

Inspection Recommendations

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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 source-transfer PMH Pad-Mounted Gear. Become familiar with the Safety Information and Safety Precautions on pages 4 and 5. The latest version of this publication is available online in PDF format at sandc.com/en/contact-us/product-literature/.

Retain this Instruction Sheet

This instruction sheet is a permanent part of source-transfer PMH Pad-Mounted Gear. Designate a location where users 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 source-transfer PMH Pad-Mounted Gear are listed in the ratings table in Specification Bulletin 663A-31. Ratings for this gear are listed on the ratings label on the interior of the doors (right-hand door only for double door models.)

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 standard warranty contained in the seller's standard conditions of sale (as set forth in Price Sheet 150) does not apply to source-transfer PMH Pad-Mounted Gear where fuse units, fuse unit end-fittings, holders, refill units, or switch blades of other than S&C manufacture are used in conjunction with S&C SML Mountings. Nor does it apply to source-transfer PMH Pad-Mounted Gear where other than Fault Fiter® Electronic Power Fuses, S&C Switch Blades, or the current-limiting fuses listed in Table 1 of S&C Information Bulletin 660-50 are used in conjunction with Fault Fiter Electronic Power Fuse Mountings and S&C Holders designed therefor, or when current-limiting fuses are applied other than as set forth under the "Recommended Voltage Ratings" section of S&C Information Bulletin 660-50.

The seller's standard warranty does not apply to major components not of S&C manufacture, such as remote terminal units and communication devices, including hardware, software, resolution of protocol-related matters, and notification of upgrades or fixes for those devices.

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 the product. Become familiar 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 any portion of this instruction sheet is unclear and assistance is needed, contact the 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 source-transfer PMH Pad-Mounted Gear.



Replacement Instructions and Labels

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

⚠ DANGER



S&C Source-Transfer PMH Pad-Mounted Gear operate 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 S&C Source-Transfer PMH Pad-Mounted Gear 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. **DOORS.** High-voltage compartment doors must be securely closed and latched, with padlocks in place at all time unless work is being performed inside the enclosure. Mini-Rupter® Switches have switch operating-shaft access covers located on the sides of the pad-mounted gear enclosure. They must be closed and padlocked at all times unless the switches are being operated.
4. **KEY INTERLOCKS.** Optional key interlocks, if furnished, must be in place. Check the operating sequence of the key interlocks to verify proper sequencing. After the pad-mounted gear is installed, destroy all duplicate keys or make them accessible only to authorized persons so the key-interlock scheme will not be comprised. Key interlocks are not security locks and are not substitutes for padlocks.
5. **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. If optional key interlocks are provided, make sure the interlocks are in their correct positions to allow door opening.
6. **SAFETY LABELS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels.
7. **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, especially when handling fuses and barriers within high-voltage compartments.
8. **GROUNDING.** The S&C Source-Transfer PMH Pad-Mounted Gear enclosure must be connected to a suitable earth ground before energizing and at all times when energized.
9. **FUSES.** Make sure fuses are disconnected from all power sources (including backfeed) before being inspected or replaced.
10. **MINI-RUPTER SWITCHES.** Always confirm the **Open/Close** position of Mini-Rupter Switches by visually observing the position of the switch blades.
11. **ENERGIZED COMPONENTS.** Always assume both terminals of any switch or fuse are energized unless proved otherwise by test, by visual evidence of open-circuit conditions on both terminals, or by observing that both terminals are grounded.

NOTICE

S&C recommends switchgear be completely de-energized and properly grounded according to the user's operating and safety procedures and be thoroughly cleaned by hand. If it is not possible to de-energize the gear, the use of pressure-sprayed dry ice (solid CO₂) is an acceptable alternative cleaning method. The use of pressure-sprayed abrasives or solvents is specifically not recommended because such abrasives or solvents will damage the switchgear.

This publication contains inspection and maintenance recommendations for source-transfer PMH Pad-Mounted Gear equipped with the Micro-AT Source-Transfer Control or the earlier vintage AT-12 Source-Transfer Control.

To successfully complete the inspection procedures involving the Micro-AT or AT-12 controls, the gear must be energized with adequate voltage available on both power sources. S&C recommends this inspection be performed at least every year. Refer to Table 1 on page 8 and Table 2 on page 10

S&C generally recommends the pad-mounted gear enclosure and the components located in high-voltage compartments be inspected six months to a year after installation and then every five years thereafter to ensure continued proper performance of the gear. Each user's own experience as well as environmental conditions at the installation will determine whether more or less frequent inspections are required. Refer to Table 3 on page 12.

A partial visual inspection of the gear for general cleanliness and to confirm the proper alignment and condition of the barriers and terminators may be performed with the gear energized, if permitted by the user's own operating practices and provided standard precautionary practices are followed. Such visual inspections may be performed for other reasons as well. However, the more detailed inspection and maintenance procedures outlined in this publication may only be completed when the unit is completely de-energized and grounded.

If maintenance is required beyond the scope of this publication, or if replacement parts are necessary, contact the nearest S&C Sales Office. Have the complete catalog number of the gear and date of shipment (as shown on the nameplate) available for reference.

Micro-AT Source-Transfer Control

Units of source-transfer pad-mounted gear shipped as of July 1992 are equipped with the Micro-AT control. This control uses an electronic microprocessor to perform specific control operations, as directed by settings programmed into the control at the factory and in the field. These settings are entered into the control by means of a keypad on the front panel and may be reviewed via a liquid-crystal display.

NOTICE

When following the inspection procedures involving the Micro-AT control, decouple both switch operators from their associated Mini-Rupter Switches. Switching operations will result in temporary service interruptions if the operators are coupled.

Refer to S&C Instruction Sheet 663-503, “S&C Source-Transfer PMH Pad-Mounted Gear: With Micro-AT® Control: *Operation*” for operating instructions regarding barriers, fusing, and switching as well as for instructions on decoupling the switch operators from the Mini-Rupter Switches. For field programming and operation of the Micro-AT control, refer to S&C Instruction sheet 515-500, “Micro-AT® Source-Transfer Controls: *Field Programming and Operation*.”

For instructions regarding operation of the optional **Test Panel** feature, refer to S&C Instruction Sheet 515-505, “Micro-AT® Source-Transfer Controls: *Instructions for Operation of Test Panel*.” For Micro-AT control troubleshooting, refer to S&C Instruction Sheet 515-520, “Micro-AT® Source-Transfer Controls: *Troubleshooting Guide*.”

Applicable instruction sheets, drawings, and wiring diagrams are in an envelope entitled, “Installation and Operation Information Kit,” which should be located in Compartment 1.

AT-12 Source-Transfer Control

Units of source-transfer pad-mounted gear shipped before July 1992 were equipped with the AT-12 control. Operating parameters are set in the field using selector switches and adjustment dials located on the programming panel of the control.

NOTICE

When following the inspection procedures involving the AT-12 control, decouple both switch operators from their associated Mini-Rupter Switches. If the pad-mounted gear to be inspected is not furnished with the **Decoupling** feature, the inspection procedures can still be followed, but exercising the operators will result in live switching and momentary interruptions of service to the load.

For operating instructions regarding the source-transfer pad-mounted gear (including the AT-12 control) or AT-12 control troubleshooting, contact the nearest S&C Sales Office. Have the complete catalog number of the gear, date of shipment (as shown on the nameplate), operating modes, and timer settings available.

Applicable instruction sheets, drawings, and wiring diagrams are in an envelope entitled “Installation and Operation Information Kit,” located in Compartment 1.

Inspection Procedures

Table 1. Inspection Procedures for Pad-Mounted Gear Equipped with Micro-AT Source-Transfer Control^①

Item	Procedures
Switch operators	<ol style="list-style-type: none"> Place the MANUAL/AUTOMATIC operation selector switch on the Micro-AT control in the Manual position and decouple both operators from their associated Mini-Rupter Switches. (Switching operations will result in temporary service interruptions if the operators are coupled.) <div style="border: 1px solid black; background-color: #0070C0; color: white; text-align: center; padding: 5px; margin: 10px 0;">NOTICE</div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;">Switching operations will result in temporary service interruptions if the operators are coupled</div> <ol style="list-style-type: none"> Open the preferred-source operator by pressing the appropriate OPEN pushbutton. After opening, the operator should recharge in less than 35 seconds. Close the alternate-source operator by pressing the appropriate CLOSE pushbutton. This operator should also recharge in less than 35 seconds. Each switch operator should be given an exercise consisting of five or more power-operated operations unless normal operating duty provides equal or greater exercise. Return both operators to their original positions (preferred Closed; alternate Open).
Clock	<ol style="list-style-type: none"> Press the <Time> menu key on the Micro-AT control. Then, press the <Last> item key. The "HH:MM:SS" (hour:minute:second) item will appear on the display. If necessary, reset the time as directed below. To reset the time, first press the <Change> key. After that, press each digit of the access-code number and the <Enter> key. Press the number keys corresponding to the desired value, and press the <Enter> key again.
Lamps, display, and keypad	<ol style="list-style-type: none"> Press the <Test> menu key on the Micro-AT control. Then, press the <Next> item key. The Test Lamps message will appear on the display. Press the <Enter> key and confirm the lamps on the control flash a total of five times. Press the <Next> item key again. The Test Display message will appear on the display. Press the <Enter> key, and confirm all dot segments comprising the characters of the display alternately appear black and then disappear a total of five times. Press the <Next> item key again. This time the Test Keypad message will appear on the display. Press the <Enter> key. Now individually press all the keys on the control and verify the value or name of each key pressed appears on the display. When finished, press the <Quit> key.
Transfer on loss of source and return of source	<ol style="list-style-type: none"> While still in the Test menu, press the <Next> item key one more time. The Enable Test Keys message will appear on the display. Press the <Change> key. Then, select On mode by pressing the <Enter> key. The test keys are now enabled for 15 minutes. Place the MANUAL/AUTOMATIC operation selector switch in the Automatic position. If the Micro-AT control has been programmed for automatic return: <ol style="list-style-type: none"> Simulate a prolonged loss of preferred-source voltage by pressing and holding in the <Loss of Voltage> key for the left source or right source, as appropriate. Verify the time to initiate transfer is the same as the loss-of-source time delay programmed into the control for the preferred source. Also confirm the associated source voltage lamp extinguishes and the switch operator targets correctly indicate an Open or Closed position. Now, release the <Loss of Voltage> key to simulate a return of the preferred-source voltage. Verify the time to initiate back transfer is the same as the return-of-source time delay programmed into the control. Confirm the associated source voltage lamp relights. Verify the switch operator targets' positions. If the Micro-AT control has been programmed for Hold Return mode: <ol style="list-style-type: none"> Simulate a prolonged loss of preferred-source voltage by pressing and holding in the <Loss of Voltage> key for the left source or the right source, as appropriate. Verify the time to initiate transfer is the same as the loss-of-source time delay programmed into the control for the preferred source. Also confirm the associated SOURCE VOLTAGE lamp extinguishes and the switch operator targets correctly indicate an Open or Closed position. Release the <Loss of Voltage> key to simulate a return of the preferred-source voltage, and wait a sufficient length of time to verify back transfer does not occur. Confirm the associated SOURCE VOLTAGE lamp relights. Now, simulate a loss of alternate-source voltage by pressing and holding in the <Loss of Voltage> key for the left source or the right source, as appropriate. Verify the time to initiate back transfer is the same as the loss-of-source time delay programmed into the control for the alternate source. Confirm the associated SOURCE VOLTAGE lamp extinguishes, and then release the <Loss of Voltage> key. Verify the switch operator targets' positions. Return the MANUAL/AUTOMATIC operation selector switch to the Manual position.

^① If the source-transfer pad-mounted gear being inspected does not operate as indicated in these inspection recommendations, refer to the Micro-AT troubleshooting guide, S&C Instruction Sheet 515-520. If further assistance is needed, contact the nearest S&C Sales Office.

Have the complete catalog number of the gear, date of shipment (as shown on the nameplate), operating characteristics, and voltage-, current-, and time-related operating parameters available for reference.

TABLE CONTINUED ►

Table 1. Inspection Procedures for Pad-Mounted Gear Equipped with Micro-AT Source-Transfer Control^①—Continued

Item	Procedures
Optional Overcurrent Lockout feature	<ol style="list-style-type: none"> 1. If the test keys are not enabled, press the <Test> menu key. Then press the <Last> item key. The Enable Test Keys message will appear on the display. Press the <Change> key and select On mode by pressing the <Enter> key. The test keys are now enabled for 15 minutes. 2. Place the MANUAL/AUTOMATIC operation selector switch on the Micro-AT in the Automatic position and simulate a fault cleared by feeder fuses by momentarily pressing the <Overcurrent> key for the preferred source. Verify the LOCKOUT lamp lights for a period equal to the lockout-reset time delay programmed into the Micro-AT control. 3. Now, simulate a lockout resulting from a fault cleared by a source-side protective device. To accomplish this, press the <Overcurrent> key for the preferred source and confirm the LOCKOUT lamp lights. Then, press and hold in the associated <Loss of Voltage> key. Release the <Loss of Voltage> key when the preferred-source operator opens, and verify the alternate-source operator remains open and locked out. 4. Return the MANUAL/AUTOMATIC operation selector switch to the Manual position and press the <Reset> key to cancel the Lockout condition. Confirm that the LOCKOUT lamp extinguishes. Then, close the preferred-source operator by pressing the appropriate CLOSE pushbutton.
Event log	<ol style="list-style-type: none"> 1. Press the <Event> menu key. Then, press the <Next> item key. The date, time, and event ID for the last control operation will appear on the display. Confirm the event ID on the display is “218” (enter manual-software). Press the <<> key to view the earlier event, and confirm the event ID on the display is “11” (local to manual control). 2. To view the event IDs for earlier or later control operations, press the <<> or <>> key respectively. The event IDs that appear on the display will vary depending on system conditions and programming of the Micro-AT control. 3. When no additional items are to be reviewed, press the <Quit> key. Confirm the EVENT lamp extinguishes.
Before leaving the gear...	<p>So the Micro-AT control is ready for automatic operation when leaving the site, perform the following:</p> <ol style="list-style-type: none"> 1. Press the <Quit> key. 2. With the MANUAL/AUTOMATIC operation selector switch in the Manual position, recouple both operators to their associated Mini-Rupter Switches. 3. Place the MANUAL/AUTOMATIC operation selector switch in the Automatic position. 4. Confirm both SOURCE VOLTAGE lamps and the READY lamp are illuminated. (If the READY lamp is not lit, refer to the display on the control. When not being used to show menu information, this display shows messages explaining why the lamp is not lit.) 5. Close and padlock all doors.

^① If the source-transfer pad-mounted gear being inspected does not operate as indicated in these inspection recommendations, refer to the Micro-AT troubleshooting guide, S&C Instruction Sheet 515-520. If further assistance is needed, contact the nearest S&C Sales Office.

Have the complete catalog number of the gear, date of shipment (as shown on the nameplate), operating characteristics, and voltage-, current-, and time-related operating parameters available for reference.

Table 2. Inspection Procedures for Pad-Mounted Gear Equipped with AT-12 Source-Transfer Control^①

Item	Procedures
Voltage-sensor signal adjustments and measurements	<ol style="list-style-type: none"> Place the MANUAL/AUTOMATIC operation selector switch in the Manual position, and decouple both operators from their associated Mini-Rupter Switches. <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <p>NOTICE</p> <p>Switching operations will result in temporary service interruptions if the operators are coupled</p> </div> <ol style="list-style-type: none"> Measure the voltage-sensor signal for each phase of the preferred source and alternate source using a voltmeter having an input impedance of at least 5000 ohms per Volt. If the measured voltage differs from 2.5 Volts, “scrub” the associated potentiometer by rotating the adjustment screw back and forth 10 to 12 times. Then, adjust the setting to obtain a 2.5-Volt reading. Note: A 2.5-Volt voltage-sensor signal is appropriate only when the system is at nominal voltage. If the system voltage is higher or lower than the nominal voltage, the required voltage-sensor signal is $2.5 \text{ Volts} \times \text{actual system voltage} \div \text{nominal system voltage}$.
Switch operators	<ol style="list-style-type: none"> With the MANUAL/AUTOMATIC operation selector switch in the Manual position, open the preferred-source operator by pressing the appropriate OPEN pushbutton. After opening, the operator should recharge in less than 25 seconds. Close the alternate-source operator by pressing the appropriate CLOSE pushbutton. This operator should also recharge in less than 25 seconds. Return both operators to their original positions.
Time delay on loss of source and return of source (“62P,” “62A,” and “2P” Timers)	<ol style="list-style-type: none"> Place the MANUAL/AUTOMATIC operation selector switch in the Automatic position and note the position of the AUTOMATIC/HOLD RETURN selector switch. If the AT-12 control is in the Automatic Return mode: <ol style="list-style-type: none"> Simulate a prolonged loss of preferred-source voltage by pressing and holding in the SIMULATE-LOSS-OF-SOURCE test switch for the preferred source. Verify the time to initiate transfer is within $\pm 20\%$ of the setting on the “62P” timer. Also confirm the SOURCE VOLTAGE lamp for the preferred source extinguishes. Now, release the test switch to simulate a return of the preferred-source voltage. Verify the time to initiate back transfer is within $\pm 20\%$ of the setting on the “2P” timer. Confirm the SOURCE VOLTAGE lamp for the preferred source relights. If the AT-12 control is in the Hold Return mode: <ol style="list-style-type: none"> Simulate a prolonged loss of preferred-source voltage by pressing and holding in the SIMULATE-LOSS-OF-SOURCE test switch for the preferred source. Verify the time to initiate transfer is within $\pm 20\%$ of the setting on the “62P” timer. Also confirm the SOURCE VOLTAGE lamp for the preferred source extinguishes. Release the test switch to simulate a return of the preferred-source voltage, and wait a sufficient length of time to verify back transfer does not occur. Confirm the SOURCE VOLTAGE lamp for the preferred source relights. Now, simulate a loss of alternate-source voltage by pressing and holding in the SIMULATE-LOSS-OF-SOURCE test switch for the alternate source. Verify the time to initiate back transfer if within $\pm 20\%$ of the setting on the “62A” timer. Confirm the SOURCE VOLTAGE lamp for the alternate source extinguishes, and then release the test switch.
Optional Overcurrent Lockout feature	<ol style="list-style-type: none"> With the MANUAL/AUTOMATIC operation selector switch in the Automatic position, simulate a fault cleared by feeder fuses by momentarily pressing the SIMULATE-OVERCURRENT test switch for the preferred source. Verify the OVERCURRENT-LOCKOUT lamp lights for a period within $\pm 20\%$ of the setting on the “62LR” timer. Now, simulate a lockout resulting from a fault cleared by a source-side protective device. To accomplish this, press the SIMULATE OVERCURRENT test switch for the preferred source and confirm the OVERCURRENT-LOCKOUT lamp lights. Then, press and hold in the associated SIMULATE-LOSS-OF-SOURCE test switch. Release the test switch when the preferred-source operator opens and verify the alternate-source operator remains open and locked out. Place the MANUAL/AUTOMATIC operation selector switch in the Manual position, and press the OVERCURRENT-LOCKOUT RESET pushbutton to cancel the Lockout condition. Confirm the OVERCURRENT-LOCKOUT lamp extinguishes. Then, close the preferred-source operator by pressing the appropriate CLOSE pushbutton.
Before leaving the gear...	<p>So the AT-12 control is ready for automatic operation when leaving the site, perform the following:</p> <ol style="list-style-type: none"> With the MANUAL/AUTOMATIC operation selector switch in the Manual position, recouple both operators to their associated Mini-Rupter Switches. Place the MANUAL/AUTOMATIC operation selector switch in the Automatic position. Confirm both SOURCE VOLTAGE lamps and the READY lamp are illuminated. (If the READY lamp is not lit, refer to the conditions required to light the READY lamp listed on the label above the control.) Close and padlock all doors.

^① If the source-transfer pad-mounted gear being inspected does not operate as indicated in these inspection recommendations, contact the nearest S&C Sales Office. Have the complete catalog number of the

gear, date of shipment (as shown on the nameplate), operating modes, and timer settings.

 **WARNING**

When access to high-voltage compartments is required, it should be restricted to qualified persons who observe the following procedures:

- Adhere to prescribed safety rules at all times.
- Be certain fuses, Mini-Rupter Switches, their mechanisms, and any other devices are disconnected from all power sources and are grounded before that device is inspected, serviced, or repaired.
- Discharge all stored-energy switch operators by using the manual operating handle.
- Always assume both sets of terminals on any Mini-Rupter Switch or fuse are energized unless proven otherwise by test, by visual evidence of open-circuit conditions on both terminal ends, or by grounding.
- All voltage sensors must be disconnected when external voltage is used to test any secondary-side wiring or devices to avoid energizing the high-voltage conductors through the voltage sensors. To disconnect the voltage sensors, transfer the input plug from the input receptacle to the shorting receptacle.
- Test for voltage. Qualified persons should be certain they have and know how to operate the correct test equipment for determining the voltage on both sets of terminals on any fuse or interrupter switch.
- After the gear has been completely disconnected from all sources of power and tested, properly connect suitable grounding leads to both sides of the equipment, that is, to the incoming and outgoing phases of the equipment to be maintained.
- Install dual-purpose front barriers, if furnished, in the **Slide In** position. ● If a contact on either side of a barrier is energized, do not leave the barrier in the **Slide In** position for longer than one week. These barriers are intended for temporary use only to isolate the blades of the switch from the main contacts while work is being performed. If the barriers are left in the “slide-in” position for extended periods of time, there is the possibility of corona discharge to the barriers. Prolonged exposure to corona discharge may damage the barriers and result in a flashover.

- When the equipment to be inspected is not of S&C manufacture, follow instructions supplied by the manufacturer of the equipment.
- Make certain the enclosure is properly grounded to the station or facility ground. No equipment should be returned to service unless such grounds are properly made.

Note: Occasionally, low-voltage components may require maintenance. The maintenance of low-voltage components isolated from high-voltage compartments may be performed under the safety rules for equipment rated 600 Volts or less. If maintenance is to be performed on devices connected to the secondary of a voltage sensor, short-circuit the secondary connections. A separate drawing will be provided with any replacement part explaining how to properly short-circuit the secondary connections.

When returning the equipment to service, the following procedures should be observed:

- Withdraw any dual-purpose front barriers, if furnished, from the **Slide In** position and return them to their normal, suspended position.
- Make sure fuses (or switch blades instead of fuses) are closed and securely latched.
- Make sure any grounding means are removed before energizing the associated Mini-Rupter Switch or fuse.
- Close each door permitting access to high voltage and make sure the associated door latching mechanisms are securely latched before energizing the circuit or operating any switching device.
- Make sure the input plug is in the input receptacle.
- Make sure the Mini-Rupter Switches are in the correct **Open** or **Closed** positions as dictated by the electric power system design.
- Padlock all doors before leaving the installation site, even momentarily. Observe this procedure even in those cases where the gear is accessible only to qualified persons.

● Dual-purpose front barriers for switches and fuses are optional on units shipped before September 1994. They became standard after September 1994.

Inspection Procedures

NOTICE

Do not use industrial strength cleaning solutions (e.g., Formula 409®, Simple Green®) or lubricants that contain solvents. Solvent vapors can attack arc compressor components and fuse pull-rings, resulting in reduced interrupting performance or weakened parts. NYE Rheolube 368 (available in small ¼-oz. tubes from S&C) is the only approved lubricant.

Table 3. Inspection and Maintenance Procedures for the Enclosure and for Components in High-Voltage Compartments^①

Item	Procedures																			
Inspect and clean interior	<ol style="list-style-type: none"> 1. Visually inspect the interior of each compartment for excess dirt, weeds, rodent, reptile, and insect intrusion. 2. If cleaning is necessary, S&C recommends using water to wash dirty or contaminated surfaces. Mild soap may be used to remove particularly stubborn deposits on painted surfaces, barriers, and Cypoxy™ Insulator parts. 3. Inspect insulators, surge arrestors, terminators, etc., for physical or electrical damage. 4. Check that gasketing around the low-voltage compartment is securely affixed and grouting around the base of the unit is in good condition. Verify there has been no major water ingress. 																			
Inspect barriers and minimum air clearances	<ol style="list-style-type: none"> 1. Inspect barriers for signs of tracking and corona discharge. Surface deposits can be wiped off. If surface erosion is present, the barriers may need to be replaced. 2. Verify interphase and end-barriers hang vertically and retaining hardware securely holds them in place. Be sure the switch-side interphase barriers are properly seated in the support notch (if present) in the lower rear and lower front (25 kV only) of the compartment. 3. Verify the clearance from the terminators and other energized parts to the barriers and electrical ground is maintained to prevent flashover (e.g., fuse silencer to terminator drain wire). Minimum air clearances are listed below: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #D3D3D3;"> <th rowspan="2">Rating, kV</th> <th colspan="4">Minimum Air Clearances, Inches (mm)</th> </tr> <tr style="background-color: #D3D3D3;"> <th>Energized Parts to Barriers</th> <th>Terminator Skirts to Barriers</th> <th>Energized Parts to Elec. Ground</th> <th>Phase-to-Phase</th> </tr> </thead> <tbody> <tr> <td>14.4</td> <td>1 (25)</td> <td>½ (13)</td> <td>6 (152)</td> <td>6 (152)</td> </tr> <tr> <td>25</td> <td>2¼ (57)</td> <td>1¼ (32)</td> <td>7½ (191)</td> <td>7½ (191)</td> </tr> </tbody> </table> 	Rating, kV	Minimum Air Clearances, Inches (mm)				Energized Parts to Barriers	Terminator Skirts to Barriers	Energized Parts to Elec. Ground	Phase-to-Phase	14.4	1 (25)	½ (13)	6 (152)	6 (152)	25	2¼ (57)	1¼ (32)	7½ (191)	7½ (191)
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Inspect and exercise Mini-Rupter Switches	<ol style="list-style-type: none"> 1. Exercise the Mini-Rupter Switches and check all blades for proper opening and closing. Make sure barriers are not in an open gap. 2. Inspect, clean, and re-lubricate the Mini-Rupter Switches. <ol style="list-style-type: none"> a. Check blades for signs of galling and excessive arc interruption. Minor surface imperfections can be burnished out. Clean the blades and apply a thin layer of lubricant, as necessary. b. Clean rotating hinge contacts and apply a thin layer of lubricant, as necessary. c. Check contacts and joints for signs of overheating, as evidenced by distorted or discolored metal.● <p>Note: S&C recommends the cleaning and re-lubrication of Mini-Rupter Switches every 10 years, regardless of condition, to ensure proper operation, or more frequently if the environment is excessively hot, humid, dry, dirty, or contaminated.</p> 																			
Inspect fuses	<ol style="list-style-type: none"> 1. Open and close fuses to ensure proper latching. Refer to the applicable S&C instruction sheet for fuse handling instructions. 2. Inspect the fuse contact surfaces for signs of galling and overheating, as evidenced by distorted or discolored contacts.● Minor imperfections can be burnished out. Clean contacts and apply a thin layer of lubricant, as necessary. 																			
Inspect key interlock and door latching mechanisms	<ol style="list-style-type: none"> 1. Verify proper functioning of key interlocks, if furnished. 2. Verify proper operation of the door latching mechanisms. 																			
Touch up exterior	<ol style="list-style-type: none"> 1. To maintain the original integrity of the finish, clean the exterior of the gear and touch up scratches and abrasions using S&C touch-up finish and red-oxide primer, available in aerosol spray cans. See Table 16 in S&C Specification Bulletin 663A-31 for catalog number information used for ordering. 																			

^① If maintenance is required beyond the scope of this publication or if replacement parts are necessary, contact the nearest S&C Sales Office. Have the complete catalog number of the gear and date of shipment (as shown on the nameplate) available for reference.

● There may be discoloration of copper or copper alloy surfaces caused by oxidation. This, however, does not indicate overheating.