



DEH-50007 Installation, Operation and Maintenance Manual

SecoVac* Ground & Test Device

For 5kV-15kV IEEE Metal-clad Switchgear



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Hazard Classifications

The following important highlighted information appears throughout this document to warn of potential hazards or to call attention to information that clarifies a procedure.

Carefully read all instructions and become familiar with the devices before trying to install, operate, service or maintain this equipment.

DANGER

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

Indicates that if the hazard is not avoided could result in minor or moderate injury .

NOTICE

It is used to notify of practices not related to personal injury .

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SecoCube® SecoBloc®
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Contact your local sales office if further information is required concerning any aspect of SecoGear switchgear and SecoVac VB2+ breaker operation or maintenance.

1. Introduction

The SecoVac Ground and Test (G&T) device is an auxiliary removable device for use when installing and maintaining SecoGear Metal-clad Switchgear. The device provides a convenient manual means of grounding a system to safeguard personnel who may be working on the equipment.

It also serves to solidly ground the equipment to permit various tests. Exposed terminals can also be used for applying a high-potential test, measuring insulation resistance to ground, and phasing out cables.

The G&T device is available in the ratings shown on Table 1-1.

Table 1-1: Rated Switchgear or SecoBloc

MAX. CURRENT	SHORT-TIME WITHSTAND CURRENT (3 S)
1200 A	31.5 kA
1200 A	40 kA
2000 A	40 kA
3000 A	40 kA

In applying the G&T device to a metal-clad unit, only the current ratings need to be considered. Electrical insulation of the device has been designed to include ratings from 4.16 kV to 15 kV and meets the applicable ANSI standard including IEEE C37.20.6.

CAUTION

This G&T device does not have interrupters or a shutoff mechanism; Therefore, it has no interrupting or closing capability.

WARNING

The G&T device extends the primary terminals of the switchgear through the front cover to make them accessible for grounding and testing. Under certain conditions these terminals may be at high potential and could cause severe injury to the operator if they are not contacted.

Safety Precautions

The G&T device and switchgear compartment have interlocks to prevent unsafe operation. The G&T device is often used during initial installation and for troubleshooting, when the possibility of making an error is greatest.

Unfortunately, it is not possible to eliminate every hazard with interlocks; therefore, it will be the responsibility of the person using this device to recognize the potential hazards while working on this equipment and take adequate precautions. For further details on the Installation of the SecoVac Vacuum Circuit Breaker (VCB) refer to Publication DEH-50001.

CAUTION

Interlocks are provided for safety of the operator and correct operation of the device. If an interlock does not function as described, DO NOT MAKE ANY ADJUSTMENT OR FORCE THE DEVICE INTO POSITION. Contact the nearest General Electric Company installation and service office for additional instructions.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise, which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

To the extent required the products described herein meet applicable ANSI, IEEE, and NEMA standards; but no such assurance is given with respect to local codes and ordinances because they vary greatly.

2. Receiving, Handling, and Storage

Receiving and Handling

Each G&T device is carefully inspected and then packed by workers experienced in proper handling of electrical equipment. Immediately upon receipt of the device, thoroughly examine it for any damage sustained during shipment.

If damage or rough handling is evident, file a claim at once with the transportation company, and promptly notify the nearest General Electric Company sales office.

Storage

The G&T device should be carefully protected against condensation, preferably in a warm, dry environment at moderate temperatures, 40°F to 100°F, since water absorption has an adverse effect on insulation components. The storage area should be clean, free from corrosive gases or fumes, and dust-free.

If the G&T device is stored for any length of time, it should be inspected prior to use to verify that corrosion has not started and to ensure proper working mechanical condition. Should the device be stored under unfavorable conditions, it should be cleaned and dried out before being placed in service.

3. Construction and Components

Figure 3-1 shows the phase shorting bar and grounding jumper installed for both the upper and lower primaries for reference only. G&T devices are shipped without the grounding jumper bar or phase shorting bar installed.

One set of, quantity 1, each grounding bus bar and phase shorting bus bar will be provided. These bars can be used on either the upper or lower primary connections. These items will be shipped loose for installation in the field.

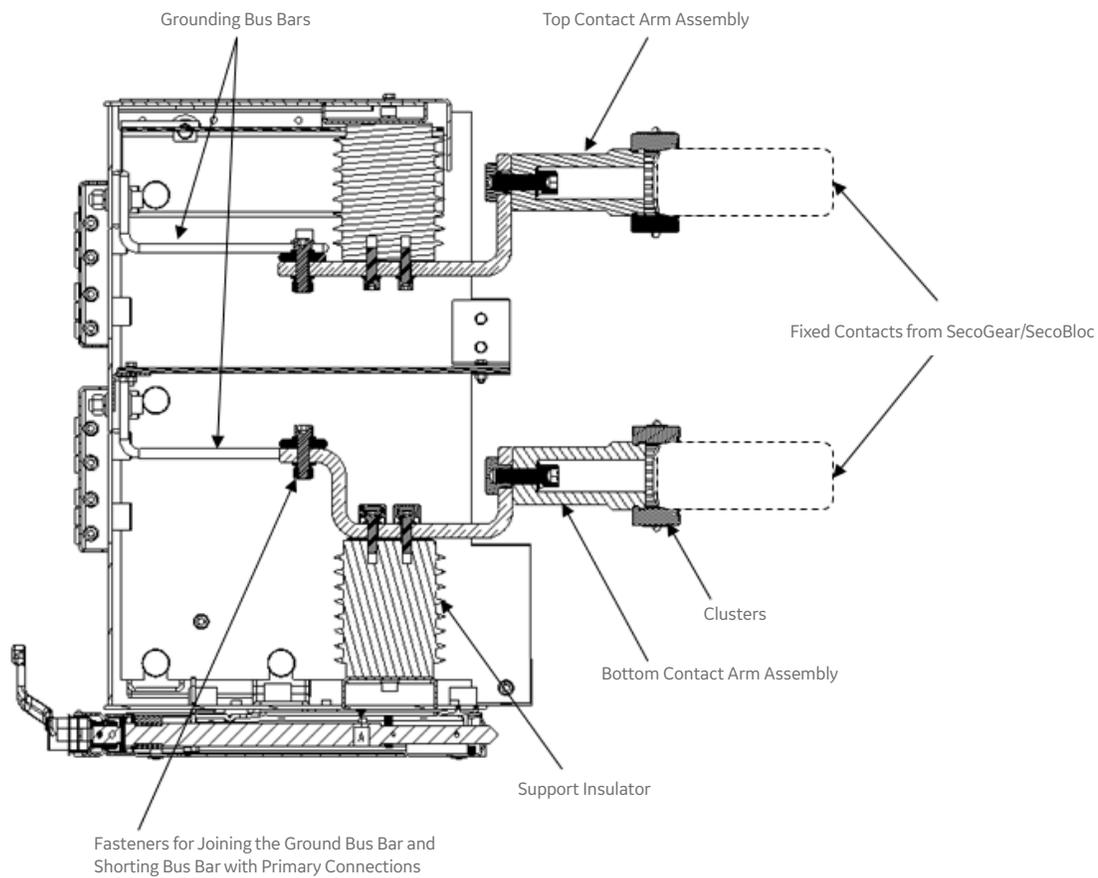


Figure 3-1: Sectional View

Note: Our drawing shows Grounding bus bars and Shorting bus bars connected to upper and lower primary connections for illustration only. Only one set is used.

The G&T device consists of four ratings, Table 1-1, and the rating will be clearly marked on the nameplate located on the front of the bottom door, Figure 3-2,1.

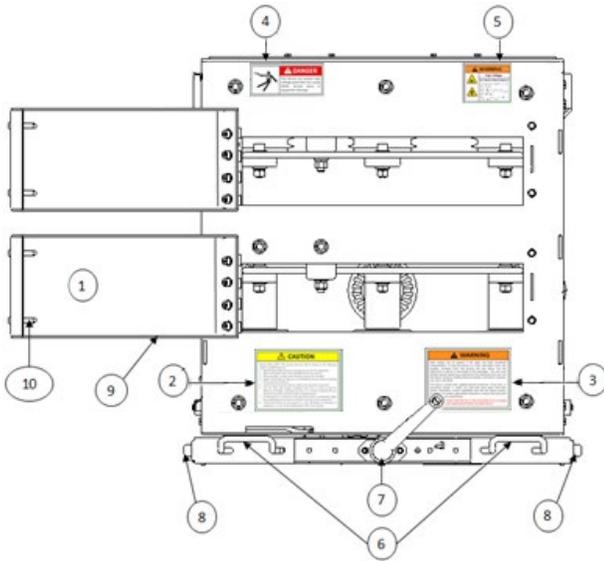


Figure 3-2: Front View

KEY

- 1. Nameplate*
- 2. Caution label
- 3. Warning label
- 4. Warning label
- 5. Danger label
- 6. Undercarriage handles
- 7. Racking handle
- 8. Undercarriage projected pins
- 9. Protective doors
- 10. Door fastening hardware

* Nameplate located on the front of the door.

The nameplate label is provided on the front of the G&T device along with caution and warning labels, Figure 3-2, 1-5.

The undercarriage assembly at the bottom of the G&T device has two handles, 6, which can lock the device inside the switchgear on the guide rail slots with pins on the undercarriage, 8. Then, with help of the racking handle, 7, the device can be operated from test to service or vice versa.

The primary extensions bus bars of the top and bottom terminals in Figure 3-3,11-12, are mounted on insulator supports, as shown in Figure 3-4,19.

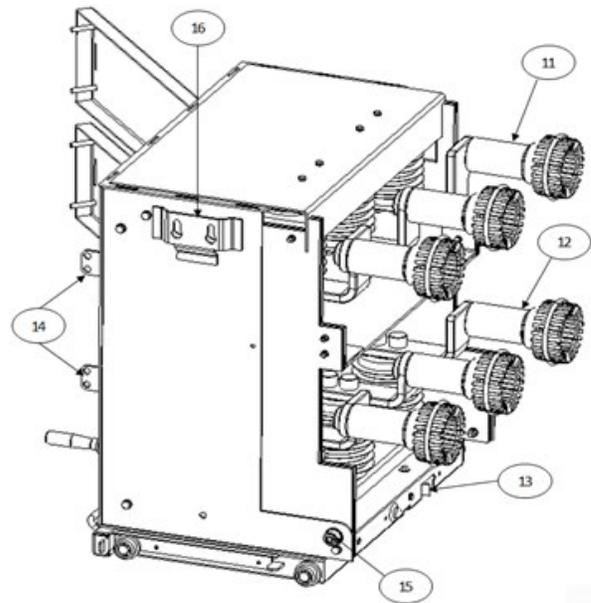


Figure 3-3: Top View, Contact Arms

KEY

- 11. Top contact arm assembly
- 12. Bottom contact arm assembly
- 13. Grounding bus bar
- 14. Padlocking bracket
- 15. Shutter activation roller
- 16. Lifting lugs

A lifting lug is provided on the left and right sides lifting the device, 16.

The padlocking bracket is provided to lock the top or bottom protective doors for the upper and lower primary grounding and connections.

SecoVac Ground & Test devices are shipped with all six primary connectors installed as shown on Figure 3-4. Grounding bus bar and shorting bus bar, Figure 3-4, 20-21, must be installed in the field to match proper configuration for the switchgear compartment.

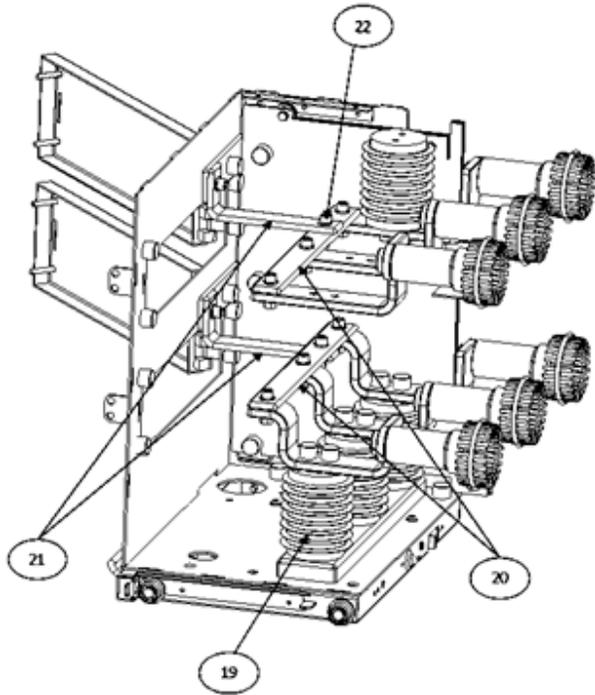


Figure 3-4: Top View, Internal Bus Bar Details

Note: Our drawing shows Grounding bus bars and Shorting bus bars connected to upper and lower primary connections for illustration only. Only one set is used.

KEY
19. Support insulators
20. Shortening bus bar
21. Grounding bus bar
22. Connecting fasteners

The switchgear contacts are connected to the contact arm assembly of the G&T device consisting of contact arms and cluster. The cluster will engage with the switchgear contact when the device moves from the test to the service position.

The grounding bus bar in Figure 3-4,21, is internally connected to the ground bar, Figure 3-5,13, is provided at the bottom of the undercarriage and is connected to the grounding shoe in SecoGear or SecoBloc OEM Module when the G&T device is in the service position.

The shutter activation roller, Figure 3-4,15,18, are provided on both the sides (left and right) to move the shutter in the SecoGear or SecoBloc while switching the Ground and Test Device from test to service position.

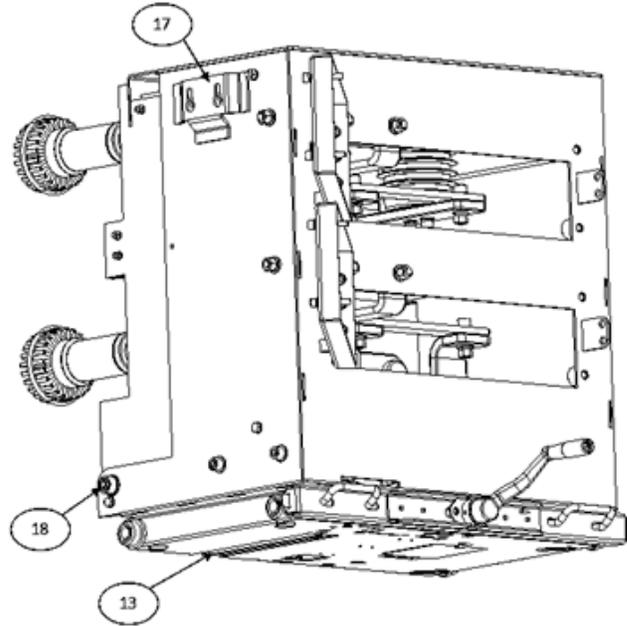


Figure 3-5: Rear View, Doors Open

KEY
13. Grounding bus bar
17. Lifting lugs
18. Shutter activation roller

Fasteners

Table 3-1: Fastener Details

TYPE	REPLACEMENT PART
Shorting/connecting bus bar joining fasteners	Bolt: M12 x 45 Spring washer: M12 Plain washer: M12 Nut: M12
Door locking fasteners	Bolt: M8 x 50 Spring washer: M8 Plain washer: M8

4. Interlocks

Current Rating Interlocks

Each G&T device is equipped with current rating interference, or rejection, plate up to 2000 A, Figure 4-1. On the 3000 A model, no rating interference plate is provided.

The interference plate assures correct current ratings of the device and metal-clad unit match. Refer to the SecoVac VCB instruction manual, Publication DEH-50001, for a more detailed description of the interference interlock in the metal-clad equipment.

The nameplate label is provided on the front of the G&T device along with caution and warning labels, Figure 3-2.

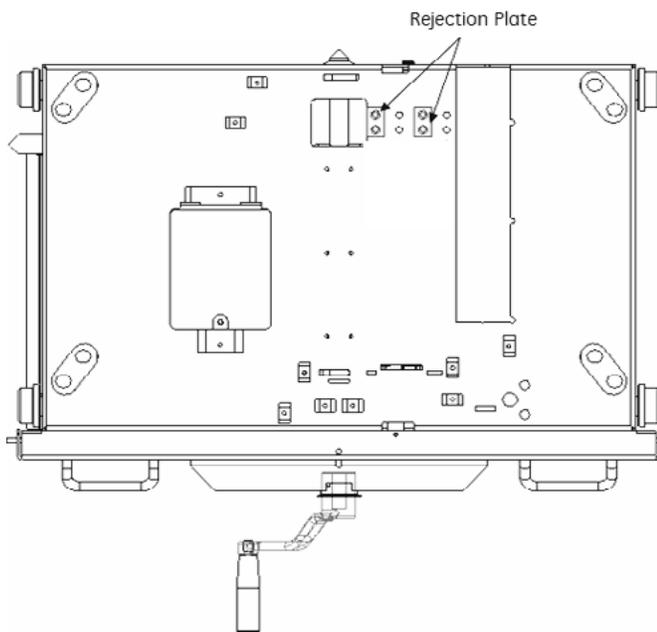


Figure 4-1: Current Rating Interlock, Bottom View

⚠ WARNING

Make certain the current rating of the G&T device matches the current rating of the switchgear compartment being tested. If the current ratings do not match and the G&T device is forced into the switchgear compartment by tampering with the interlock, serious injury could result to the operator.

Compartment Doors and Manual Padlock

Padlocking bracket provisions are provided for additional safety while using the G&T device, Figure 3-3, 14.

Based on the grounding requirement, configure the G&T device and proceed to open the required top or bottom access door and padlock the other one. Refer to Section 6 in this manual for Operation Procedures.

⚠ WARNING

Padlock provisions are provided to safeguard the operator by identification of the correct terminals to be tested when the padlock is applied and used properly. It is the responsibility of the operator to determine which terminals should be exposed for a particular test. If the padlock is misapplied, the incorrect terminals may be accessible such that serious injury could result to the operator.

⚠ WARNING

The G&T device doors will not prevent unsafe operation. It is provided as a convenience to the operator to be able to cover the primary connections not under test. It is the responsibility of the operator to check the primary connections to make certain they match the desired testing conditions. Tampering with doors or partially covering the terminals could result in an unsafe testing condition and cause serious injury to the operator.

5. Protective Doors

Protective doors are provided to cover the access to grounding bus bar and shorting bus bar access points. These doors are manually closed and fastened by tightening screws located on the front, Figure 5-1.



Figure 5-1: Tightening screws and padlock provisions on the front of the G&T device.

6. Operating Procedures

CAUTION

SecoVac Ground & Test devices are shipped with all six primary connectors shorted and grounded. Do not insert into SecoGear or SecoBloc OEM Module without proper grounding configuration. Follow the instructions in this sections to remove primary connectors, grounding and shorting bus bars.

WARNING

Before proceeding to work on the SecoGear or SecoBloc OEM Module, make sure the equipment has been de-energized from all its potential sources.

Before beginning, identify the current rating of the G&T device by reading the nameplate. Compare the amperage with the rating for the intended SecoGear or SecoBloc OEM Module. The available G&T device ratings are provided in Table 1-1.

Step 1. Prepare Padlock, Ground Bus Bar, and Shorting Bus Bar

A padlock, not provided, will be required to lock the protective door of the set of primaries not being grounded. Locate the grounding bus bar and the shorting bus bar hardware for the setup procedure.

Step 2. G&T Device Setup

The G&T device must be configured differently for grounding upper primaries and lower primaries.

1. To ground the lower primary side,
 - a) Assure that the lower bus/cluster assemblies are attached to each pole.
 - b) Attach the shorting bus bar & grounding bus bar to the lower primary cluster assembly.
 - c) Attach padlock to the upper door to secure it from unauthorized access.
 - d) Insert the G&T device into the switchgear compartment to ground the lower primaries.

2. To ground the upper primary side,
 - a) Assure that the upper bus/cluster assemblies are attached to each pole
 - b) Attach the shorting bus bar & grounding bus bar to the upper primary cluster assembly.
 - c) Attach padlock to the lower door to secure it from unauthorized access.
 - d) Insert the G&T device into the switchgear compartment to ground the upper primaries.

Step 3. Place the G&T Device into the Gear

Use the lift truck to place the G&T device inside the SecoGear or SecoBloc OEM Module. For more information on its operation, see SecoVac Lift Truck Operation Manual, Publication DEH-500012.

Step 4. Lock the G&T Device into the Gear

Align the G&T device undercarriage with the SecoGear or SecoBloc OEM Module guide rail slots. Lock into the test position by pulling the undercarriage handles inside, and move the device toward the locking slots in guide rail at the test position. When you release the handles, the undercarriage projected pins, Figure 3-2, 8, move outward into the slots with a spring effect.

Also, see “Compartment Doors and Manual Padlock” in Section 4.

Step 5. Operate the G&T Device

Rotate the lead screw in the racking handle, Figure 3-2, 7, clockwise to move the G&T device from test to service position.

While racking in manually, the side rollers, Figure 3-3, 15, on the G&T device activate the switchgear compartment shutters, Figure 6-1, in SecoGear and SecoBloc OEM Module.



Figure 6-1: Automatic Shutters

Step 6. Remove the G&T Device

In the service position, G&T device clusters engage with fixed contacts, Figure 3-1, inside SecoGear or SecoBloc OEM Module. Rotate the handle counterclockwise to rack out the device from the service to the test position.

Step 7. Returning G&T Device to Base Configuration

Once grounding and testing is complete, and G&T device has been removed from the compartment. Remove the shorting and grounding bus bars to return to starting point.

Testing

Before testing, identify the current rating of the G&T device by reading the nameplate. Compare the amperage with the rating for the intended SecoGear or SecoBloc OEM Module. The available G&T device ratings are provided in Table 1-1.

1. Determine the compartment elevation, upper or lower.
2. Lock the front door of the G&T device, upper compartment or lower compartment.
3. Manually rack the G&T device into the switchgear compartment.
4. Ensure that the mains supply is off.
5. Follow the breaker installation and removal procedure contained in the SecoVac instruction manual, Publication DEH-50001.



Figure 6-2: SecoVac Lift Truck

7. Maintenance

Proper maintenance of the G&T device is necessary to ensure satisfactory operation. The following items should be checked each time the device is used:

1. Make certain all primary and grounding connections are tightly connected.
2. Contact surfaces of primary disconnect fingers and ground shoe should be lightly coated with 0282A2048P009 grease.
3. Make insulation parts are free of dust and contaminants.
4. The compartment padlocks should operate freely.
5. Racking lead screw should operate freely.
6. Shutter actuation rollers should rotate freely.

See SECTION 3. Construction and Components for the locations of these parts.

8. High-Potential Tests

If the G&T device has been stored for a long period of time or exposed to high humidity, it is recommended that the insulation be checked before it is placed in service. A standard 60 Hz high-potential test at 27 kV rms will normally indicate whether the device is satisfactory for service.

Apply the voltage to each phase individually for one minute with two other phases and the frame grounded.

After the high potential test, inspect the primary stud support for leakage paths. Clean surfaces and retest if leakage paths are visible or replace the support.

Appendix A: Dimensions

The drawings are organized according to device current ratings, expressed in inches and millimeters.

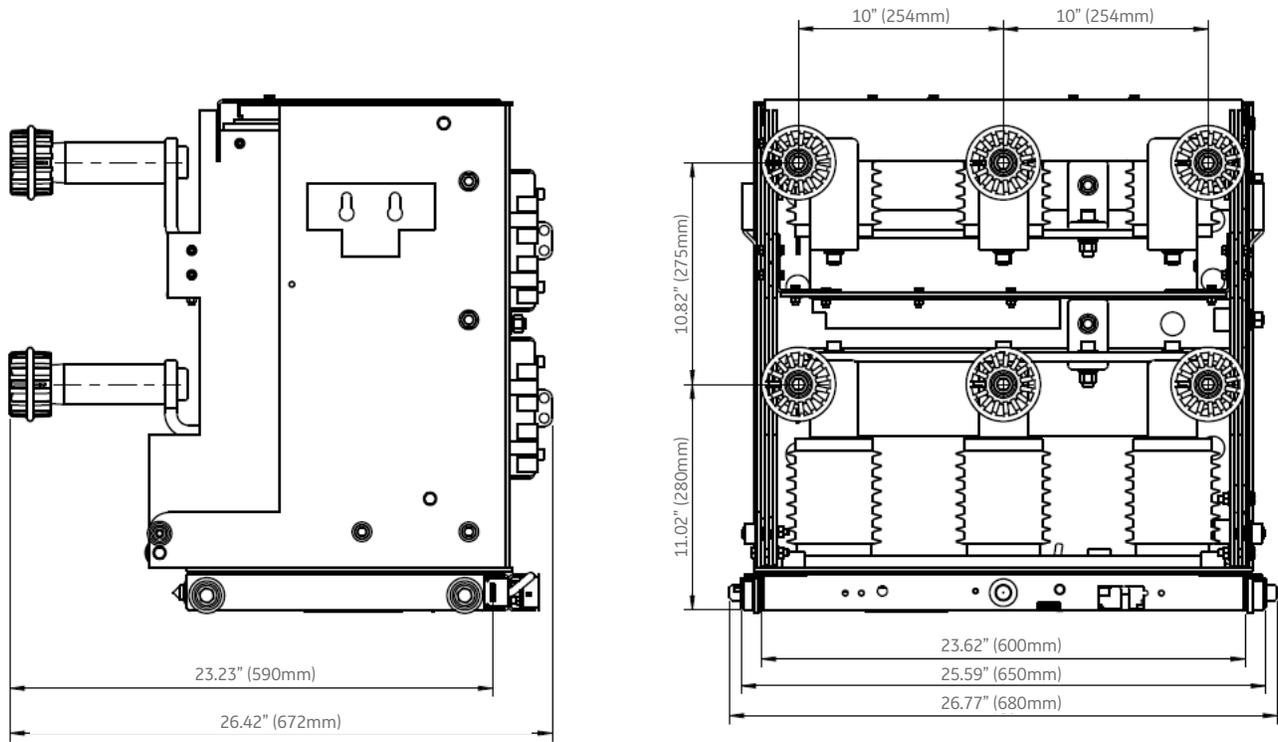


Figure A-1: Rated 1200 A, 31.5kA

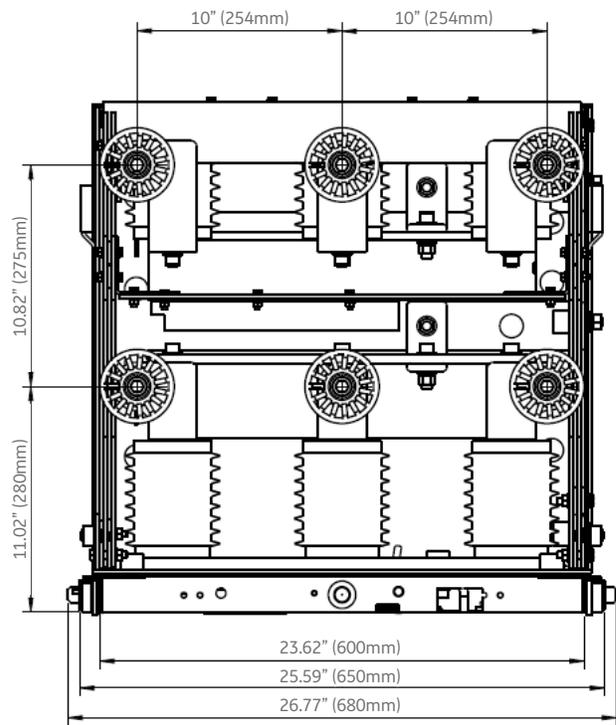
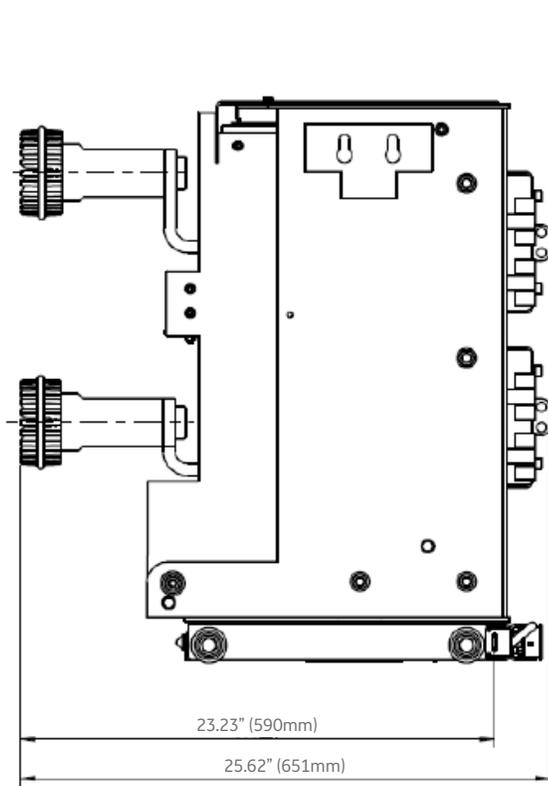


Figure A-2: Rated 1200 A/2000 A, 40 kA

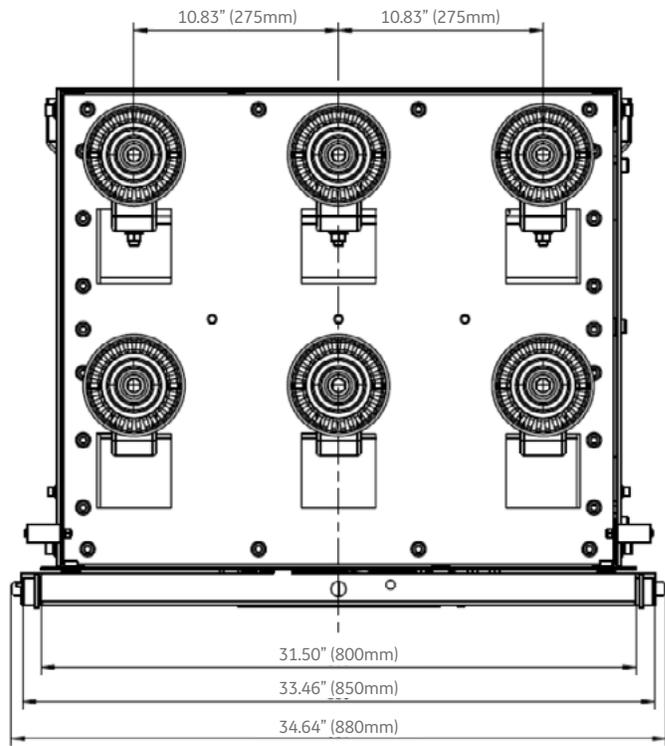
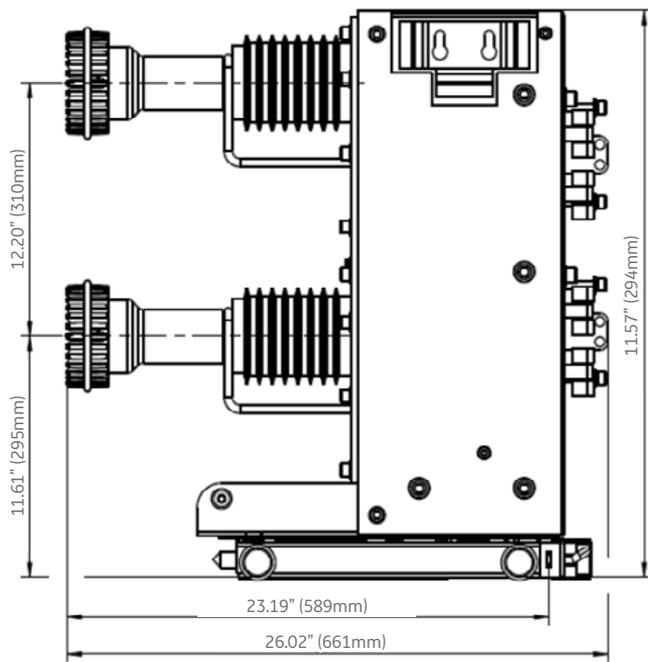


Figure A-3: Rated 3000 A, 40 kA



Imagination at work

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