

Installation

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Introduction

Qualified Persons

WARNING

Only qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended **ONLY** for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Read this Instruction Sheet

NOTICE

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before installing or operating Vista SD Underground Distribution Switchgear. Familiarize yourself with the Safety Information and Safety Precautions on pages 4 through 8. The latest version of this publication is available online in PDF format at sandc.com/en/support/product-literature/.

Retain this Instruction Sheet

This instruction sheet is a permanent part of your Vista SD Underground Distribution Switchgear. Designate a location where you can easily retrieve and refer to this publication.

Proper Application

WARNING

The equipment in this publication is only intended for a specific application. The application must be within the ratings furnished for the equipment. Ratings for the Vista SD Underground Distribution Switchgear are listed in the ratings table in Specification Bulletin 695-33. The ratings are also on the nameplate affixed to the product.

Warranty

The warranty and/or obligations described in S&C's Price Sheet 150, "Standard Conditions of Sale-Immediate Purchasers in the United States," (or Price Sheet 153, "Standard Conditions of Sale-Immediate Purchasers Outside the United States,") plus any special warranty provisions, as set forth in the applicable product-line specification bulletin, are exclusive. The remedies provided in the former for breach of these warranties shall constitute the immediate purchaser's or end user's exclusive remedy and a fulfillment of the seller's entire liability. In no event shall the seller's liability to the immediate purchaser or end user exceed the price of the specific product that gives rise to the immediate purchaser's or end user's claim. All other warranties, whether express or implied or arising by operation of law, course of dealing, usage of trade or otherwise, are excluded. The only warranties are those stated in Price Sheet 150 (or Price Sheet 153), and THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY EXPRESS WARRANTY OR OTHER OBLIGATION PROVIDED IN PRICE SHEET 150 (OR PRICE SHEET 153) IS GRANTED ONLY TO THE IMMEDIATE PURCHASER AND END USER, AS DEFINED THEREIN. OTHER THAN AN END USER, NO REMOTE PURCHASER MAY RELY ON ANY AFFIRMATION OF FACT OR PROMISE THAT RELATES TO THE GOODS DESCRIBED HEREIN, ANY DESCRIPTION THAT RELATES TO THE GOODS, OR ANY REMEDIAL PROMISE INCLUDED IN PRICE SHEET 150 (or PRICE SHEET 153).

**Warranty
Qualifications**

The seller's standard warranty does not apply to components not of S&C manufacture that are supplied and installed by the purchaser or to the ability of the seller's equipment to work with such components.

Safety Information

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to Vista SD Underground Distribution Switchgear. Familiarize yourself with these types of messages and the importance of these various signal words:

DANGER

“DANGER” identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.

WARNING

“WARNING” identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

CAUTION

“CAUTION” identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

NOTICE

“NOTICE” identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

Following Safety Instructions

If you do not understand any portion of this instruction sheet and need assistance, contact your nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website sandc.com, or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before installing Vista SD Underground Distribution Switchgear.

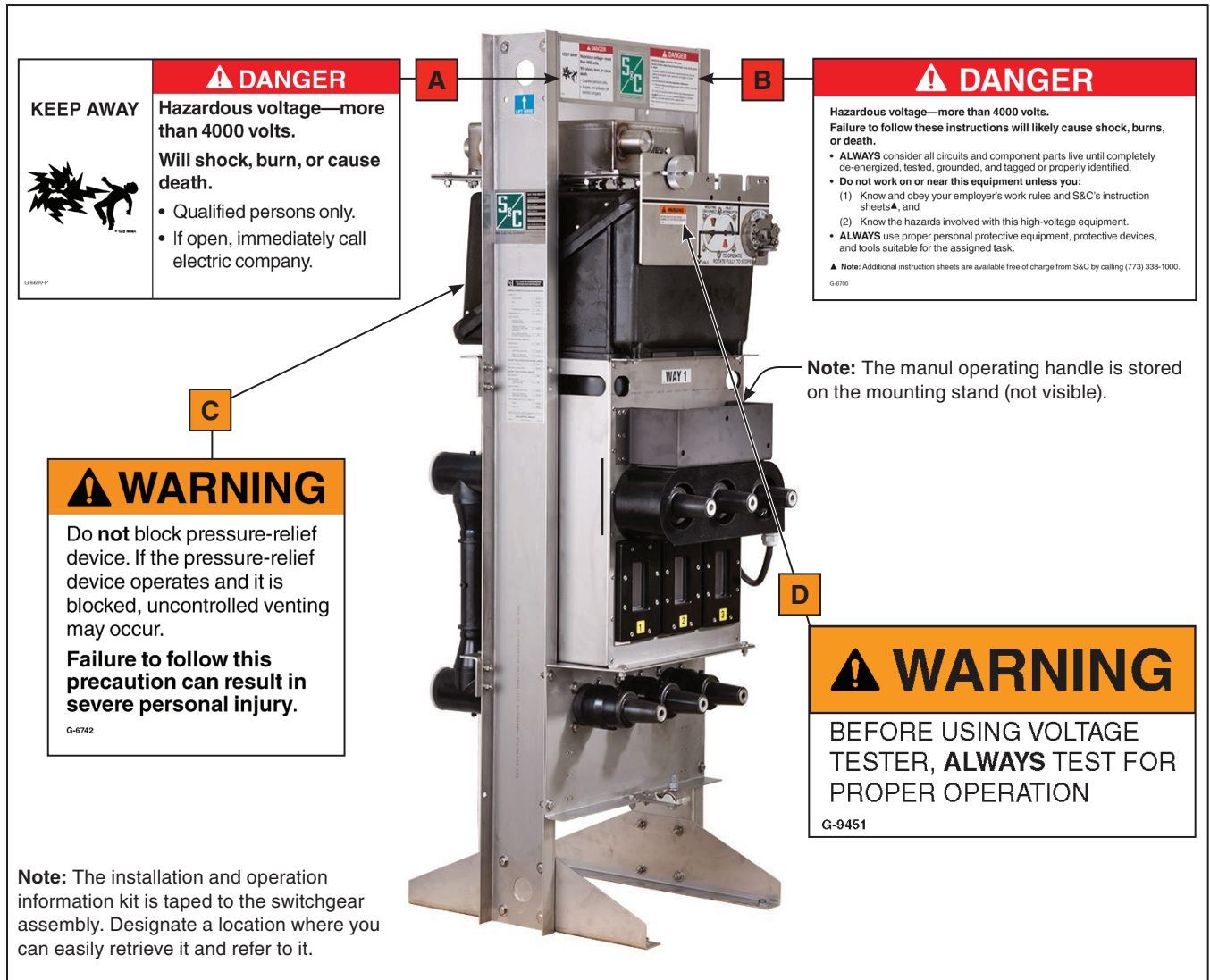


Replacement Instructions and Labels

If additional copies of this instruction sheet are needed, contact the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

Location of Safety Labels and Tags—Single-Way Vault-Mounted Style

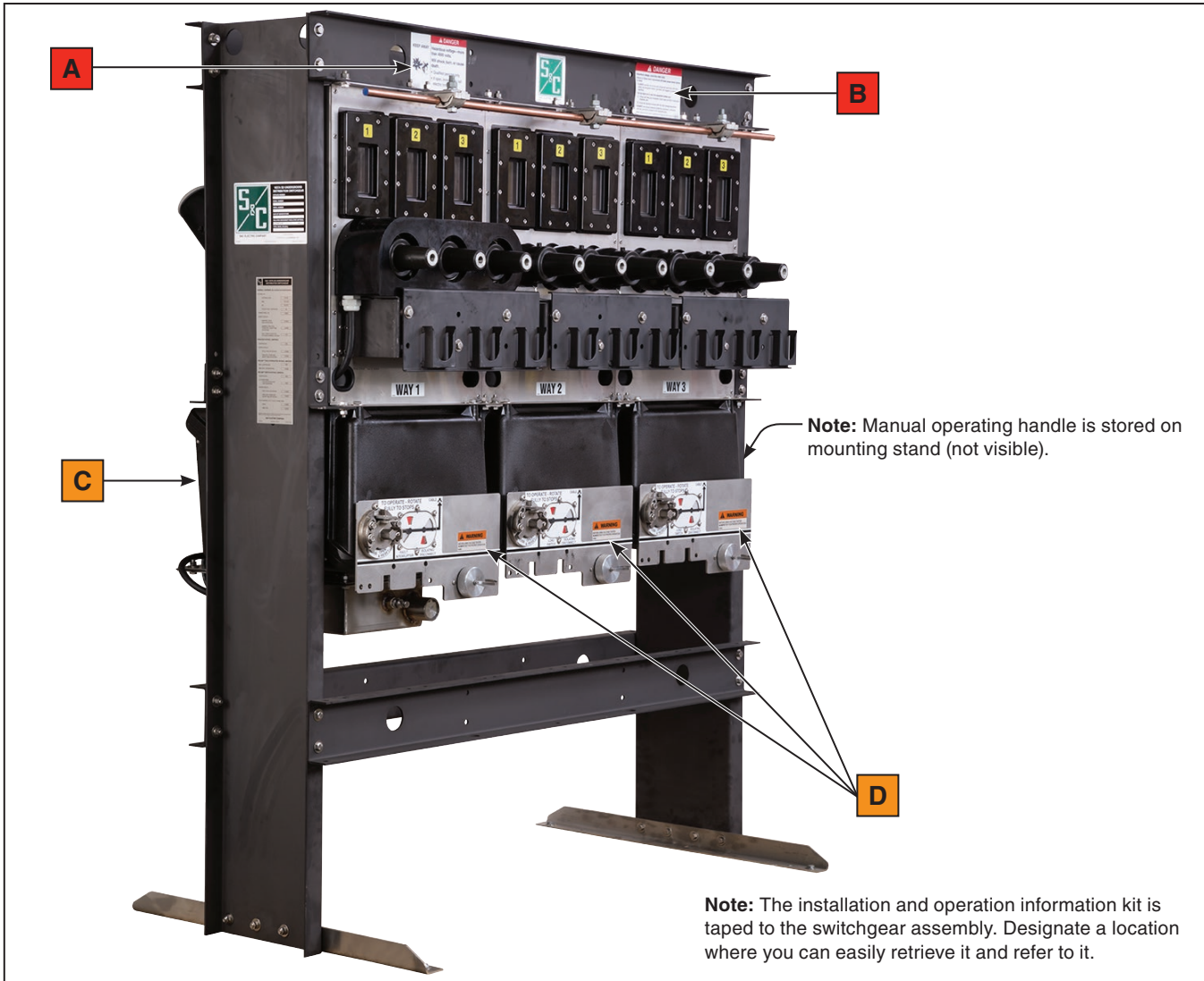


Reorder Information for Safety Labels

| Location | Safety Alert Message | Description | Number |
|----------|----------------------|---|--------|
| A | DANGER | Keep Away—Hazardous Voltage (“Mr. Ouch”) | G-6699 |
| B | DANGER | Hazardous Voltage—Always Consider Circuits and Components Live... | G-6700 |
| C | WARNING | Do Not Block Pressure-Relief Device (not shown) | G-6742 |
| D | WARNING | Voltage Tester—Always Test for Proper Operation | G-9451 |

Figure 1. Location of safety labels—Model 101 (single-way) vault-mounted style unit shown.

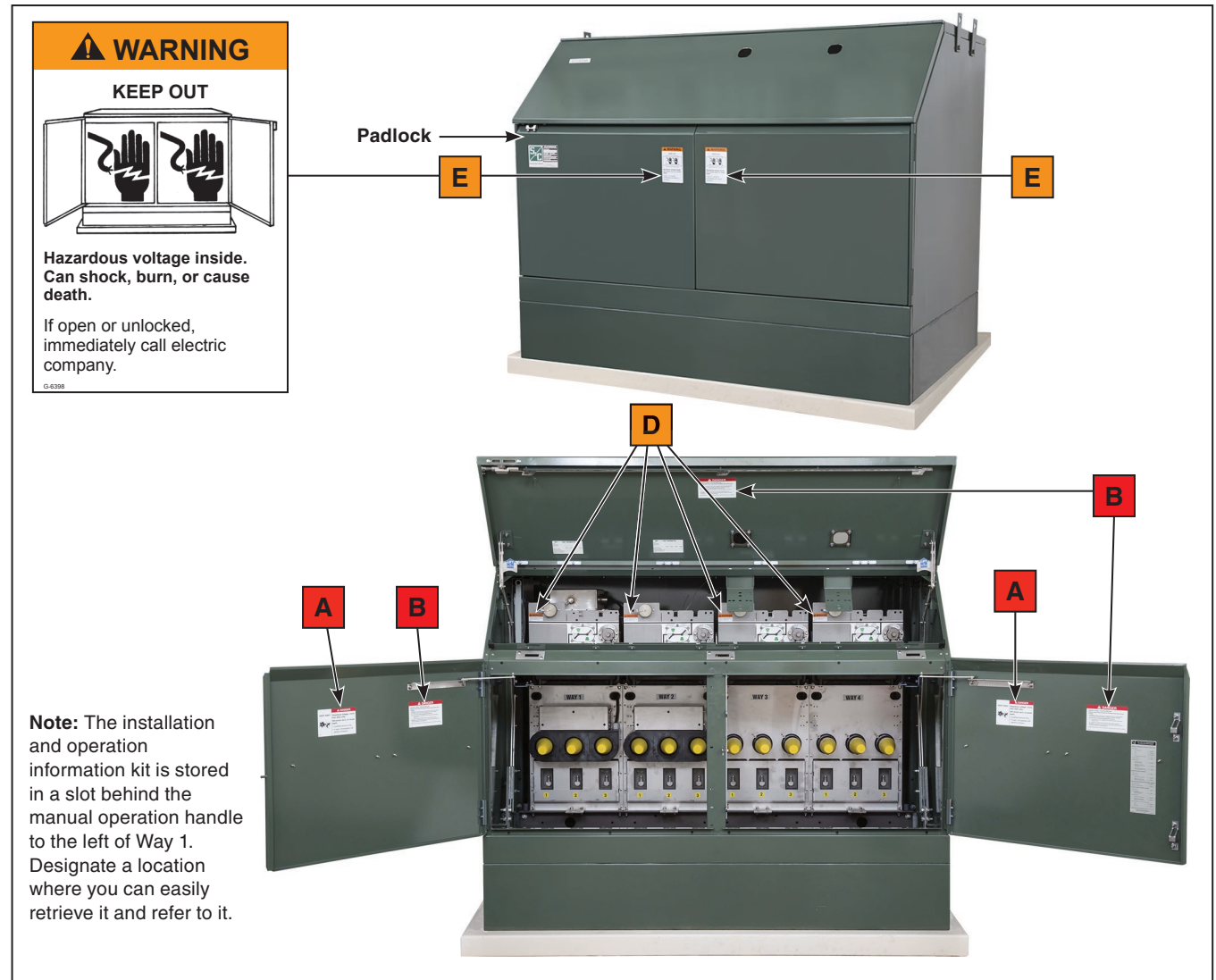
Location of Safety Labels and Tags—Multi-Way Vault-Mounted Style



| Reorder Information for Safety Labels | | | |
|---------------------------------------|----------------------|---|--------|
| Location | Safety Alert Message | Description | Number |
| A | ⚠ DANGER | Keep Away—Hazardous Voltage (“Mr. Ouch”) | G-6699 |
| B | ⚠ DANGER | Hazardous Voltage—Always Consider Circuits and Components Live... | G-6700 |
| C | ⚠ WARNING | Do Not Block Pressure-Relief Device (not visible) | G-6742 |
| D | ⚠ WARNING | Voltage Tester—Always Test for Proper Operation | G-9451 |

Figure 2. Location of safety labels — Model 312 (3-way) vault-mounted style unit shown.

Location of Safety Labels and Tags—Pad-Mounted Style



Reorder Information for Safety Labels

| Location | Safety Alert Message | Description | Number |
|----------|----------------------|---|--------|
| A | ⚠ DANGER | Keep Away—Hazardous Voltage (“Mr. Ouch”) | G-6699 |
| B | ⚠ DANGER | Hazardous Voltage—Always Consider Circuits and Components Live... | G-6700 |
| C | ⚠ WARNING | Do Not Block Pressure-Relief Device (not visible) | G-6742 |
| D | ⚠ WARNING | Voltage Tester—Always Test for Proper Operation | G-9451 |
| E | ⚠ WARNING | Keep Out—Hazardous Voltage Inside | G-6398 |

Figure 3. Location of safety labels — Model 422 (4-way) pad-mounted style unit shown.

DANGER



Vista SD Underground Distribution Switchgear operates at high voltage. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

1. **QUALIFIED PERSONS.** Access to the Vista SD underground distribution switchgear must be restricted only to qualified persons. See the "Qualified Persons" section on page 2.
2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules. Always maintain proper clearance from energized components.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment such as rubber gloves, rubber mats, hard hats, safety glasses, and arc-flash clothing in accordance with safe operating procedures and rules.
4. **DOORS.** High-voltage compartment doors must be securely closed and latched, with padlocks in place at all times unless work is being performed inside the enclosure.
5. **KEY INTERLOCKS.** Optional key interlocks, if furnished, must be in place. Check the operating sequence of key interlocks to verify proper sequencing. After the switchgear is installed, destroy all duplicate keys or make them accessible only to authorized persons so that the key-interlock scheme will not be compromised.
6. **OPENING DOORS.** Do not apply any undue force when attempting to open a door. The use of undue force may damage the door-latching mechanism.
7. **SAFETY LABELS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels.
8. **ENERGIZED BUSHINGS.** Always assume the bushings are energized unless proven otherwise by test, by visual evidence of an open-circuit condition at the load-interrupter switch or fault interrupter, or by observing that the load-interrupter switch or fault interrupter is grounded.
9. **BACKFEED.** Bushings, cables, load-interrupter switches, and fault interrupters may be energized by backfeed.
10. **GROUNDING.**
 - Vista SD Switchgear must be connected to a suitable earth ground before energizing, and at all times when energized.
 - The ground wire(s) must be bonded to the system neutral, if present. If the system neutral is not present, proper precautions must be taken to ensure that the local earth ground cannot be severed or removed.
 - After the switchgear has been completely disconnected from all sources of power and tested for voltage, properly ground the load-interrupter switches and fault interrupters before touching any bushings or components to be inspected, replaced, serviced, or repaired.
11. **LOAD-INTERRUPTER SWITCH OR FAULT INTERRUPTER POSITION.**
 - Always confirm the open/closed position of the load-interrupter switch or fault interrupter by visually observing the position of the isolating disconnect.
 - Load-interrupter switch or fault interrupter may be energized by backfeed.
 - Load-interrupter switch or fault interrupter may be energized in any position.
12. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.

Packing

Vault-mounted style Vista SD Underground Distribution Switchgear is shipped in a wooden crate. Pad-mounted style Vista SD Underground Distribution Switchgear is fastened to a wood skid. At the first opportunity, remove all packing materials (cardboard, paper, foam padding, etc.) from the switchgear assembly. This will prevent the switchgear from being damaged by rainwater absorbed by the packing materials and will also prevent wind-induced abrasion from loose cardboard.

Inspection

Examine the shipment for external evidence of damage as soon after receipt as possible, preferably before removal from the carrier's conveyance. Check the bill of lading to make sure all listed shipping skids, crates, and containers are present.

If there is visible loss and/or damage:

1. Notify the delivering carrier immediately.
2. Ask for a carrier inspection.
3. Note the condition of shipment on all copies of the delivery receipt.
4. File a claim with the carrier.

If concealed damage is discovered:

1. Notify the delivering carrier within 15 days of receipt of shipment.
2. Ask for a carrier inspection.
3. File a claim with the carrier.

Also, notify S&C Electric Company in all instances of loss and/or damage.

Handling

WARNING

When handling Vista SD Underground Distribution Switchgear with an overhead hoist, observe standard lifting practices as well as the general instructions below. **Failure to follow these precautions can result in serious personal injury or equipment damage.**

Note: Refer to the nameplate affixed to exterior of switchgear assembly for the net weight.

- STEP 1.** Use 6-foot (183-cm) or longer hoist slings of equal length to prevent damage to the gear during lifting. 4-foot (122-cm) hoist slings are acceptable for two-way and three-way switchgear assemblies. See Figure 4 and Figures 5 and 6 on page 11.
- STEP 2.** Arrange the hoist slings to distribute lifting forces equally between the lifting tabs.
- STEP 3.** Avoid sudden starts and stops.

NOTICE

Before hoisting, remove motor operator (if supplied) for single-way vault-mounted style Vista SD Underground Distribution Switchgear assemblies supplied with the “-V3” catalog number suffix (horizontal orientation). **Failure to follow this precaution may result in damage to the motor operator or to the switchgear assembly from contact with the hoist sling.**

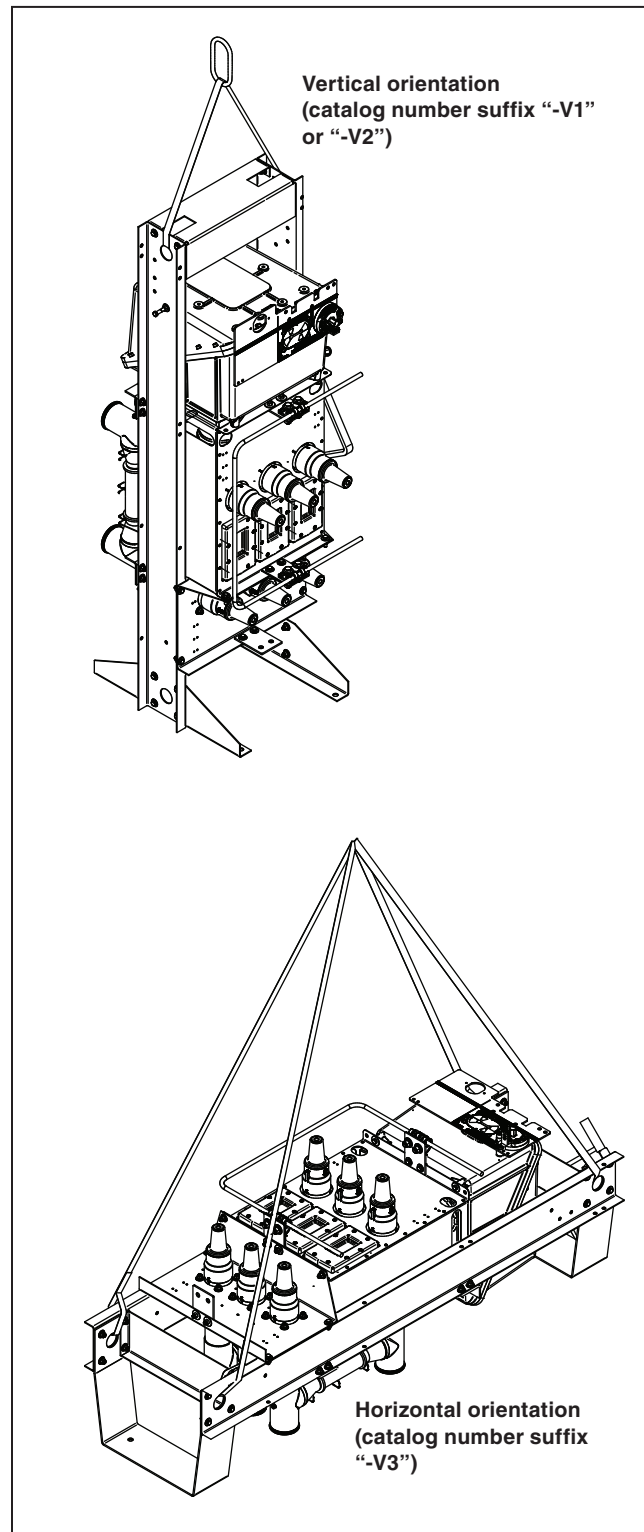


Figure 4. Hoisting a single-way vault-mounted style Vista SD switchgear assembly.

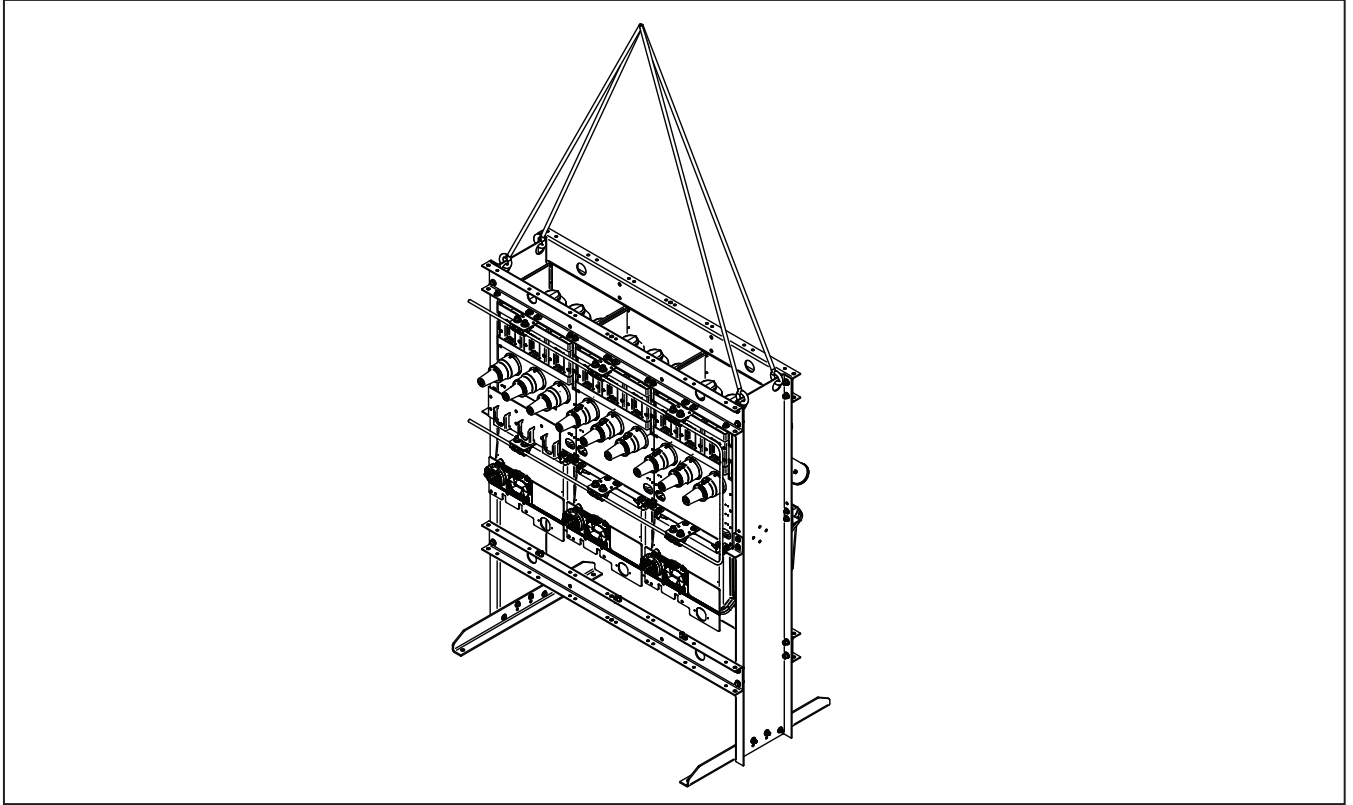


Figure 5. Hoisting a multi-way vault-mounted style Vista SD switchgear assembly.

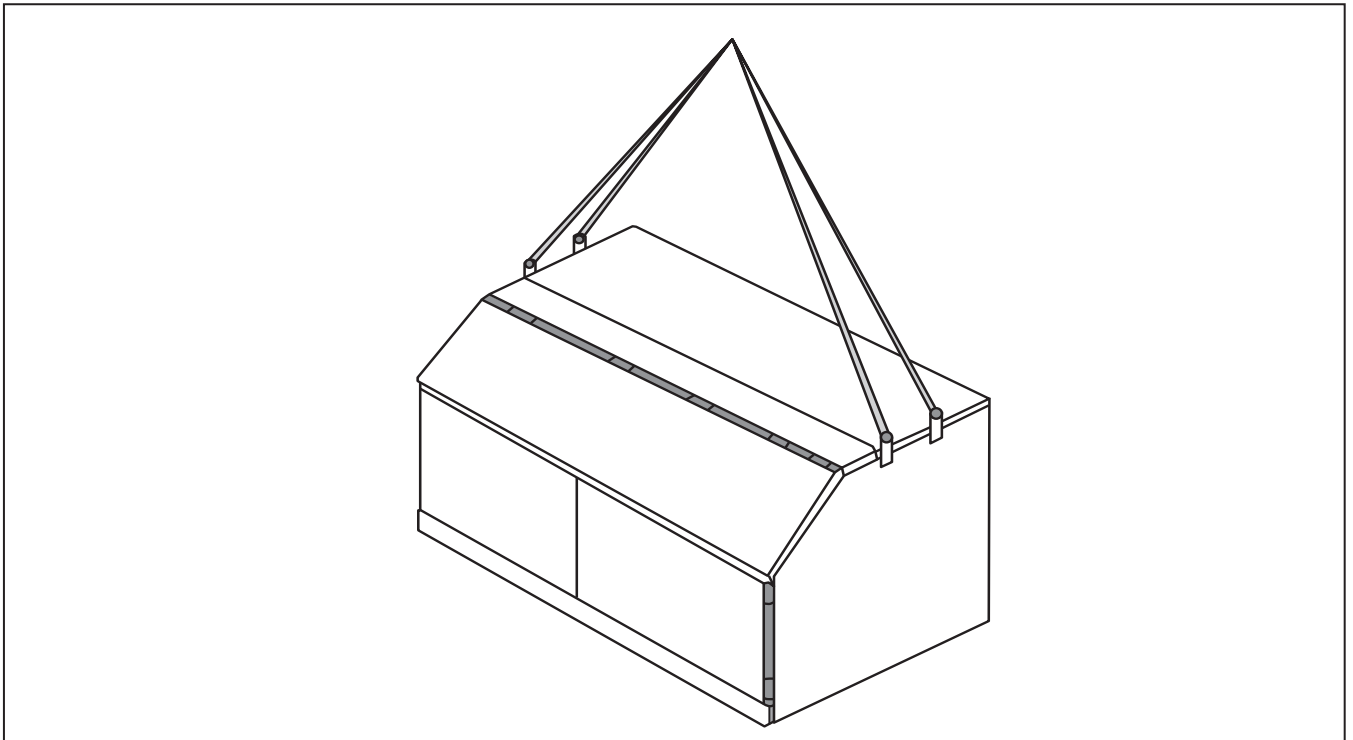


Figure 6. Hoisting a pad-mounted style Vista SD switchgear assembly (multi-way assembly shown).

Installation

Vault-Mounted Style

Switchgear Placement

- STEP 1.** At the installation site, remove all separately packaged components (if any) shipped with the switchgear assembly and set them aside.
- STEP 2.** Remove switchgear assembly from its crate and lift it into place, observing the precautions given under the “Handling” section on page 10. See Figure 7.

NOTICE

For vault-style switchgear assemblies mounted in the horizontal orientation (catalog number suffix “-V3”), the clearance between the back of the bus work and the floor of the vault is approximately ½-inch (13 mm). Be sure the floor beneath the switchgear assembly is clean and level. **Failure to follow this precaution may result in damage to the switchgear from contact with the floor or from contact with foreign objects lying on the floor.**

- STEP 3.** Secure the switchgear assembly in place using ½-inch fasteners (supplied by user).



Figure 7. Single-way vault-mounted style switchgear assembly shown in shipping crate. Shipping crates for multi-way switchgear assemblies are similar.

Single-Way Vault-Mounted Style Unit Installed Through 31½-Inch Manhole

- STEP 1.** At the installation site, remove all separately packaged components (if any) shipped with the switchgear assembly and set them aside.
- STEP 2.** Remove switchgear assembly from its crate.
- STEP 3.** Remove optional motor operator, if supplied (see S&C Instruction Sheet 695-520).
- STEP 4.** Remove optional continuous ground bus, if supplied, and the upper bushing or bushing-well adapters (see S&C Instruction Sheet 695-530). See Figure 8.
- STEP 5.** While the switchgear assembly is suspended by the hoist slings, remove the mounting stand feet.
- STEP 6.** Lower the switchgear assembly through the manhole opening.
- STEP 7.** Re-install the mounting stand feet removed in Step 5, and move the switchgear assembly into place.
- STEP 8.** Secure the switchgear in place using ½-inch fasteners (supplied by user).
- STEP 9.** Re-install the bushing or bushing-well adapters (see S&C Instruction Sheet 695-530) and the continuous ground bus (if furnished) removed in Step 4.
- STEP 10.** Re-install the motor operator (see S&C Instruction Sheet 695-520) removed in Step 3.

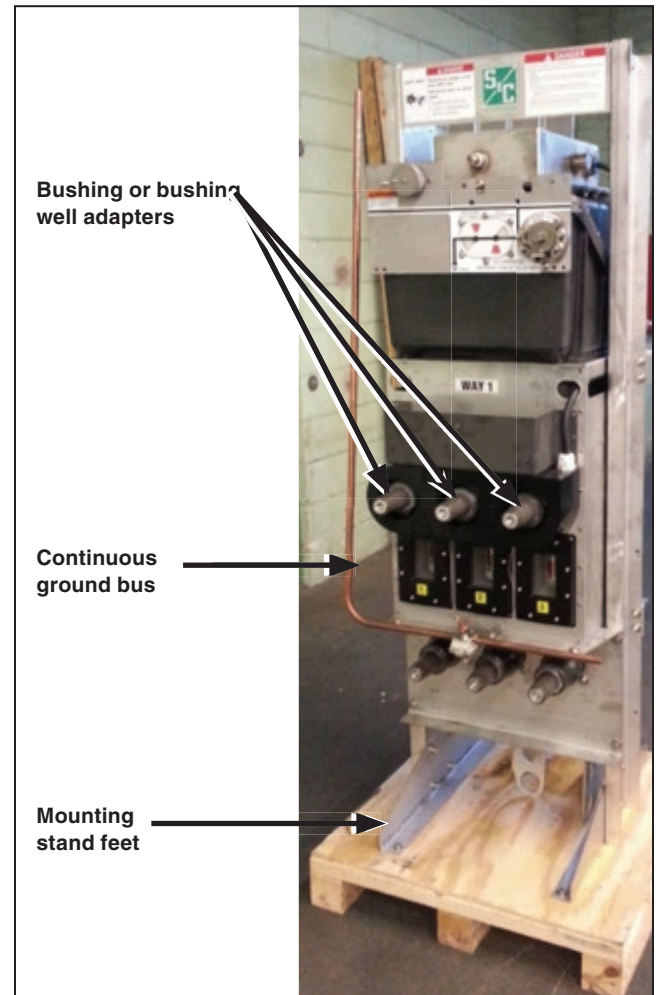


Figure 8. Vault-mounted switchgear assemblies are shipped on a skid.

Installation

Cables

⚠ WARNING

Before energizing the switchgear, replace the shipping covers on all bushings and bushing wells with elbows or insulated protective covers or caps. **Failure to replace the shipping covers on all bushings with elbows or insulated protective covers or caps can result in a flashover and serious personal injury or death.**

STEP 1. Remove the shipping covers from the 600-ampere bushing (yellow) or 200-ampere bushing wells (orange). See Figure 9.

NOTICE

ALWAYS follow proper cable-installation practices. When installing cable that will be attached to the switchgear, provide a strain-relief segment to minimize the load on the bushings. Cables must be allowed to expand and flex without putting a significant load on the bushings. For a pit, either loop the cable in the pit or bring it into the pit horizontally and up to the gear at a 90° angle. **Failure to follow these precautions can result in damage to the bushings and bushing wells.**

STEP 2. Install cable support brackets in accordance with the appropriate reference drawing included in the installation and operation information kit. See Table 1.

STEP 3. Terminate the cables with user-furnished separable insulated connectors, following the manufacturer's instructions.

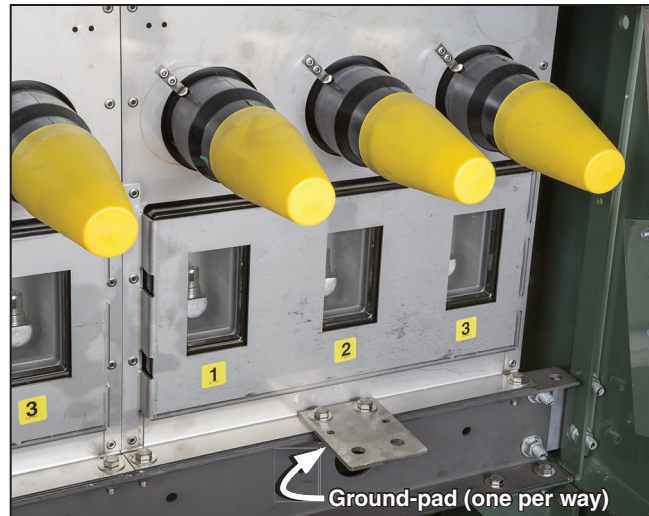


Figure 9. Remove the shipping covers from 600-ampere bushing—(yellow) or 200-ampere bushing wells (orange).

Table 1. Reference Drawings for Cable-Support Brackets

| Switchgear Style | | Reference Drawing |
|------------------|---|-------------------|
| Single-way | Vertical orientation, cables enter/exit from top, operating mechanism on bottom (catalog number suffix “-V1”) | RD-7540-1 |
| | Vertical orientation, cables enter/exit from bottom, operating mechanism on top (catalog number suffix “-V2”) | RD-7540-2 |
| | Horizontal orientation, cables enter/exit from sides (catalog number suffix “-V3”) | RD-7540-3 |
| Multi-way | Vertical orientation, cables enter/exit from top, operating mechanism on bottom (catalog number suffix “-V1”) | RD-7544-3-V1 |
| | Vertical orientation, cables enter/exit from bottom, operating mechanism on top (catalog number suffix “-V2”) | RD-7544-3-V2 |

Grounding

- STEP 1.** Connect the ground pads on each way of the switchgear assembly to the system ground in accordance with the user's standard grounding practice. See Figure 9 on page 14.
- STEP 2.** If the switchgear is furnished with the continuous ground bus (catalog number suffix "-O"), connect the ground bus to the system ground in accordance with the user's standard practice.
- STEP 3.** Use the equivalent of 4/0 copper (or cable sized in accordance with the user's standard practice) in either a single or multiple connection to realize the maximum momentary rating of the switchgear assembly. For a multiple cable connection, cables smaller than 1/0 copper or equivalent should not be used.
- STEP 4.** Connect the cable concentric-neutral wires to the grounding system as appropriate.

Fault Indicators

Fault indicators are to be furnished by the user and installed in accordance with the manufacturer's instructions. Optional mounting provisions for fault indicators (catalog number suffix "-F1" or "-F2") are available for Vista SD Underground Distribution Switchgear. If mounting provisions are specified, mount the fault indicators on the mounting brackets and attach the associated sensors to the cables below the cable terminations.

Installation

Pad-Mounted Style

Switchgear Placement

- STEP 1.** At the installation site, remove all separately packaged components (if any) shipped within the pad-mounted gear enclosure and set them aside.
- STEP 2.** Unbolt the switchgear assembly from its skid and lift the unit onto the mounting pad, observing the precautions given under the “Handling” section on page 10. See Figure 10. Refer to the catalog dimensional drawing furnished and verify the enclosure is positioned correctly and the unit is properly aligned with respect to the anchor bolts (or flush anchors).
- STEP 3.** Level the enclosure using metal shims (user provided) as required between the mounting pad and the enclosure. Then, secure the enclosure to the pad using the anchor brackets provided (see anchor-bolt detail on the catalog dimensional drawing). Make sure the hinged roof section and all doors open and the latch closes without binding. Binding indicates enclosure distortion that must be corrected by additional shimming.

Access to Interior

- STEP 1.** Remove the shipping clamp from the padlock recess. See Figure 11.
- STEP 2.** Insert a pentahead socket wrench or tool (or a hexhead socket wrench or tool if catalog number suffix “-H1” is specified) into the hinged roof latching mechanism. Rotate the wrench or tool 360° *counterclockwise* to unlatch the hinged roof. See Figure 12.

NOTICE

Do not apply any undue force when attempting to open the hinged roof or a door. The use of undue force may damage the latching mechanism. If optional key interlocks are provided, make certain the interlocks are in their correct positions to allow door opening.



Figure 10. Pad-mounted switchgear assemblies are shipped on a skid.



Figure 11. Remove the shipping clamp.



Figure 12. To unlock the hinged roof, turn the pentahead socket wrench 360° *counterclockwise*.

STEP 3. Lift the hinged roof to approximately 45° above horizontal; the “hold-open” latching mechanism will engage automatically. See Figure 13.

⚠ WARNING

After lifting the roof open and ensuring the “hold-open” latching mechanism is engaged, release pressure on the hinged roof slowly. **Failure to engage the “hold-open” latching mechanism could result in personal injury.**

STEP 4. To gain access to the termination compartment, lift the latch handle to open the right-hand door or the center door. See Figure 14. Open door far enough to permit the door-holder mechanism to engage automatically.

STEP 5. To open the left-hand door, lift the finger latch. See Figure 15. Open door far enough to permit the door-holder mechanism to engage automatically.

Note: Optional pad-mounted style enclosures furnished on switchgear assemblies with five or six ways have three doors. The right-hand door and the center door have lift-style latch handles. The left-hand door has a finger latch.



Figure 13. Lift the hinged roof all the way open to engage the “hold-open” latching mechanism.



Figure 14. To gain access to the termination compartment, lift the latch handle to open the right-hand door.



Figure 15. To open the left-hand door, lift the finger latch.

Installation

Cables

STEP 1. Remove the cover panels by unscrewing the pins connecting the panels to the front of the enclosure. Lift the front of each panel upwards and pull outwards to disengage the tab at the back of the panel from the slot at the bottom of the operating mechanism. See Figure 16.

STEP 2. When pulling cables, the hinged roof can be placed in a second, more vertical position. While pushing up slightly on the hinged roof, release the latches on the “hold-open” mechanisms on both sides of the switchgear enclosure. Lift the hinged roof to the second, more vertical position; the “hold-open” latching mechanism will automatically engage. See Figure 17 on page 19. Lifting the hinged roof to the second, more vertical position is a two-person exercise, especially on switchgear assemblies having four or more ways.

NOTICE

The hinged roof cannot be placed in the second, more vertical position if the hinged-roof counterweights are attached. If necessary, remove the pins connecting the upper and lower lever arms of the counterweight mechanism. See Figure 18 on page 20.

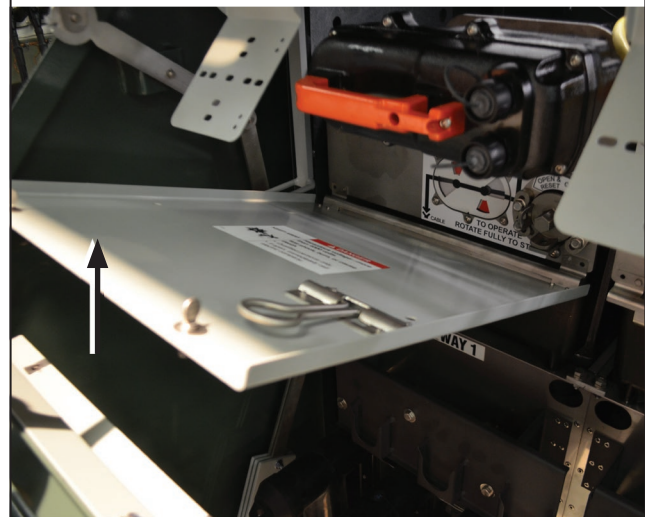
⚠ WARNING

Before energizing the switchgear, replace the shipping covers on all bushings and bushing wells with elbows or insulated protective covers or caps. **Failure to replace the shipping covers on all bushings with elbows or insulated protective covers or caps can result in a flashover and serious personal injury or death.**

STEP 3. Remove the shipping covers from the 600-ampere bushings (yellow) or 200-ampere bushing wells (orange). See Figure 20 on page 21.



(a)



(b)

Figure 16. To remove cover panels, unscrew the pins connecting the panel to the enclosure (a), lift up on the panel and pull outward (b).

NOTICE

ALWAYS follow proper cable-installation practices. When installing cable that will be attached to the switchgear, provide a strain-relief segment to minimize the load on the bushings. Cables must be allowed to expand and flex without putting a significant load on the bushings. For a pit, either loop the cable in the pit or bring it into the pit horizontally and up to the gear at a 90° angle. **Failure to follow these precautions can result in damage to the bushings and bushing wells.**

STEP 4. Install cable-support brackets in accordance with the appropriate reference drawing included in the installation and operation information kit. See Table 2.

Table 2. Reference Drawings for Cable-Support Brackets

| Switchgear Style | Reference Drawing |
|---|-------------------|
| All styles ^① (catalog number suffix "-P1") | RD-7568 |

^① Cable-support brackets are not required if the switchgear assembly is supplied with a pad-mounted style enclosure to be installed on a concrete pad.

STEP 5. Terminate the cables with user-furnished separable insulated connectors, following the manufacturer's instructions.

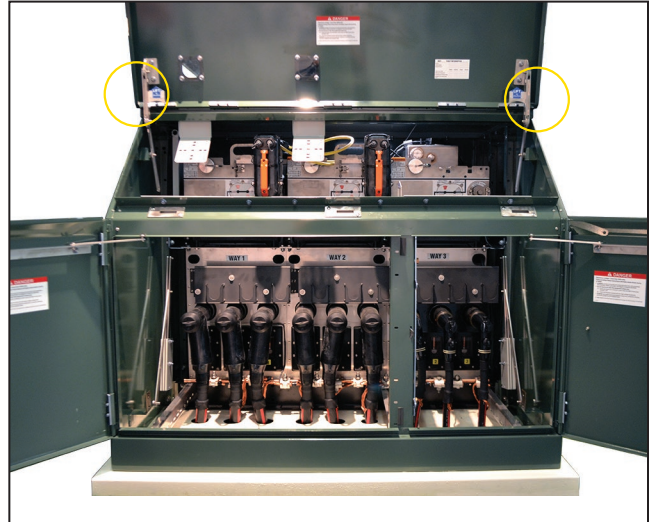


Figure 17. Release the latches on the “hold-open” mechanisms (circled) and lift the roof to the second, more vertical position (shown).

Attach Hinged-Roof Counterweights

- STEP 1.** If the roof was previously lifted to the second most vertical position, return it to the 45° position. On the right-hand side of the switchgear enclosure, while pushing up on the hinged roof, release the latch on the “hold-open” mechanism. See Figure 23 on page 23. Allow hinged roof to sag against the “hold-open” mechanism. At the other end of the enclosure, push up on the hinged roof just enough to allow the left-hand “hold-open” mechanism latch to be released, ensuring the right-hand “hold-open” latching mechanism does not re-engage. Lower the hinged roof to the 45° position.
- STEP 2.** To attach hinged-roof counterweights, first remove the shipping materials surrounding the counterweight mechanisms on both ends of the enclosure. See Figure 18. Then, cut the plastic cable ties holding the longer lever arms in the down position.
- STEP 3.** At one end of the enclosure, pivot the longer lever arm up and position it on the back side of the shorter upper lever arm (i.e., the longer lever arm should be closest to the side wall of the enclosure). Align the two holes in both lever arms—it may be necessary to lift up slightly on the longer lever arm to achieve this goal—and press the captive pin through the holes in both lever arms. Spring-loaded tabs in the pin will automatically extend to engage the retaining pin.
- STEP 4.** Repeat Step 3 at the opposite end of the enclosure.

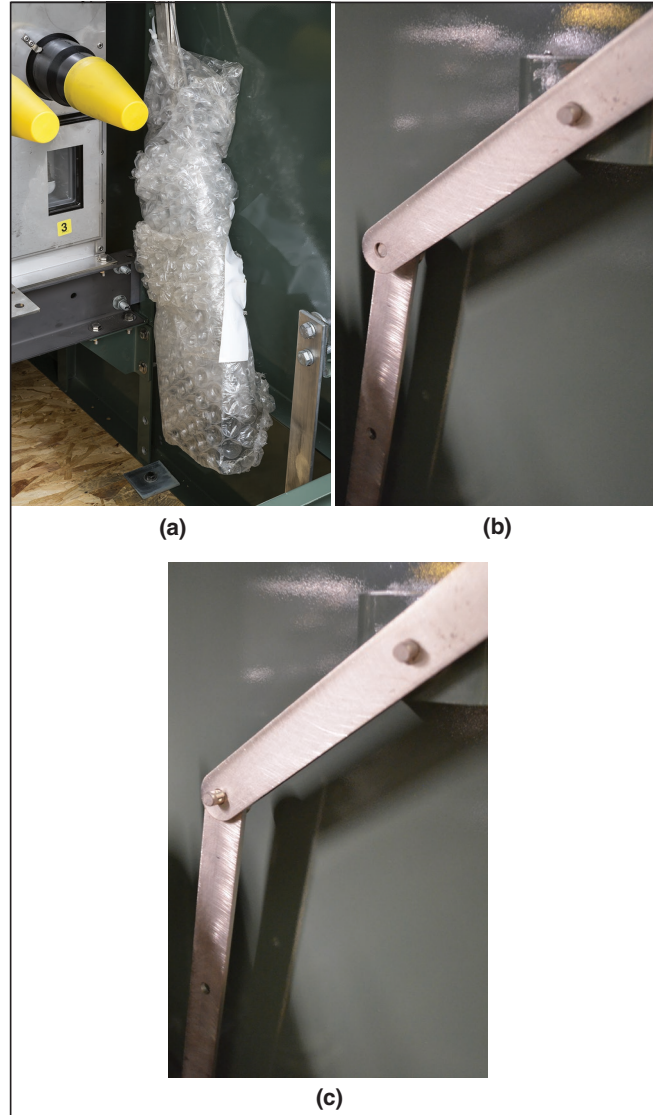


Figure 18. To attach the hinged-roof counterweights, remove the shipping material surrounding the counterweight mechanism (a), pivot longer lever arm up and position it on the back side of the shorter upper lever arm (b), push the captive pin through the holes in both lever arms (c). Spring-loaded tabs in the pin will automatically extend to engage the pin.

Install Termination Compartment Cover Panels

Carefully re-install the cover panels over each way by inserting the tab at the back of the panel into the slot at the bottom of the operating mechanism. See Figure 19. When lowered to the horizontal position, tighten the pins on the front of the panel to engage them with the front of the enclosure.

Grounding

STEP 1. Connect the ground pads on each way to the enclosure ground pad. Then, connect the enclosure ground pad to the system ground in accordance with the user's standard practice. See Figure 20, and Figure 21 on page 22.

If the switchgear is furnished with the continuous ground bus (catalog number suffix "-O"), connect the ground bus to the enclosure ground pad. Then, connect the enclosure ground pad to the system ground in accordance with the user's standard practice.

Use the equivalent of 4/0 copper (or cable sized in accordance with the user's standard practice) in either a single or multiple connection to realize the maximum momentary rating of the switchgear assembly. For a multiple connection, cables smaller than 1/0 copper or equivalent should not be used.

STEP 2. Connect the cable concentric-neutral wires to the grounding system as appropriate.

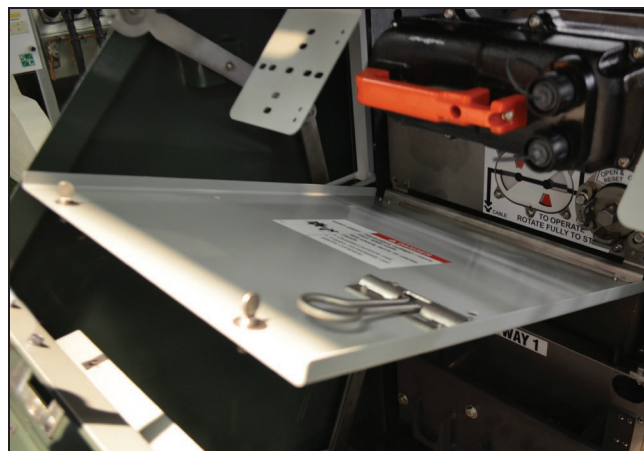


Figure 19. Install the cover panels over each way by inserting the tab at the back of the panel into the slot at the bottom of the operating mechanism.

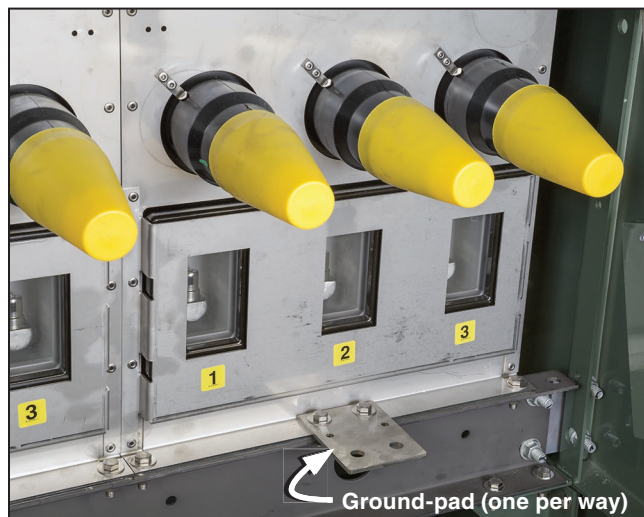


Figure 20. Remove the shipping covers from 600-ampere bushing (yellow) or 200-ampere bushing wells (orange).

Fault Indicators

Fault indicators are to be furnished by the user and installed in accordance with the manufacturer's instructions. Optional mounting provisions for fault indicators (catalog number suffix "-F1" or "-F2") are available for Vista SD Underground Distribution Switchgear. If mounting provisions are specified, mount the fault indicators on the mounting brackets and attach the associated sensors to the cables below the cable terminations.



Figure 21. The enclosure ground pad.

Closing the Doors and the Hinged Roof

- STEP 1.** Lift door-holder mechanism up to allow left-hand door to swing closed. See Figure 22. Make sure the finger latch engages the pin. See Figure 15 on page 17.
- STEP 2.** Lift the door-holder mechanism up to allow right-hand door or the center door to swing closed. See Figure 22. Close the door completely. Make sure the latch handle drops down fully to engage the door latching mechanism.
- STEP 3.** On the right-hand side of the switchgear enclosure, while pushing up on the hinged roof, release the latch on the “hold-open” mechanism. See Figure 23. Allow hinged roof to sag against the right-hand “hold-open” mechanism. At the other end of the enclosure, push up on the hinged roof just enough to allow the left-hand “hold-open” mechanism latch to be released, ensuring the right-hand “hold-open” latching mechanism does not re-engage. Lower the hinged roof into the closed position.
- STEP 4.** Insert a pentahead socket wrench or tool (or a hexhead socket wrench or tool if catalog number suffix “-H1” is specified) into the hinged roof latching mechanism. Rotate wrench or tool 360° *clockwise* to fully latch the hinged roof. See Figure 24.
- STEP 5.** Insert padlock shackle through the hole in padlock recess and lock the padlock.



Figure 22. Lift the door-holder mechanism up to allow the door to swing closed.



Figure 23. While pushing up on the hinged roof, release the latch on the “hold-open” mechanism.



Figure 24. To fully latch the hinged roof, rotate the pentahead socket wrench or tool 360° clockwise.

Completing the Installation

STEP 1. A resilient closed-cell gasket on the bottom flange of the enclosure protects the finish from being scratched during installation and isolates it from the alkalinity of a concrete foundation. This gasket also helps to seal the enclosure; to guard against entry of rodents, insects, and weeds; and to discourage tampering.

In the event the gasket cannot compensate for an uneven foundation, grout the bottom of the enclosure as necessary. Any grout applied should be recessed enough to permit caulking. To complete the installation, caulk around the bottom of the enclosure; a weather-proof room-temperature vulcanizing (RTV) silicone-rubber compound is recommended. See Figure 25.

Apply a suitable compound to fill the spaces between the cable and the conduit, and cap all empty conduits to prevent the entry of moisture and rodents.

STEP 2. Wipe down the exterior of the enclosure with a clean, damp cloth. Refinish any scratches or abrasions with S&C touch-up finish and red-oxide primer, which are available in aerosol spray cans. Order catalog number 999-080 for light gray finish, 999-058 for olive green finish, 9991363-493 for seafoam green, 9991363-488 for equipment green, and 9999-061 for red-oxide primer. See Figure 26.

No other finish or primer is approved. The area to be touched up should be cleaned to remove all oil and grease. Sand the area to remove any traces of rust that may be present, and make sure all edges are feathered before applying primer.

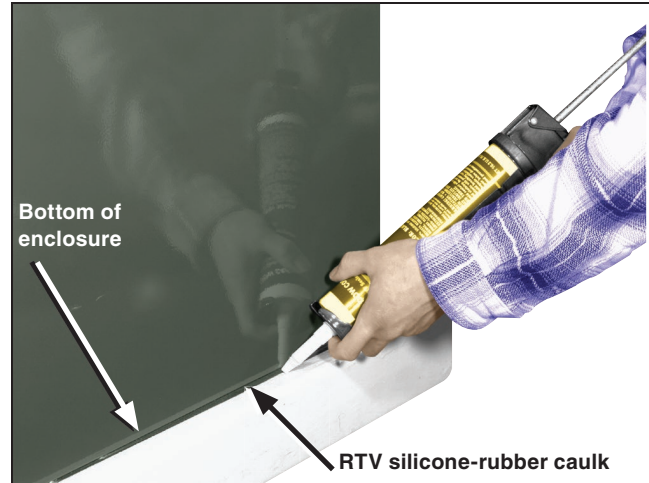


Figure 25. To complete the installation, caulk around the bottom of the enclosure using a weather-proof, room-temperature vulcanizing (RTV) silicone-rubber compound.

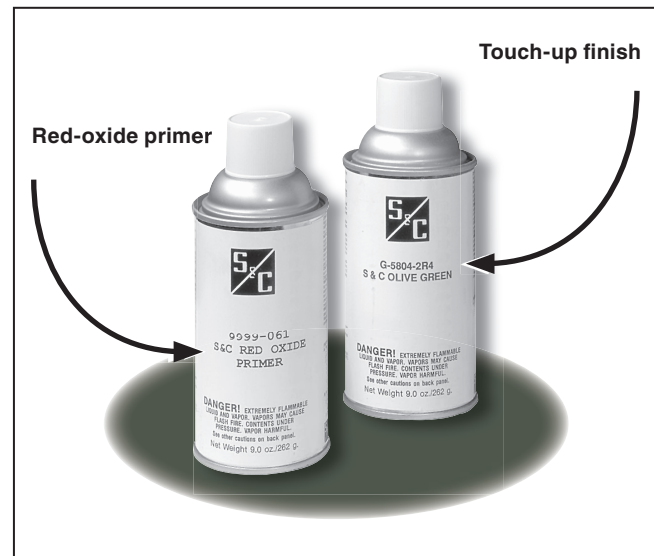


Figure 26. Refinish any scratches or abrasions with S&C red-oxide primer and S&C touch-up finish.

Routine Switchgear Testing

For the convenience of users who normally perform electrical tests on system components such as switchgear, appropriate withstand test values for Vista SD Underground Distribution Switchgear are given in the following tables. These test values are significantly greater than the normal operating voltage of the switchgear and are near the flashover voltage of the switchgear. They should be applied only when the switchgear is completely de-energized and disconnected from all power sources.

WARNING

When performing electrical withstand tests on Vista SD Underground Distribution Switchgear, always observe the following precautions. **Failure to observe these precautions can result in a flashover, injury, and equipment damage.**

1. Completely de-energize the switchgear and disconnect it from all power sources.
2. Terminate bushings with an insulated cap or other appropriate cable termination capable of withstanding the test voltage.

Dc Cable Testing and Fault Locating

Dc testing of installed cables is performed to determine the condition of the cables and to locate faults. Industry standards such as IEEE 400, "IEEE Guide for Making High-Direct-Voltage Tests on Power Cable Systems in the Field," describe such testing and should be referenced for selection of the test procedures. Dc testing also includes cable "thumping" (the sudden application of dc voltage from a large capacitor for the purpose of fault locating), which causes transients and voltage doubling at the end of the open cable. When the cables are attached to the switchgear, the unit will also be subjected to the dc test voltages.

WARNING

The dc withstand capability of the switchgear may be reduced because of aging, damage, or electrical or mechanical wear. Therefore, the dc test voltage must be selected so it does not exceed the withstand limits of the switchgear. **Application of dc test voltage greater than the withstand capability of the switchgear can result in a flashover, injury, and equipment damage.**

WARNING

Do not exceed the test voltages given in Table 4 on page 26. Exceeding the test voltages can cause a flashover of the isolating gap or phase-to-phase insulation of the switchgear. **This can lead to a power-frequency fault in the gear of the dc test source, and result in severe personal injury or death.**

Table 3. Maximum Insulation Test Voltages

| Vista SD Switchgear Rating, kV | | | Withstand Test Voltage, kV | |
|--------------------------------|------|---------------|------------------------------|------------------|
| IEC | IEEE | Impulse (BIL) | Power Frequency ^① | Dc ^{②③} |
| 12 | 17.5 | 95 | 31 | 42 |
| 24 | 29 | 125 | 45 | 62 |

① The power-frequency withstand test voltages listed in the table are approximately 80% of the design values for new equipment.

② The dc withstand test voltages listed in the table are approximately 80% of the design values for new equipment.

③ Dc withstand test voltages are given for reference for those users performing dc withstand tests. The presence of these values does not imply a dc withstand rating or performance requirements for the switchgear. A dc withstand design test is specified for new equipment because the switchgear may be subjected to dc test voltage when connected to the cable. The dc withstand test voltages listed in the table are approximately equal to the ac test voltage.

Vista SD Underground Distribution Switchgear has been designed to allow dc testing of the cables with the other ways of the gear energized. After testing, the dc test equipment should be used to discharge any stored charge on the cable. The dc test voltages and dc cable-thumping voltages should not exceed the voltages given in Table 4.

⚠ WARNING

When testing cables connected to energized switchgear, proper isolation of the power-frequency source from the dc test source must be maintained. Follow the recommendations provided by the manufacturer of the dc test equipment or fault-locating equipment. Follow the user's operating and safety procedures for grounding the cable, connecting the dc test source, isolating the dc test source (in case of flashover), ungrounding the cable, applying the dc test source, discharging the cable, and regrounding the cable. **Failure to follow these recommendations can result in a flashover, injury, and equipment damage.**

An acceptance test is a field test made after installation of the power cable system, including terminations and joints, but before the cable system is placed in normal service. A maintenance test is a field test made during the operating life of a power cable system to detect deterioration and to check serviceability of the system.

VLF cable testing may subject the Vista SD Underground Distribution Switchgear to the ac test voltage when the cables are attached to the switchgear. S&C recommends the Vista SD switchgear be completely de-energized and disconnected from all power sources when performing VLF cable testing. However, Vista SD switchgear has been designed to allow VLF testing of the cables with the other ways of the gear energized, if necessary.

Upon completion of the VLF cable testing, or an interruption in the testing, the test set must be turned off to discharge the cable circuit and test set. Then, the cable system must be grounded.

The VLF sinusoidal waveform test voltage applied to the Vista SD switchgear must not exceed the voltages listed in Table 5 on page 27.

Very Low Frequency (VLF) Cable Testing

IEEE Standard 400.2, "IEEE Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF) (less than 1 Hz)," addresses the application of 0.01- to 1-Hz high-voltage ac excitation as one means for evaluating a shielded power cable system during an acceptance test or a maintenance test. The cable system must be taken out of service for this testing.

Table 4. Maximum Cable Testing and Cable Thumping Dc Withstand Voltages

| Vista SD Switchgear Rating, kV | | | Dc Cable Test Voltage, kV | Dc Cable Thumping Voltage, kV ^① |
|--------------------------------|------|---------------|---------------------------|--|
| IEC | IEEE | Impulse (BIL) | | |
| 12 | 17.5 | 95 | 34 | 17 |
| 24 | 29 | 125 | 40 | 20 |

① The dc cable thumping voltage is 50% of the dc cable test voltage because voltage doubling will occur at the open end of the cable, which is assumed to be a unit of Vista SD Underground Distribution Switchgear. If the open end of the cable is grounded, the dc cable-thumping voltage applied to the cable and switchgear can be increased to the dc cable test voltage.

⚠ WARNING

The VLF ac withstand capacity of the switchgear may be reduced because of aging, damage, or electrical or mechanical wear. Therefore, the ac test voltage must be selected so it does not exceed the withstand limits of the switchgear. **Application of ac test voltage greater than the withstand capability of the switchgear can result in a flashover, injury, and equipment damage.**

⚠ WARNING

Do not exceed the test voltages given in Table 5. Exceeding the test voltages can cause a flashover of the isolating gap or phase-to-phase insulation of the switchgear. **This can lead to a power-frequency fault in the gear or the VLF test source, and result in severe personal injury or death.**

⚠ WARNING

When testing cables connected to energized switchgear, proper isolation of the power-frequency source from the VLF test source must be maintained. Follow the recommendations provided by the manufacturer of the VLF test equipment. Follow the user's operating and safety procedures for grounding the cable, connecting the VLF test source, isolating the VLF test source (in case of flashover), ungrounding the cable, applying the VLF test source, discharging the cable, and regrounding the cable. **Failure to follow these recommendations can result in a flashover, injury, and equipment damage.**

NOTICE

When VLF cable testing has been completed, or has been interrupted, the cable system and the test equipment must be discharged. Allow the time needed to fully discharge the cable system and test equipment. **Failure to fully discharge the cable system and test equipment can result in serious damage to the cable system and test equipment.**

Fault-Interrupter Testing

When performing dielectrical tests on Vista SD Underground Distribution Switchgear, the vacuum fault interrupters will not be subject to voltage across the open gap because the disconnect switch isolates the vacuum interrupters from the test voltage. Since the vacuum interrupter will not be energized across the open gap, there is no exposure to the X-rays normally associated with high-voltage testing of vacuum devices. Routine testing of the vacuum fault interrupters is not recommended. For those users who desire to test the vacuum interrupters, contact the nearest S&C Sales Office for specific instructions.

Table 5. Vista SD Switchgear Very Low Frequency (.01- to 1-Hz) Sinusoidal Waveform Maximum Test Voltages

| Vista SD Switch-gear System Class, kV | Acceptance Test (phase to ground) | | Maintenance Test (phase to ground) | |
|---------------------------------------|-----------------------------------|----------|------------------------------------|----------|
| | kV, RMS | kV, Peak | kV, RMS | kV, Peak |
| 15.5 | 23 | 33 | 19 | 26 |
| 27 | 36 | 51 | 27 | 38 |