, winch, or winch cable. Never put any part of the body into the base structure.
- Do not touch the lift truck platform as it is being raised or lowered.
- Keep all feet clear of the lift truck platform when lowering and of the lift truck when moving.
- Do not allow anyone to stand or pass under the lift truck platform.
- Slowly lower and raise the lift truck platform manually using only the winch handle.
- Always lower the lift truck platform before moving the lift truck.
- Always slowly move the lift truck with the platform lowered as close to floor as possible.
- Engage the foot pedal locking brake before leaving lift truck unattended or moving the circuit breaker or auxiliary drawer onto the lift truck.
- Use the foot pedal locking brake only to hold the truck in a desired position on a level surface with the lift truck already at a complete stop.
- Do not leave a lift truck unattended with the platform raised.
- Use lift truck only on smooth, hard, level surfaces capable of sustaining the load.
- Use lift truck only in areas free from gaps, floor drains, etc.
- Use lift truck only in areas free of debris and liquids.
- Do not use the lift truck on ramps or inclines.
- Maintain a safe distance with the lift truck from the edge of ramps, inclines, and platforms.
- Always confirm both lift truck front hooks are seated correctly in the circuit breaker compartment side sheet hook slots before the circuit breaker is rolled out onto the lift truck platform.
- Always use the lift truck cable hoist hook on the circuit breaker and verify the lift truck automatic latch hook is engaged before moving.

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

Before using the lift truck, read and understand the instructions contained in this user guide, all labeling on the lift truck, and other user guides referenced in this material. Visual inspection of the lift truck shall be made before each use of the lift truck. Check for abnormal conditions such as cracked welds, damaged parts, missing parts, or loose parts. Inspect the lift truck immediately if the lift truck is believed to have been subjected to an abnormal load or shock. If damage has occurred to the lift truck, contact the local Schneider Electric representative and remove the lift truck from service immediately until repairs have been properly made.

Removing a Circuit Breaker

Before using the lift truck, make sure:

- The circuit breaker is in the test/disconnected position and the circuit breaker is open.

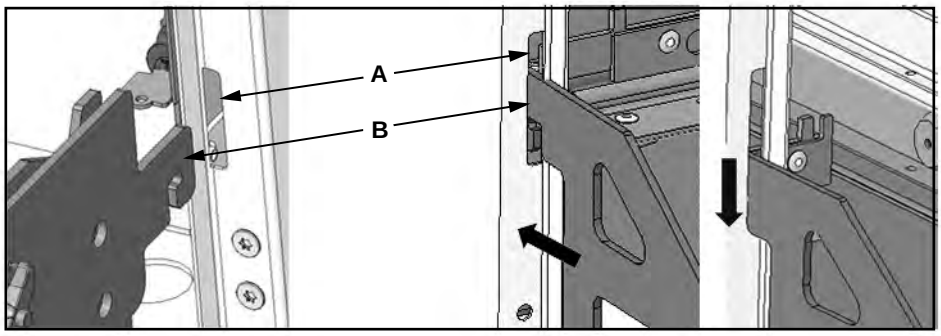
  NOTE: The circuit breaker is in the test/disconnected position when the circuit breaker position indicator shows this state (refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for further information) and the circuit breaker carrier pan is flush with the back of the integrated racking mechanism beam, (see the figure Locking Tabs Fully Extended Into the Latch Plates, page 27).

- The circuit breaker compartment door is open (refer to the section Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77) with the automatic door stay latch engaged (see the figure Hinged Door with Low Voltage Device Panel and Automatic Door Stay Latch, page 20).
- All power sources to this equipment are off.

To remove a circuit breaker from a circuit breaker compartment with the lift truck, follow these steps (see the figure Hooking Lift Truck Platform to Circuit Breaker Compartment, page 121):

1. Using the lift truck handles, push the lift truck toward the circuit breaker compartment, keeping the lift truck platform square with the front of the compartment.
2. Raise the platform until the front hooks on each side of the platform align with the hook slots on the switchgear side sheets of the circuit breaker compartment.
3. Push the lift truck toward the circuit breaker compartment until the hooks enter the hook slots and the hooks clear the sidesheets.
4. Lower the platform until the front hooks are securely held by the side sheets and the hooks make contact with the bottom edge of the hook slots.

Figure 82 - Hooking Lift Truck Platform to Circuit Breaker Compartment



A	Hook slot	**B**	Front hook

5. Lock the lift truck with the foot pedal locking brake.
6. Simultaneously, pull the left and right green handles located on the beam of the circuit breaker racking mechanism in towards the center of the circuit breaker to pull in the locking tabs. This will disengage the circuit breaker from the compartment latch plates, allowing it to move out of the circuit breaker compartment.

7. Pull the circuit breaker out of the circuit breaker compartment onto the lift truck. The front, center of the circuit breaker carrier pan can be used to assist in pulling the circuit breaker out of the compartment.

   NOTE: As the circuit breaker is withdrawn from the compartment onto the lift truck, the circuit breaker will automatically open, if it is closed, and a loud noise will occur as the spring discharges. This action is made to automatically discharge the spring mechanism in case the circuit breaker was not opened or if the mechanism springs were not discharged before withdrawing. A circuit breaker equipped with a mechanism charging motor, may automatically perform an open, close, and second open operation with three separate loud noises as the circuit breaker mechanism discharges all of the stored energy during the removal of the circuit breaker. For further information on the automatic spring discharge, refer to section Compartment Interlocks, page 29.

8. Roll the circuit breaker onto the lift truck until it latches with the automatic latch hook.
9. Attach the provided lift truck safety cable onto the two slot openings in the circuit breaker front pan.

   NOTE: Verify that both the latch and cable are in place and the breaker cannot be moved back towards the switchgear.

10. Slowly raise the platform until it clears the hook slots on each side of the circuit breaker compartment.
11. Unlock the lift truck with the foot pedal locking brake.
12. Move the lift truck with the circuit breaker away from the compartment only until the lift truck clears the compartment, then lower the platform to the floor.
13. To remove the circuit breaker from the lift truck, disconnect the safety cable from the front pan of the circuit breaker.
14. Push the circuit breaker slightly toward the back of the platform and release the automatic latch hook by pulling up the lever on the right side of the platform.
15. While holding the lever, push the circuit breaker towards the front of the platform until the circuit breaker clears the automatic latch hook.
16. Release the lever and push the circuit breaker completely off the platform.

Inserting a Circuit Breaker

Before using the lift truck, make sure:

- The circuit breaker is in the test/disconnected position and the circuit breaker is open.

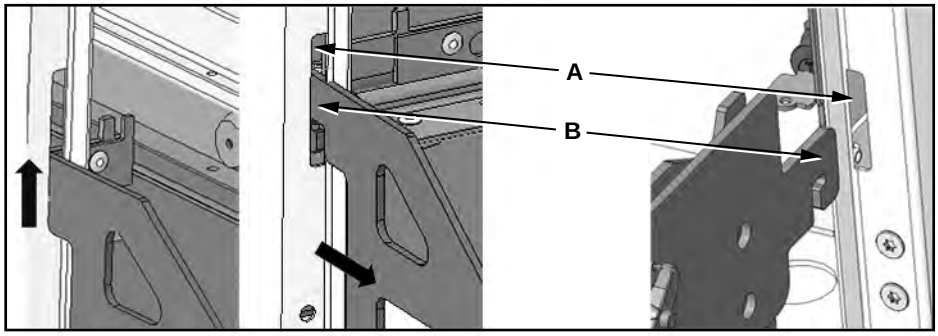
  NOTE: The circuit breaker is in the test/disconnected position when the circuit breaker position indicator shows this state (refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for further information) and the circuit breaker carrier pan is flush with the back of the integrated racking mechanism beam, (see the figure Locking Tabs Fully Extended Into the Latch Plates, page 27).

- The customer order drawings and nameplates are correct, and that the secondary disconnect labels coordinate on the circuit breaker and the circuit breaker compartment (see Coordinating Circuit Breaker Compartment and Circuit Breaker Top Cover Secondary Disconnect Labels, page 33) to verify the circuit breaker is installed into the proper compartment.
- The circuit breaker compartment door is open (refer to the section Front Compartments (Circuit Breaker/Auxiliary/LV) Door Operation, page 77) with the automatic door stay latch engaged (see the figure Hinged Door with Low Voltage Device Panel and Automatic Door Stay Latch, page 20).
- All power sources to this equipment are off.

To install a circuit breaker into a circuit breaker compartment with the lift truck, follow these steps (see the figure Unhooking Lift Truck Platform from Circuit Breaker Compartment, page 123):

1. Lock the lift truck with the foot pedal locking brake.
2. Lower the lift truck platform to the surface the breaker is on and roll the circuit breaker onto the lift truck with the front cover of the circuit breaker facing towards the lift truck base, until it latches with the automatic latch hook.
3. Attach the provided lift truck safety cable onto the two slot openings in the circuit breaker front pan.
4. Raise the platform until the front hooks on each side of the platform align with the hook slots on the switchgear side sheets of the circuit breaker compartment.

Figure 83 - Unhooking Lift Truck Platform from Circuit Breaker Compartment



A	Hook slot	**B**	Front hook

5. Unlock the lift truck with the foot pedal locking brake.
6. Push the lift truck toward the circuit breaker compartment until the front hooks enter the hook slots and the hooks clear the switchgear side sheets.
7. Lower the platform until the front hooks are securely held by the side sheets and make contact with the bottom edge of the hook slots.
8. Lock the lift truck with the foot pedal locking brake.
9. Disconnect the safety cable from the front pan of the circuit breaker.
10. Push the circuit breaker slightly toward the back of the lift truck platform, towards the lift truck base.
11. Release the automatic latch hook by pulling up the release handle on the right side of the platform.
12. While holding the lift truck release handle up, move the circuit breaker towards the circuit breaker compartment until the circuit breaker clears the automatic latch hook.
13. Simultaneously pull the left and right green handles on the beam of the circuit breaker racking mechanism towards the center of the circuit breaker. Refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for further information.

    NOTE: The circuit breaker racking mechanism locking tabs must be manually retracted, in this manner, during circuit breaker insertion into the circuit breaker compartment to avoid interference because the racking mechanism locking tabs will not automatically retract or slide on the compartment latch plates. Inserting the circuit breaker without these locking tabs retracted could damage the circuit breaker and/or the switchgear.
14. Align the rail wheels on each side of the circuit breaker with the positioning rails mounted on the side walls of the circuit breaker compartment.

15. Push on the racking mechanism beam with the handles retracted. Do not push on the front circuit breaker covers or at the top of the circuit breaker. This might cause damage to the circuit breaker or potentially cause the circuit breaker to tip over. Take care to move the circuit breaker straight in off of the lift truck platform into the circuit breaker compartment, so that any extensions from the sides of the circuit breaker (i.e. TOC pin, MOC roller, automatic spring discharge pin) do not hit or get caught on the side sheets of the circuit breaker compartment. Refer to Schneider Electric document number JYT3013100, *EvoPacT MV Vacuum Circuit Breaker* for further information.
16. Push the circuit breaker into the compartment until the racking mechanism beam contacts the back flanges on the compartment latch plates mounted on the left and right positioning rails.
17. Release the left and right green handles and engage the locking tabs on the left and right sides of the circuit breaker racking mechanism with the slots on the compartment racking mechanism latch plates, (see the figure Locking Tabs Fully Extended Into the Latch Plates, page 27). Make sure both of the racking mechanism locking tabs are fully extended into these compartment latch plate slots. Otherwise, it will not be possible to mechanically or electrically rack the breaker. The circuit breaker is now positioned in the compartment in the test/disconnected position.

    NOTE: If the circuit breaker does not easily roll into the circuit breaker compartment, remove the circuit breaker. If necessary, pull the left and right beam handles in to release the circuit breaker from the test/disconnected position. Repeat process. If satisfactory results are not achieved, contact Schneider Electric.
18. Once the circuit breaker has been placed into the compartment, slowly raise the lift truck platform until the front hooks clear the hook slots on each side of the compartment.
19. Move the lift truck away from the compartment only until it is clear of the compartment, then lower the platform to the floor.

Removing Auxiliary Drawers

The auxiliary compartment contains two sets of rails for rolling auxiliary drawers into and out of the auxiliary compartment. One set is stationary, while the other set (the extension rails) is movable. Before removing an auxiliary drawer, make sure the auxiliary compartment door is open, the automatic door latch is engaged to hold the door open, and the extension rails are fully extended (see the figure Extension Rails in Fully Extended Position, page 91).

Removing Auxiliary Drawers From Compartments A, B, and C

Before using the SureSeT lift truck to remove an auxiliary drawer from compartment A, B, or C, read and understand the instructions contained in this user guide, all labeling on the lift truck, and other user guides referenced in this material.

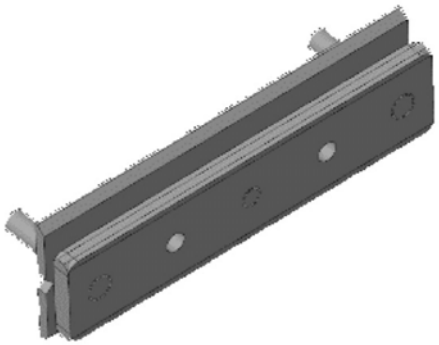
⚠WARNING

FALLING OBJECT

- Use adapters and quick release pins to secure auxiliary device to pan.

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

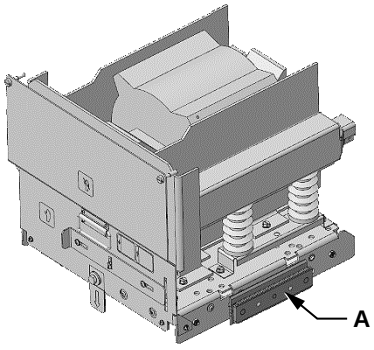
Figure 84 - Auxiliary Drawer Lifting Adapter



To remove an auxiliary drawer from compartment A, B, or C, perform the following steps:

1. Disconnect the auxiliary drawer and roll it out of the auxiliary compartment on the extension rails (see the figure Extension Rails in Fully Extended Position, page 91) according to the instructions in the section CPT and VT Drawer Operation, page 88.
2. Prepare the auxiliary drawer with two auxiliary drawer lifting adapters (see the figure Auxiliary Drawer with Lifting Adapter, page 125) :
   a. Locate the two lifting adapters in the storage area below the base handles of the SureSeT lift truck, located below the base handles.
   b. Pull out the two quick release pins from each adapter and remove the adapters.
   c. Attach one lifting adapter to each side of the auxiliary drawer by sliding the two (2) fixed rods on the adapter into the two (2) holes on the sides of the auxiliary drawer (see the figure Auxiliary Drawer Lifting Adapter, page 125).

Figure 85 - Auxiliary Drawer with Lifting Adapter

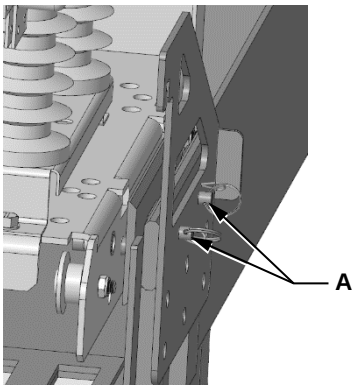


A	Lifting adapter

3. Push the lift truck toward the auxiliary compartment, keeping the lift truck platform square with the front of the auxiliary compartment.
4. Raise the platform until the platform sides are aligned with the auxiliary drawer lifting adapters.

5. Insert the four quick release pins into the lifting adapters and lock in place to hold the auxiliary drawer on the platform (see the figure Auxiliary Drawer Attached to Lift Truck Platform, page 126).

Figure 86 - Auxiliary Drawer Attached to Lift Truck Platform



A	Quick release pin

6. Slowly raise the platform until the auxiliary drawer has been removed from the extension rails.
7. Pull the lift truck back until it exposes the extended rails.
8. Push the extension rails back into the auxiliary compartment.
9. Lower the platform to the floor and lock the lift truck with the foot pedal locking brake.
10. Use a properly rated lifting device to move the auxiliary drawer to a pallet, workspace, or storage area:
    a. Install an eye bolt to each of the two threaded holes on each side of the auxiliary drawer (a total of four eye bolts).
    b. Insert hoist straps through the four eye bolts.
    c. Remove the four quick release pins from the sides of the platform.
    d. Lift and move the drawer to its designated location.
    e. Remove the auxiliary drawer lifting adapters from the auxiliary drawer and return the lifting adapters to the proper storage location on the lift truck.
11. Move the SureSeT lift truck to the storage location.

Removing an Auxiliary Drawer From Compartment D

Before using the lift truck to remove an auxiliary drawer from compartment D, read and understand the instructions contained in this user guide, all labeling on the lift truck, and other user guides referenced in this material.

⚠WARNING

FALLING OBJECT

- Use lifting straps preparation only for lower compartment auxiliary drawers.

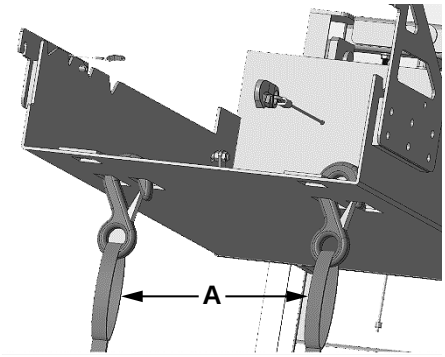
Failure to follow these instructions can result in death, serious injury, or equipment damage.

To remove an auxiliary drawer from compartment D, perform the following steps:

1. Make sure there are no open doors, extended rails, or anything else in an upper compartment that will interfere with lifting the drawer.

2. Disconnect the drawer and roll it out of the auxiliary compartment on extension rails (see the figure Extension Rails in Fully Extended Position, page 91) according to the instructions in the section CPT and VT Drawer Operation, page 88.
3. Attach an eye bolt to each of the two threaded holes on each side of the auxiliary drawer (a total of four eye bolts).
4. Attach lifting straps to the lift truck platform (see the figure Lifting Straps Attached to Lift Truck Platform, page 127).

Figure 87 - Lifting Straps Attached to Lift Truck Platform



A	Lifting strap

5. Raise the platform until there is sufficient vertical clearance between it and the top of the auxiliary drawer.
6. Push the lift truck toward the auxiliary compartment, keeping the platform square with the front of the auxiliary compartment, until the platform is above the drawer. Observe any door mounted low voltage instrumentation on other compartments and take care to not make contact.
7. Attach the free ends of the hoist straps to the four eye bolts on the auxiliary drawer.
8. Slowly raise the lift truck platform until the auxiliary drawer clears the extension rails.

   NOTE: Do not raise the auxiliary drawer more than 12 in. (304 mm) above the floor.
9. Pull the lift truck back until it exposes the extended rails.
10. Push the extension rails back into the auxiliary compartment.
11. Move the auxiliary drawer to a pallet, workspace, or storage area.
12. Slowly lower the lift truck platform until the auxiliary drawer is in place.
13. Detach the hoist straps from the auxiliary drawer and remove the eye bolts.
14. Move the SureSeT lift truck to the storage location.

Installing Auxiliary Drawers

The auxiliary compartment contains two sets of rails for rolling auxiliary drawers into and out of the compartment. One set is stationary, while the other set (the extension rails) is movable. Before installing an auxiliary drawer, make sure the appropriate auxiliary compartment door is open, the automatic door latch is engaged to hold the door open, and the extension rails are fully extended (see the figure Extension Rails in Fully Extended Position, page 91). All other section doors should be securely closed during installation of an auxiliary drawer.

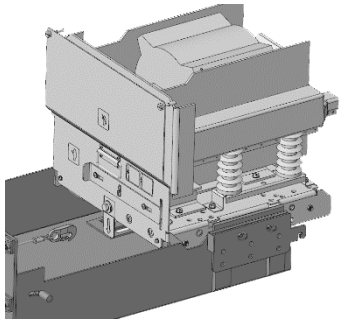
Installing Auxiliary Drawers Into Compartments A, B, and C

Before using the SureSeT lift truck to install an auxiliary drawer into compartment A, B, or C, read and understand the instructions contained in this user guide, all labeling on the lift truck, and other user guides referenced in this material.

To install an auxiliary drawer into compartment A, B, or C, perform the following steps:

1. Make sure the appropriate compartment extension rails are fully extended.
2. Prepare the auxiliary drawer with two auxiliary drawer lifting adapters (see the figure Auxiliary Drawer Lifting Adapter, page 125) :
   a. Locate the two lifting adapters in the storage area on the base of the SureSeT lift truck, located below the base handles.
   b. Pull out the two quick release pins from each adapter and remove the adapters.
   c. Attach one adapter to each side of the auxiliary drawer by sliding the two (2) fixed rods on the adapter into the two (2) holes on the sides of the auxiliary drawer (see the figure Auxiliary Drawer Lifting Adapter, page 125).
3. Using a properly-rated lifting device equipped with lifting straps, perform the following steps to lift the auxiliary drawer onto the lift truck platform:
   a. Install an eye bolt to each of the two threaded holes on each side of the auxiliary drawer (a total of four eye bolts).
   b. Insert hoist straps through the four eye bolts.
   c. Remove the four quick release pins from the sides of the platform.
   d. Lift the auxiliary drawer with adapters and place it onto the side flanges of the lift truck platform, aligning the holes in the lift truck platform with the holes in the auxiliary drawer adapters.
   e. Re-insert and lock the four quick release pins in the holes to hold the auxiliary drawer on the platform (see the figure Auxiliary Drawer Attached to Lift Truck Platform, page 126.

Figure 88 - Auxiliary Drawer Attached to Lift Truck Platform



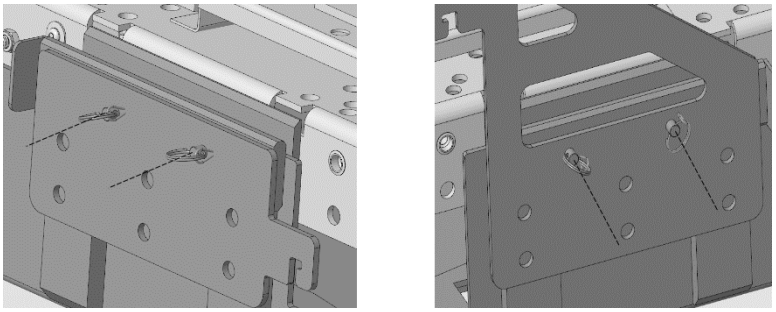
   f. Remove the hoist straps from the four eye bolts.
   g. Remove the four eye bolts from the auxiliary drawer.
4. Push the lift truck toward the auxiliary compartment (but not past the extension rails) so the lift truck platform is square with the front of the auxiliary compartment.
5. Slowly raise the platform until the extension rails are aligned and can pass fully between the auxiliary drawer and the lift truck platform.

6. Push the lift truck toward the auxiliary compartment until the auxiliary drawer wheels align with the rails.

NOTICE
BENT EXTENSION RAILS Remove the four quick release pins from the lift truck platform just before the auxiliary drawer is fully lowered onto the extension rails. **Failure to follow these instructions can result in equipment damage.**

7. Slowly lower the platform until the four auxiliary drawer wheels initially make contact with the extension rails.
8. Lock the lift truck with the foot pedal locking brake.
9. Pull out the four quick release pins (see the figure Removing Quick Release Pins).

Figure 89 - Removing Quick Release Pins



10. Continue to slowly lower the platform until the auxiliary drawer is fully installed on the extension rails.
11. Unlock the lift truck with the foot pedal locking brake.
12. Pull the lift truck back until it completely clears the extended rails.
13. Lower the platform to the floor and lock the lift truck with the foot pedal locking brake.
14. Remove the auxiliary drawer lifting adapters from the auxiliary drawer and return the lifting adapters to the proper storage location on the lift truck.
15. Roll the auxiliary drawer into the compartment to the disconnected position.

    NOTE: Push on the drawer, in the area near the black pull handle, located on the front, lower, middle of the drawer, to move the drawer into the disconnected position from the extension rails (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50).

    When a racking mechanism is not installed: The arrow on the plate mounted on the middle, bottom of the drawer should align with the symbol for disconnected on the label located on the compartment floor (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50.

    When a racking mechanism is installed: Locate the racking mechanism dismounting bolt located on the middle, bottom of the auxiliary drawer and use a tool to bolt the auxiliary drawer to the compartment racking system (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50, and table Switchgear Bolt Torque Value, page 65).

    The auxiliary drawer is now ready for further operation and installation procedures. For further information, refer to the sections CPT and VT Drawer Operation, page 88 and CPT and VT Drawer Installation, page 92.

16. Push the extension rails completely into the compartment.
17. Move the SureSeT lift truck to the storage location.

Installing an Auxiliary Drawer Into Compartment D

Before using the lift truck to install an auxiliary drawer into compartment D, read and understand the instructions contained in this user guide, all labeling on the lift truck, and other user guides referenced in this material.

To install an auxiliary drawer into compartment D, perform the following steps:

1. Make sure there are no open doors, extended rails, or anything else in an upper compartment that will interfere with installing the auxiliary drawer into the lower compartment.
2. Make sure the extension rails on the lowest compartment (Auxiliary Position D) are fully extended.
3. Install an eye bolt to each of the two threaded holes on each side of the auxiliary drawer (a total of four eye bolts).
4. Attach the lifting straps to the SureSeT lift truck platform (see the figure Lifting Straps Attached to Lift Truck Platform, page 127).
5. Raise the platform until there is sufficient vertical clearance between it and the top of the auxiliary drawer.
6. Push the lift truck toward the auxiliary drawer, keeping the platform square with the front of the auxiliary compartment, until the platform is above the drawer.
7. Attach the free ends of the hoist straps to the eye bolts on the auxiliary drawer.
8. Slowly raise the lift truck platform. Do not raise the auxiliary drawer more than 12 in. (304 mm) above the floor.
9. Push the lift truck toward the auxiliary compartment, keeping the platform square with the front of the compartment. Observe any door mounted low voltage instrumentation on other compartments and take care to not make contact.
10. Slowly lower the platform until the four auxiliary drawer wheels fully contact the extension rails.
11. Remove the hoist straps from the four eye bolts on the auxiliary drawer.
12. Pull the lift truck back until it completely clears the extended rails.
13. Lower the platform to the floor and lock the lift truck with the foot pedal locking brake.
14. Remove the eye bolts from the auxiliary drawer.

15. Roll the auxiliary drawer into the compartment to the disconnected position.

    NOTE: Push on the drawer, in the area near the black pull handle, located on the front, lower, middle of the drawer, to move the drawer into the disconnected position from the extension rails (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50).

    When a racking mechanism is not installed: The arrow on the plate mounted on the middle, bottom of the drawer should align with the symbol for disconnected on the label located on the compartment floor (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50.

    When a racking mechanism is installed: Locate the racking mechanism dismounting bolt located on the middle, bottom of the auxiliary drawer and use a tool to bolt the auxiliary drawer to the compartment racking system (see the figures CPT Compartment and Drawer Features, page 49 and VT Compartment and Drawer Features, page 50, and the table Switchgear Bolt Torque Value, page 65).

    The auxiliary drawer is now ready for further operation and installation procedures. For further information, refer to the sections CPT and VT Drawer Operation, page 88 and CPT and VT Drawer Installation, page 92.

16. Push the extension rails completely into the compartment.
17. Move the SureSeT lift truck to the storage location.

Test Cabinet (Optional)

An optional, wall-mounted test cabinet is furnished when listed in a customer's specifications. The test cabinet features the following items:

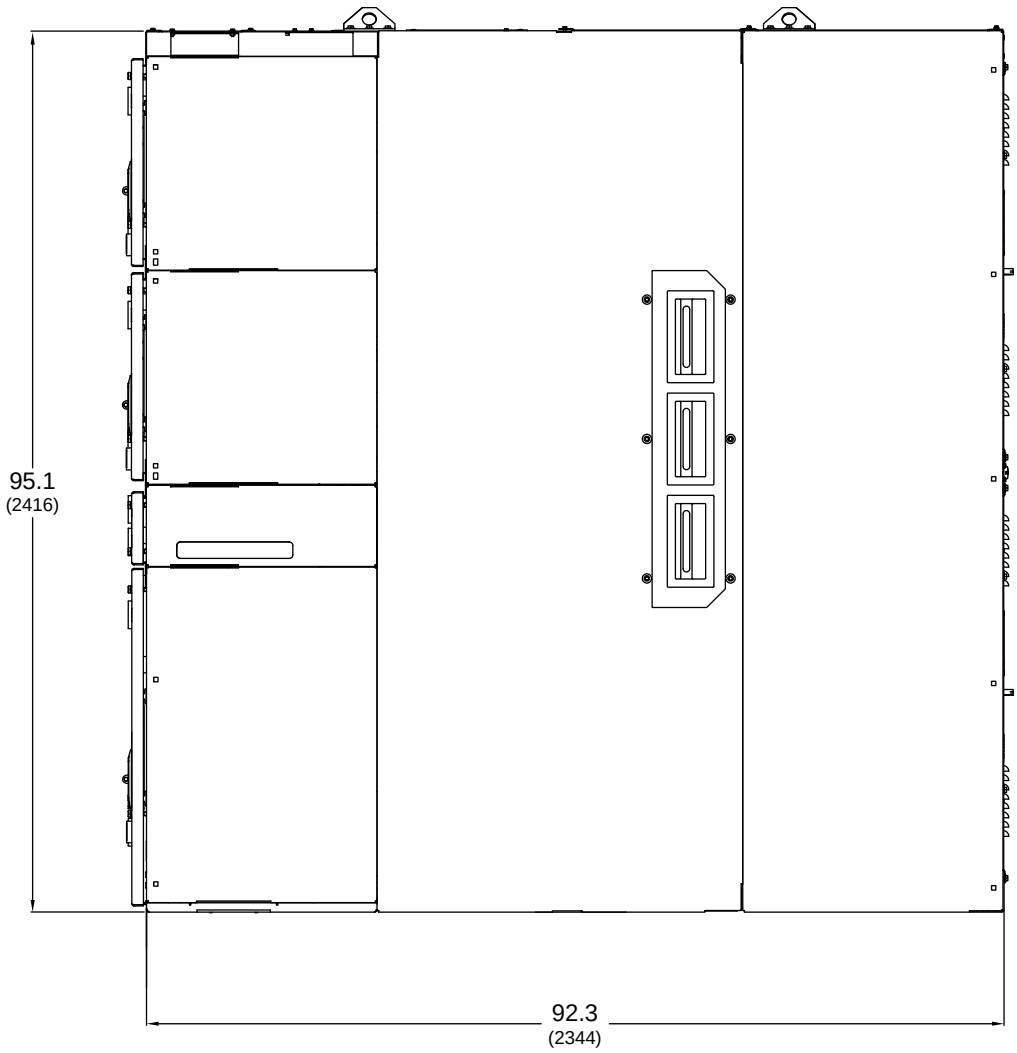
- small enclosure with a power on-off toggle switch
- amber light that illuminates when the power is on
- red light that illuminates when the circuit breaker is closed
- green light that illuminates when the circuit breaker is open
- CLOSE and OPEN push buttons
- 8 ft. (2.4 m) cable with a secondary disconnect receptacle that can be connected directly to the secondary disconnect plug on top of the circuit breaker

NOTE: Some breaker accessory combinations may not work with the test cabinet.

Refer to the customer order drawings for the external power connections and requirements necessary for the cabinet. A convenient terminal block is provided inside the test cabinet for these connections.

Outlines

Figure 90 - SureSeT 25–40 kA Indoor Switchgear Outline—Dual Dimensions: Inches (mm)



Product Technical Datasheet

SureSeT Switchgear Characteristics	
Main Characteristics	
Brand	Square D™ by Schneider Electric
Range series of product	SeT Series
Range of product	SureSeT
Product or component type	Metal-Clad Switchgear
Ratings of SureSeT with EvoPacT Series	
Rated maximum voltage range available (kV rms)	5–15.0
Rated power frequency withstand range available (kV rms)	19–38
Rated lightning impulse withstand insulation levels available (kV peak)	60–95
Rated frequency (Hz)	60
Rated continuous current range available (A)	1200–2000
Rated momentary withstand current range available (kA peak)	65–104
Rated 2 second short-time withstand current (kA sym)	25–40
Enclosure Category	B
Internal Arc Withstand	Non-Arc Rated
Environmental Schneider Electric Eco-Design Level	Green Premium 2
RoHS Compliant	Applicable
REACH Compliant	Applicable
California Proposition 65	Applicable
Ambient and Operating Conditions	
Type	Type 1 Indoor
Applicable Codes and Standards	
cULus	Listed
ANSI	Compliant
IEEE	Compliant
NEMA	Compliant
CSA	Compliant
IEC/IEEE	Compliant

Packages and Accessories Shipped with the Switchgear

Table 10 - List of Packages and Accessories

Package	Contents
Switchgear Line-up Items	Shipping Split Hardware
Racking/Charging Handle	Racking/Charging Handle
Lift Truck Pallet	SureSeT Circuit Breaker/Auxiliary Drawer Lift Truck

Replacement Parts

For questions concerning the replacement of any parts or components please contact the local Schneider Electric representative.

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

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